Committee Report

CONSENT CALENDAR

February 19, 2021

HOUSE OF REPRESENTATIVES

REPORT OF COMMITTEE

The Committee on Science, Technology and Energy to which was referred HB 225,

AN ACT relative to the calculation of net energy metering payments or credits. Having considered the same, report the same with the following resolution: RESOLVED, that it is INEXPEDIENT TO LEGISLATE.

Rep. Fred Plett

FOR THE COMMITTEE

Original: House Clerk
Cc: Committee Bill File

COMMITTEE REPORT

Committee:	**Science, Technology and Energy**
Bill Number:	**HB 225**
Title:	**relative to the calculation of net energy metering payments or credits.**
Date:	**February 19, 2021**
Consent Calendar:	**CONSENT**
Recommendation:	**INEXPEDIENT TO LEGISLATE**

STATEMENT OF INTENT

This bill would reduce payments for excess net metering from default service energy rates (in the nine-cent range) to locational marginal pricing - wholesale rates (about 3 cents per kWh), while allowing an increase in the maximum generator size from 1 to 2 MW. It would also require the excess sale to the utility to appear as a monetary credit on future bills, thus avoiding any net sale to the utility over time. The committee voted this as Inexpedient to Legislate due to the complexity and the shortage of time to deal on the floor this session with controversy. It may resurface in the future in some form.

Vote 21-0.

Rep. Fred Plett
FOR THE COMMITTEE

Original: House Clerk
Cc: Committee Bill File

CONSENT CALENDAR

Science, Technology and Energy
HB 225, relative to the calculation of net energy metering payments or credits. **INEXPEDIENT TO LEGISLATE.**
Rep. Fred Plett for Science, Technology and Energy. This bill would reduce payments for excess net metering from default service energy rates (in the nine-cent range) to locational marginal pricing - wholesale rates (about 3 cents per kWh), while allowing an increase in the maximum generator size from 1 to 2 MW. It would also require the excess sale to the utility to appear as a monetary credit on future bills, thus avoiding any net sale to the utility over time. The committee voted this as Inexpedient to Legislate due to the complexity and the shortage of time to deal on the floor this session with controversy. It may resurface in the future in some form. **Vote 21-0.**

Original: House Clerk
Cc: Committee Bill File

Archived: Tuesday, May 11, 2021 11:53:46 AM
From: Michael Vose
Sent: Saturday, March 13, 2021 11:39:00 AM
To: Carrie Morris
Cc: Jennifer Foor
Subject: Fw: Committee Reports needed
Importance: Normal

Another one.

--Rep. Michael Vose, Chair
Science, Technology, & Energy Committee
Rockingham District 9
Epping, NH

From: Michael Vose <Michael.Vose@leg.state.nh.us>
Sent: Saturday, March 13, 2021 11:37 AM
To: Michael Vose <Michael.Vose@leg.state.nh.us>
Subject: Re: Committee Reports needed

Here's another one:

HB225
Rep. Fred Plett for ST&E
HB225 would reduce payments for excess net metering from default service energy rates (in the nine-cent range) to locational marginal pricing - wholesale rates (about 3 cents per kWh), while allowing an increase in the maximum generator size from 1 to 2 MW. It would also require the excess sale to the utility to appear as a monetary credit on future bills, thus avoiding any net sale to the utility over time. The committee voted this as ITL due to the complexity and the shortage of time to deal on the floor this session with controversy. It may resurface in the future in some form.

--Rep. Michael Vose, Chair
Science, Technology, & Energy Committee
Rockingham District 9
Epping, NH

From: Michael Vose <Michael.Vose@leg.state.nh.us>
Sent: Saturday, March 13, 2021 10:33 AM
To: Carrie Morris <carrie.morris@leg.state.nh.us>
Cc: Jennifer Foor <Jennifer.Foor@leg.state.nh.us>
Subject: Re: Committee Reports needed

Carrie,

Here's a start.

HB399 ITL

Rep. Doug Thomas for of Science, Technology, & Energy.
This bill would have changed the focus of the NH energy reduction goal to greenhouse gas emissions instead of fossil fuels, but after consultation with the Department of Environmental Services, the sponsor found this is already being done and is no longer needed. Therefore, the sponsor's request to ITL was recommended 20-0.

HB373 ITL
Rep. Jeanine Notter for the Majority of Science, Technology, & Energy.
In 2012, the New Hampshire legislature passed a law requiring the State to seek legislative approval before entering any program that would implement a low carbon fuel standard or any cap-and-trade scheme for transportation fuels but allowed DES to continue to participate in the development of such plans. Those plans resulted in the Transportation Climate Initiative, a major back door gas and diesel tax increase that would tie future gas tax hikes to an unelected board. TCI is RGGI for vehicles. This participation through the end of 2020 has cost the state nearly $50,000 and utilized 811 staff hours that could have been spent giving better services to our residents and employers. After Governor Sununu made clear that New Hampshire would not participate in TCI, DES still spent 21 staff hours on the project in 2020. HB 373, as amended, would require DES to get specific approval from the Governor in order to keep tabs on the TCI, so that we can ensure that valuable taxpayer resources are maximized and not wasted.

HB168 ITL
Rep. Jeanine Notter for the Majority of Science, Technology, & Energy.
This bill would force New Hampshire consumers to follow California's Low Emissions/Zero Emissions vehicle (LEV/ZEV) standards. It also makes an appropriation to the Department of Environmental Services to fund an additional position. Passing a ZEV mandate is not what creates a viable ZEV or LEV marketplace. Legislation such as this has not changed consumers' buying habits in neighboring states. Maine has 1.2% registered electric vehicles. Rhode Island has 1.4%, while NH stands at 1.0% without a mandate. During the hearing, the majority questioned the process that goes into the making of an electric vehicle battery: Where and how are the raw materials, like lithium and cobalt, mined? Aren't fossils fuels used in the process to get the raw materials from the mine, to the factory, to the automobile sales lot? How much do these batteries weigh and how are they disposed of when they are no longer in service? These questions aside, the free-market economy works. If there is a demand for more LEV/ZEV vehicles, the market will respond. We received testimony that automakers are spending billions in research and development to sell more electric vehicles.

HB 396 ITL
Rep. Troy Merner for the Majority of Science, Technology, & Energy.
This bill would require the public utilities commission to report its estimate of total yearly production for customer cited sources that are not net metered but are not issued renewable energy certificates and removes the credit to the electrical provider. This practice is known as REC sweeping and eliminating it would increase electricity costs.

HB294 ITL
Rep. J D Bernardy for Science, Technology and Energy. This bill is substantially equivalent to HB1262 which was rejected last session to allow necessary revisions. No revisions were incorporated into the resubmitted bill. The bill as written would likely require significantly more activity by the offices of the Consumer Advocate, Attorney General, and the Public Utility Commission to address contractual issues in an unregulated limited producer sector, potentially requiring additional staffing.

HB206 is not one of our bills.

I will send minority reports in a separate email.

--Rep. Michael Vose, Chair
Science, Technology, & Energy Committee
Rockingham District 9
Epping, NH

From: Carrie Morris <carrie.morris@leg.state.nh.us>
Sent: Thursday, March 11, 2021 8:20 AM
To: Michael Vose <Michael.Vose@leg.state.nh.us>
Cc: Jennifer Foor <Jennifer.Foor@leg.state.nh.us>
Subject: Committee Reports needed

Good Morning, I have dissected the executive minutes and these are the reports that I see at the moment that I will need:

HB168 Majority- Notter   Minority- McWilliams
HB225 Majority – Plett
HB289 Majority – Harrington
HB206 Majority – Bernardy
HB309 Majority – Harrington
HB315 Majority – Vose
HB351 Majority – Thomas   Minority – McGhee
HB373 Majority – Notter   Minority - ??
HB396 Majority – Merner   Minority – Oxenham
HB399 Majority – Thomas
HB407 Majority – White   Is there a minority?

You can send these anytime, I can do them one at a time

Carrie

Voting Sheets

HOUSE COMMITTEE ON SCIENCE, TECHNOLOGY AND ENERGY

EXECUTIVE SESSION on HB 225

BILL TITLE: relative to the calculation of net energy metering payments or credits.

DATE: February 19, 2021

LOB ROOM: 206 Hybrid

MOTIONS: **INEXPEDIENT TO LEGISLATE**

Moved by Rep. Plett Seconded by Rep. White Vote: 21-0

CONSENT CALENDAR: YES

Statement of Intent: Refer to Committee Report

Respectfully submitted,

Rep Fred Plett, Clerk

HOUSE COMMITTEE ON ______Science, Technology and Energy

EXECUTIVE SESSION ON HB __225_________

BILL TITLE:

DATE: February 19, 2021

LOB ROOM: 206

MOTION: (Please check one box)

☐ OTP ☐x ITL ☐ Retain (1st year) ☐ Adoption of Amendment # ____________ *(if offered)*

☐ Interim Study (2nd year)

Moved by Rep. ___Plett____ Seconded by Rep. White Vote: __21-0_______

MOTION: (Please check one box)

☐ OTP ☐ OTP/A ☐ ITL ☐ Retain (1st year) ☐ Adoption of Amendment # ____________ *(if offered)*

☐ Interim Study (2nd year)

Moved by Rep. __________________ Seconded by Rep. ____________________ Vote: _________

MOTION: (Please check one box)

☐ OTP ☐ OTP/A ☐ ITL ☐ Retain (1st year) ☐ Adoption of Amendment # ____________ *(if offered)*

☐ Interim Study (2nd year)

Moved by Rep. __________________ Seconded by Rep. ____________________ Vote: _________

MOTION: (Please check one box)

☐ OTP ☐ OTP/A ☐ ITL ☐ Retain (1st year) ☐ Adoption of Amendment # ____________ *(if offered)*

☐ Interim Study (2nd year)

Moved by Rep. __________________ Seconded by Rep. ____________________ Vote: _________

CONSENT CALENDAR? ___x__ Yes _______ No

Minority Report? _____ Yes ___x___ No If yes, author, Rep.: _________________ Motion: _______

Respectfully submitted, Rep.____Fred Plett ___________________, Clerk

STATE OF NEW HAMPSHIRE
OFFICE OF THE HOUSE CLERK

1/22/2021 10:09:50 AM
Roll Call Committee Registers
Report

2021 SESSION

Science, Technology and Energy

Bill #: 225 **Motion:** ITL **AM #:** **Exec Session Date:** February 19, 2021

Members	YEAS	Nays	NV
Vose, Michael Chairman	x		
Thomas, Douglas W. Vice Chairman	x		
Harrington, Michael D.	x		
Notter, Jeanine M.	x		
Merner, Troy E.	x		
Plett, Fred R. Clerk	x		
Berezhny, Lex	x		
Bernardy, JD	x		
Cambrils, Jose E.	x		
Ploszaj, Tom	x		
White, Nick D.	x		
Somssich, Peter F.	x		
Cali-Pitts, Jacqueline A.	x		
Mann, John E.	x		
Oxenham, Lee Walker	x		
Vincent, Kenneth S.	x		
McGhee, Kat	x		
McWilliams, Rebecca J.	x		
Chretien, Jacqueline H.	x		
Pimentel, Roderick L.	x		
Parshall, Lucius	x		

1/22/2021 10:09:50 AM
Roll Call Committee Registers
Report

2021 SESSION

Science, Technology and Energy

Bill #: 225 **Motion:** ITL **AM #:** **Exec Session Date:** February 19, 2021

TOTAL VOTE:	21	0	

Hearing Minutes

HOUSE COMMITTEE ON SCIENCE, TECHNOLOGY AND ENERGY

PUBLIC HEARING ON HB 225

BILL TITLE: **relative to the calculation of net energy metering payments or credits.**

DATE: **February 19, 2021**

LOB ROOM: **303 Hybrid** **Time Public Hearing Called to Order:** **1:00 p.m.**

Time Adjourned:

<u>Committee Members</u>: **Reps. Vose, Thomas, Plett, Harrington, Notter, Merner, Berezhny, Bernardy, Cambrils, Ploszaj, White, Somssich, Cali-Pitts, Mann, Oxenham, Vincent, McGhee, McWilliams, Chretien, Pimental and Parshall**

<u>Bill Sponsors</u>:
Rep. Plett

TESTIMONY

* Use asterisk if written testimony and/or amendments are submitted.

Rep: Fred Plett – will ITL bill.

Joseph Kwasnik: HB 225 increases capacity, dramatically cuts payments. Renewables lower carbon, transmission, distribution. Renewables are load reduction.

Rep. Sommsich: Diffgerence in price? Price paid to solar is now default, wholesale. Sommsich: do you know difference? Wheolsale 3-4 cents, 8-10 cents per kWh default.

Doria Brown, Nashua – 2 hydro, profit hit to community. Also solar will take a hit.

Clifton Below: Concur that net metered generation should be load reducers. Liberty 8 cents per kWh. 90% cost of energy, 10% covers Liberty costs.

Heidi Kroll – Granite State Hydro Power Association. Concur ITL. PUC nearing end of expanded process establishing value. Started in 2017.

Rep: Cali-Pitts. Docket # DE 16-576.

Rep. Oxenham: Public health costs of existing gen. Do you have available health benefits?
Ms. Kroll – don't have readily available.

Rep McGhee: Describe process for stakeholder process. Can try – Legislature HB 116 directed PUC to establish value of net metering 2.0. Final study February 2022.

Madeline Mineau Clean Energy NH. Echo other comments. We tasked PUC to look at net metering costs and avoid undue cost shifting,
Should protect previous investors, not pull rug out.

Mayor James Donchess: Madeline used to work for city as water works manager. Testimony brief, in support of net metering,

Rep Sommsich: question for Madeline Mineau – health benefits impact? Commissioned report on value of net metering but did look at SO_2, NOx, etc. value of 1 cent per kWh. Also looked at CO_2 avoidance.

Rep Oxenham: Hoping to speak on why worthwhile.

Rep: Parshall – 2016 had a change in calculation of net metering. In 2016 small net metering used to get full retail credit. That was changed to default service and 25% of distribution, Larger get default service. There is a lot of restrictions, so they make sure they are under 100 kW. Parshall – compare to other states> Ours are more conservative. ME used to be like us but they ramped up. Sommsich: Difference between solar large and small. Is there benefit to see large or small? Each have their purposes.

Rep Harrington: How about disadvantage since no obligation to perform? ISO-NE quite good based on weather forecast at managing grid.

Rep Pimental: Germane to this bill. What parameters does PUC look at? Specific parameters to look at? Fair value, no undue cost shift, etc. Series of pilots and studies, including locational value.

Rep Pimental: Does rate come close to compensating? No. Not at all close.

Rep McGhee: Parameter locational value. Say something about that. If can concentrate in certain areas, can be a non-wires alternative.

HOUSE COMMITTEE ON SCIENCE, TECHNOLOGY AND ENERGY

PUBLIC HEARING on Bill # ______225__________________

BILL TITLE:
DATE: _February 19, 2021____________________________

ROOM: **Time Public Hearing Called to Order: ___1:00__________**

Time Adjourned: _____________

(please circle if present)

__Committee Members__: **Reps. Vose, Thomas, Plett, Harrington, Notter, Merner, Berezhny, Bernardy, Cambrils, Ploszaj, White, Somssich, Cali-Pitts, Mann, Oxenham, Vincent, McGhee, McWilliams, Chretien, Pimental and Parshall**

All present

TESTIMONY

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Rep: Fred Plett – will ITL bill.
Joseph Kwasnik: HB 225 increases capacity, dramatically cuts payments. Renewables lower carbon, transmission, distribution. Renewables are load reduction.
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Sommsich: Difference between solar large and small. Is there benefit to see large or small? Each have their purposes.
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Pimental: Does rate come close to compensating? No. Not at all close.
McGhee: Parameter locational value. Say something about that. If can concentrate in certain areas, can be a non-wires alternative.

House Remote Testify

Science, Technology and Energy Committee Testify List for Bill HB225 on 2021-02-19

Support: 127 Oppose: 2 Neutral: 1 Total to Testify: 3

Name	City, State Email Address	Title	Representing	Position	Testifying	Signed Up
Kroll, Heidi	kroll@gcglaw.com	A Lobbyist	Granite State Hydropower Association	Oppose	Yes (6m)	2/16/2021 3:05 PM
Donchess, James	Nashua, NH donchessj@nashuanh.gov	An Elected Official	Nashua	Oppose	Yes (5m)	2/17/2021 4:49 PM
Mineau, Madeleine	Concord, NH madeleine@cleanenergynh.org	A Lobbyist	Clean Energy NH	Oppose	Yes (3m)	2/18/2021 11:14 AM
Below, Clifton	Lebanon, NH Clifton.Below@LebanonNH.gov	An Elected Official	City of Lebanon	Oppose	Yes (3m)	2/18/2021 3:45 PM
Brown, Doria	Nashua, NH brownd@nashuanh.gov	A Member of the Public	City of Nashua	Oppose	Yes (2m)	2/18/2021 11:18 AM
Kwasnik, Joseph	Concord, NH jkwasnik25@gmail.com	A Member of the Public	Myself	Oppose	Yes (0m)	2/18/2021 12:48 PM
Kaufman, Judith	Cornish, NH jpk52@aol.com	A Member of the Public	Myself	Oppose	No	2/18/2021 1:16 PM
Minihan, Jeremiah	Rochester, NH Jeremiah.minihan@gmail.com	A Member of the Public	Myself	Support	No	2/18/2021 1:17 PM
Carole, Kimberly	Bedford, NH Mskimberlycarole@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 1:34 PM
Storrs, Caroline	Cornish, NH pcstorrs@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 1:43 PM
Terai, Shideko	Cornish, NH mary.n.boyle@gmail.com	A Member of the Public	Myself - resident of NH	Oppose	No	2/18/2021 1:57 PM
Stock, Jasen	Concord, NH jstock@nhtoa.org	A Lobbyist	NH Timberland Owners Association	Oppose	No	2/18/2021 2:09 PM
King, Walter	Dover, NH genedocwk@comcast.net	A Member of the Public	Myself	Oppose	No	2/18/2021 11:11 PM

Maynard, Richard	Manchester, NH maynardrick@outlook.com	A Member of the Public	Myself	Oppose	No	2/19/2021 12:02 AM
Lanigan, Cathy	Peterborough, NH Clanigan@comcast.net	A Member of the Public	Myself	Oppose	No	2/18/2021 2:56 PM
Moffett, Howard	Canterbury, NH howard.m.moffett@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 3:32 PM
longley, margaret	sandwich, NH peggylongley@sbcglobal.net	A Member of the Public	Myself	Oppose	No	2/18/2021 3:41 PM
Nickerson, Lana	Eaton Center, NH fossmtnfarm@msn.com	A Member of the Public	Myself	Oppose	No	2/17/2021 6:00 PM
Smith, Ruth	Canterbury, NH ruthnaturally234@gmail.com	A Member of the Public	Myself	Oppose	No	2/17/2021 8:50 PM
Cutshall, Catherine	Bedford, NH vivadofamily@aol.com	A Member of the Public	Myself	Oppose	No	2/17/2021 11:08 PM
Vivado, Mauricio	Bedford, NH maumojo@aol.com	A Member of the Public	Myself	Oppose	No	2/17/2021 11:09 PM
Parmele, Victoria	NORTHWOOD, NH victoria.willow7@gmail.com	A Member of the Public	Myself	Oppose	No	2/17/2021 11:09 PM
hatch, sally	Concord, NH sallyhatch@comcast.net	A Member of the Public	Myself	Oppose	No	2/18/2021 7:37 AM
Bushueff, Catherine	Sunapee, NH agawamdesigns@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 5:20 AM
Warren, Joan	Warner, NH joanbcwarren@gmail.com	A Member of the Public	Myself	Support	No	2/18/2021 11:00 AM
Heard, virginia	Center Sandwich, NH vlheard151@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 11:06 AM
Donovan, Julie	BEDFORD, NH julie.donovan@juno.com	A Member of the Public	Myself	Oppose	No	2/18/2021 6:16 AM
Graham, Nancy	West Lebanon, NH nancygraham806@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 6:30 AM
Keen, Rangi	Plainfield, NH nh@buenokeen.com	A Member of the Public	Myself	Oppose	No	2/18/2021 6:31 AM
Minton, Faith	Warner, NH minton.faith@gmail.com	A Member of the Public	Myself	Support	No	2/18/2021 6:55 AM
Gordon, Laurie	Weare, NH Lmgord23@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 7:59 AM

Redding, Michael	PORTSMOUTH, NH michael@nesolargarden.com	A Member of the Public	Myself	Oppose	No	2/18/2021 8:16 AM
Jones, Stephanie	Bedford, NH stephaniermjones@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 8:19 AM
Crosby, Peter	meredith, NH clewmutt2@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 8:31 AM
Thorndike, Katherine	North Sandwich, NH khthorndike@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 8:50 AM
McKenzie, David	Bennington, NH mckenzied@tds.net	A Member of the Public	Myself	Oppose	No	2/18/2021 8:51 AM
House, Don	Belmont, NH donhouse@metrocast.net	A Member of the Public	Myself	Oppose	No	2/18/2021 9:06 AM
Beck, Gerald	Holderness, NH bentrimone@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 9:17 AM
Keating, Sally	NEW LONDON, NH sck154@gmail.com	A Member of the Public	Myself	Support	No	2/18/2021 9:41 AM
Hope, Lucinda	Tilton, NH lmhope46@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 9:43 AM
Clark, Denise	Milford, NH denise.m.clark03055@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 9:43 AM
Poor, Daniel	Cornish, NH dpoor45@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 9:57 AM
Diamond, Maureen	Tamworth, NH maureeninoregon@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 11:50 AM
Martin, Patricia	Rindge, NH pmartin2894@yahoo.com	A Member of the Public	Myself	Oppose	No	2/18/2021 11:54 AM
Heard, Lisa	Center Sandwich, NH lisaheardd onald@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 2:23 PM
Creer, David	Concord, NH dcreer@BIAofNH.com	A Lobbyist	BIA	Support	No	2/18/2021 2:51 PM
Rung, Rosemarie	MERRIMACK, NH rosemarie.rung@leg.state.nh.us	An Elected Official	Myself	Oppose	No	2/18/2021 6:17 PM
Knox, Jean	Center Sandwich, NH Jeanmknox@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 6:20 PM
Nichols, Martha	SANDWICH, NH martha.nichols.coach@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 7:01 PM

Shedd, Ann	Keene, NH ladyleafy@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 7:04 PM
Mess, Mark	Keene, NH 1nhmoose@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 7:05 PM
White, David	Sandwich, NH whitesforestfarm@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 8:33 PM
White, Cynthia	Center Sandwich, NH cc.alchemy@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 8:33 PM
Worsowicz, Paul	worsowicz@gcglaw.com	A Lobbyist	Monadnock Paper Mills	Oppose	No	2/16/2021 3:11 PM
Richman, Susan	susan7richman@gmail.com	A Member of the Public	Myself	Oppose	No	2/16/2021 5:19 PM
Green, Debra	laffalot37@gmail.com	A Member of the Public	Myself	Oppose	No	2/16/2021 6:50 PM
Koch, Helmut	helmut.koch.2001@gmail.com	A Member of the Public	Myself	Oppose	No	2/16/2021 7:08 PM
Cook, Richard	r_cook@mcttelecom.com	A Member of the Public	Myself	Oppose	No	2/16/2021 8:15 PM
Spencer, Louise	lpskentstreet@gmail.com	A Member of the Public	Myself	Oppose	No	2/16/2021 10:35 PM
Spencer, Rob	kentstusa@aol.com	A Member of the Public	Myself	Oppose	No	2/16/2021 10:35 PM
Blagden, Timothy	tsblagden@gmail.com	A Member of the Public	Myself	Support	No	2/16/2021 11:22 PM
Franciscovich, Pamela	frankids@aol.com	A Member of the Public	Myself	Oppose	No	2/17/2021 4:50 AM
Mooney, Bridget	bridget@moonchick.com	A Member of the Public	Myself	Oppose	No	2/17/2021 9:52 AM
Contos, Karen	kcontos84@gmail.com	A Member of the Public	Myself	Oppose	No	2/17/2021 9:53 AM
Hayden, Sam	hayden.sam@gmail.com	A Member of the Public	Myself	Oppose	No	2/17/2021 8:07 AM
Bartlett, Susan	suebartlett@tds.net	A Member of the Public	Myself	Support	No	2/17/2021 9:08 AM
HUSBAND, RICHARD	RMHusband@gmail.com	A Member of the Public	Myself	Oppose	No	2/17/2021 9:36 AM
Miller, Patrick	perogroup@gmail.com	A Member of the Public	Myself	Oppose	No	2/17/2021 9:41 AM
Kelly, Lorraine	ltompkinskelly@gmail.com	A Member of the Public	Myself	Oppose	No	2/17/2021 9:43 AM
Davis, Kevin	kilo7delta@gmail.com	A Member of the Public	Myself	Oppose	No	2/17/2021 9:49 AM
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Raynolds, Ned	nedr64@gmail.com	A Member of the Public	Myself	Oppose	No	2/17/2021 11:26 AM
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SUTHERLAND, CLAUDE	PLAINFIELD, NH script@comcast.net	A Member of the Public	Myself	Oppose	No	2/17/2021 3:28 PM
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Moe, Carmeiita	andover, NH carmelitaymoe@outlook.com	A Member of the Public	Myself	Support	No	2/17/2021 3:45 PM
Butcher, Suzanne	Keene, NH SuzanneButcherNH@yahoo.com	A Member of the Public	Myself	Oppose	No	2/17/2021 4:17 PM
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Damon, Claudia	cordsdamon@gmail.com	A Member of the Public	Myself	Oppose	No	2/14/2021 8:59 PM
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Hackmann, Kent	hackmann@uidaho.edu	A Member of the Public	Myself	Support	No	2/15/2021 2:11 PM
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Wells, Ken	kenwells3@gmail.com	A Member of the Public	Myself	Oppose	No	2/15/2021 8:14 PM
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Carter, Robert	rcarter212@hotmail.com	A Member of the Public	Myself	Oppose	No	2/15/2021 8:27 PM
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Saum, Judith	judithsaum@gmail.com	A Member of the Public	Myself	Oppose	No	2/16/2021 6:50 AM
Brown, Morgan	mmbrown1998@gmail.com	A Member of the Public	Myself	Oppose	No	2/16/2021 9:13 AM
Brown, William	brownwd95@gmail.com	A Member of the Public	Myself	Oppose	No	2/16/2021 9:24 AM
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Nardino, Marie	mdnardino@gmail.com	A Member of the Public	Myself	Oppose	No	2/16/2021 9:33 AM
Keeler, Margaret	peg5keeler@gmail.com	A Member of the Public	Myself	Oppose	No	2/16/2021 9:44 AM
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Brown, Howard	hobro39@hotmail.com	A Member of the Public	Myself	Oppose	No	2/16/2021 9:50 AM
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Gallagher, Tim	tjgallagher13@yahoo.com	A Member of the Public	Myself	Support	No	2/16/2021 12:23 PM
Lucas, Janet	janluca1953@gmail.com	A Member of the Public	Myself	Oppose	No	2/16/2021 12:38 PM
Zaenglein, Barbara	bzaenglein@gmail.com	A Member of the Public	Myself	Oppose	No	2/16/2021 1:19 PM
Zaenglein, Eric	henley11@comcast.net	A Member of the Public	Myself	Oppose	No	2/16/2021 1:22 PM
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Buck, Jean	Hopkinton, NH jean.buck@tds.net	A Member of the Public	Myself	Support	No	2/18/2021 4:06 PM
Cramton, Karen	Concord, NH karen.cramton@puc.nh.gov	State Agency Staff	PUC	Neutral	No	2/18/2021 4:16 PM
BERK, BRUCE	PITTSFIELD, NH bruce.berk.nh@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 4:28 PM
Eaton, George	CENTER SANDWICH, NH gheaton1@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 4:39 PM
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Porter, Margaret	Center Sandwich, NH constantine.maggie@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 5:54 PM
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Strayer, Frances	NH, NH fdstrayer@gmail.com	A Member of the Public	Myself	Oppose	No	2/18/2021 8:23 PM
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Ingalls, Helen	Sandwich, NH Ingalls20007@icloud.com	A Member of the Public	Myself	Oppose	No	2/18/2021 9:20 PM
QUISUMBING-KING, Cora	Dover, NH coraq@comcast.net	A Member of the Public	Myself	Oppose	No	2/18/2021 9:20 PM
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ARONSON, LAURA	MANCHESTER, NH laura@mlans.net	A Member of the Public	Myself	Oppose	No	2/18/2021 10:03 PM
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Spielman, Kathy	Durham, NH jspielman@comcast.net	A Member of the Public	Myself	Oppose	No	2/19/2021 7:17 AM
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Testimony

ENERGY & ENVIRONMENT

THE NEED FOR ELECTRICITY RETAIL MARKET REFORMS

An innovative 21st century retail electric power market is within reach, but won't emerge until we ditch 20th century regulations.

BY MICHAEL GIBERSON AND LYNNE KIESLING

School budgets always seem tight, so you might be surprised that state regulators would seriously consider a proposal that would *increase* school operating costs by millions of dollars as part of an effort to boost monopoly electric utility profits. Yet Michigan legislators came close to adopting such a proposal in 2014 when they considered ending the state's customer choice option for retail electricity consumers.

School administrators working with the nonprofit Michigan Schools Energy Cooperative (MISEC) told legislators that retail energy choice helped them save almost $15 million in 2013. MISEC has helped Michigan schools save over $120 million since it was formed in 2000, the year the state first allowed customer choice. Eliminating customer choice meant schools would have to cut services elsewhere.

Ever since Michigan allowed retail customer choice for electric power, the state's regulated electric utilities have pushed to return to the comforts of being regulated monopolies. In 2008 the utilities convinced regulators to cap the popular option at just 10% of the market. Average retail power prices were just below the national average when customer choice began in the state, and were still below the national average in 2008. Now, however, Michigan prices are above the national average and the waiting list of retail customers wanting to choose their own electric suppliers has grown into the tens of thousands. Those whom regulation excludes from the market are clamoring for choice.

WHATEVER HAPPENED TO DEREGULATION?

The Michigan experience exemplifies the last two decades' half-hearted push into customer choice reforms for electric power. The hope of reformers in Michigan and elsewhere was to bring to electric power the same burst of innovation, better prices, and customer-oriented growth that had resulted from the deregulation of airlines, trucking, financial services, and other industries in the late 1970s and 1980s. There is some evidence that it is working, too, if you look in the right places—Michigan schools, for example.

The customer choice movement was strongest in states with especially high power prices in the 1990s, like California, New

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THINKSTOCK

York, and Massachusetts. A few moderate-priced states with well-organized industrial energy consumers, like Michigan, Ohio, and Texas, also pursued reform. If regulated monopoly was the problem, then reform meant allowing competition and giving customers the ability and responsibility to choose their own electricity supplier. By early 2001, about 20 states had begun reforms and millions of electric power consumers gained at least some freedom to choose their retail supplier.

Yet when California's newly restructured system fell apart in 2000–2001, the push for deregulation stopped faster than it started. (See "Special Report: The California Crisis," Fall 2001.) States that had not initiated reforms simply abandoned deregulatory proposals. Others froze reforms, limiting competition to a fraction of mostly industrial and commercial customers. Only 15 states continued to push for competition, more cautiously than before.

The passage of time has given us perspective on the California market meltdown, and we now have experience with retail competition from the states that stayed the course. The industry has also changed much in 20 years, with new and better technologies for power generation, communication, and coordination now available. We have a deeper understanding of the resource opportunities and environmental tasks we face, and reasons to appreciate both the role of policymakers and the wisdom behind limits placed on their reach.

It is time to take a fresh look at the case for retail electric power competition. Vast advancements in digital technology provide the basis for dramatic change in the electric power industry. For these developments to emerge, however, the distribution grid must transition from its one-directional, utility-to-consumer flow to support multi-directional flow. Homes, small businesses, office parks, and other utility customers are already shifting from pure consumers to being hosts for distributed energy resources on a small scale, with technologies like microgrids, rooftop solar, and electric vehicles. The potential for distributed generation and greater customer interaction is much larger than 20 years ago.

The technology for this transformation already exists. Computers and telecommunication technology are merging with distributed energy systems. At the leading edge, programmable thermostats have given way to smart home energy management systems that enable consumers to automate changes in their appliance and device settings. Great possibilities arise from the "internet of things," a vision of device-to-device coordination working automatically to achieve consumer goals at low cost. This vision enables smarter energy use that can produce both environmental benefits and consumer savings.

THE CHOICE BETWEEN MONOPOLY AND COMPETITION

The historical logic of utility regulation was as follows: the electric utility industry offered significant economies of scale—the larger the utility, the lower the average cost of producing power. If competition were to be permitted, the largest of the competitors could undercut its competitors and become a monopolist, and would then be in a position to raise prices and obtain excess profits. By granting a state-protected monopoly territory, the state enabled the utility to achieve economies of scale, but in exchange the state asserted authority to regulate utility rates to protect consumers.

Utility regulation also had an economy-of-scope rationale. The need for continuous close matching of the quantity of electricity produced and consumed on the grid provided significant economic and reliability benefits from vertical integration across the retail, "wires," and generation sectors of the industry. Transaction costs would have overwhelmed any early attempt to develop a large-scale local distribution system involving multiple generating companies and many competitive power retailers on an interconnected grid.

Technical advance has undermined both the economies-of-scale and economies-of-scope rationales for monopoly in electricity. For many years, building larger generating units and larger distribution networks lowered average costs. But beginning in the 1970s the trend toward lower average costs from bigger and bigger utilities came to an end. Smaller generation units were developed that were as cheap or cheaper when matched to the right location, and the recent advances in natural gas drilling that have lowered natural gas prices have amplified that trend. Advances in digital technologies have significantly reduced the transaction costs of continuous coordination among many generating firms.

Perhaps only the power delivery system—the distribution and transmission grid—still shows natural monopoly characteristics. It is no longer necessary for all power production and delivery assets to be owned and managed by a single company. Yet electricity distribution utilities are still substantially subject to monopoly-based regulation.

The internet, with all of its dynamic possibilities, was in large part made possible because telecommunication companies were freed from such monopoly-based regulation. Critical to the internet's dynamism is its openness to experimentation and learning. The internet allows permissionless innovation: within very broad technical and contractual limits, just about anyone can try just about anything.

Economic regulation, however, is fundamentally a permission-based system. Because any new development or change in regulated service requires approval from the utility commission, regulation tends to slow or stifle innovation. Legal entry barriers, bureaucratic procedures for cost recovery, and the risk aversion of both regulator and regulated, all undermine processes that enable innovation. Perhaps ironically, while the most dynamic sectors of the economy are powered electrically, the electric power industry remains largely stuck with 20th century ways of doing business. These old ways discourage innovations that could help the industry better meet the needs of 21st century electric power customers.

The public policy choice to grant monopolies to vertically integrated electric utilities always faced tradeoffs between the innovation and value that would have resulted from competition and the lower costs and more reliable supplies from a regulated monopolist. For many years, both consumers and regulated monopolies seemed better off from the system. This conclusion is no longer true. The costs of blocking competition are growing larger and the benefits smaller. The reasons to prevent customers from picking their own suppliers have faded.

What next? Delivery of electric power is likely to remain mostly a monopoly for the foreseeable future. Allowing competition to grow elsewhere requires isolating the regulated monopoly from competitive sectors. The first step, then, is to quarantine the monopoly. Second, the regulated distribution monopoly must be organized to support transactions among many suppliers and many consumers. Third, the role of utility regulators must shift from market overseer to something more akin to referee.

QUARANTINE THE MONOPOLY

What of the 15 years or so of experience with retail choice in the states that stuck with reforms after the California market disaster? The results disappoint some market advocates. While retail competition for industrial and large commercial customers is strong, at the residential level markets remain weak in most of the 15 states that allow retail choice. Only in Texas has retail rivalry been robust for residential consumers. While the reasons for weak competition are debated by industry insiders, the Texas exception is telling. Texas, much more clearly than in any other state, has "quarantined the monopoly."

The phrase "quarantine the monopoly" was devised by William Baxter, an assistant attorney general for the U.S. Department of Justice and the primary architect of the 1982 settlement of the federal government's antitrust case against the AT&T monopoly. One of Baxter's principal concerns about AT&T was that the company would have incentives and opportunity to extend its monopoly into related markets to the detriment of competition. In response, he proposed limiting the harm to competition in related markets by isolating the regulated monopoly as much as possible from these markets. This policy of quarantining the monopoly has become known as "Baxter's Law" (and also as the Bell Doctrine).

Most restructured states have failed to effectively quarantine the monopoly in electricity in large part because the incumbent monopolist's role as a default provider created a cost of entry that deterred competitors.

Texas very clearly quarantined the "wires" monopoly when it restructured its retail power market. Over most of the state, the large, vertically integrated utilities were spun off into separate energy retailers, generation resources, and wires companies. Only the wires companies retained status as regulated monopolies. Texas also chose not to have incumbent default service, which other restructured states retained and which keeps the incumbent in the retail market, even if the generation cost is a pass-through.

With these changes, competition has emerged quite robustly in Texas. Most residential customers in the competitive markets in Texas can choose from over 40 different potential retail energy providers and have over 200 different products to choose from. Over 90% of customers have switched providers at least once since competition began. Consumer products offered include both long-term and short-term fixed rates as well as variable rates, renewable content varies from a few percent to 100%, and consumers with solar panels on their property can sign up for "net metering"–style offers from competitive retail suppliers. The Public Utility Commission of Texas reports electric rates in areas open for retail competition have fallen by about 30–40% compared to the regulated price that prevailed prior to opening the market.

Most restructured states have failed to effectively quarantine the monopoly in electricity in large part because the incumbent monopolist's role as a default provider created a cost of entry that deterred competitors. In Michigan, some customers jumped at the chance to dump the former monopoly provider, but regulated "default service" rates offered by the incumbent utility made it difficult for competitive providers to gain much of a foothold.

Ohio provided for retail competition in 2001, requiring investor-owned utilities to unbundle their services and charges for generation, transmission, and distribution; customers were allowed to choose their own retail supplier. But unbundling services into affiliated companies does not provide the needed quarantine around the monopoly, and competition in Ohio has suffered because of it. After a very slow start, just over half of Ohio residential customers have switched from the utility-offered default service, but most switching has been through customer aggregation programs run by local governments rather than competitive suppliers. Municipal power purchases on behalf of end customers is a far cry from the dynamic retail marketplace needed to promote customer-serving innovations.

The results in other states vary, but a survey of ongoing state legislative and regulatory efforts suggests unhappiness with the current half-way reforms now more than 15 years old. New York, while engaged in a multi-year regulatory push to re-imagine the future of competitive retail power in the state, has simultaneously been imposing tighter, more cumbersome controls on existing competitive retail suppliers. Illinois, too, has been talking about grander visions for a dynamic future, but retains policies like incumbent default service that stifle competitive entry. Connecticut offers customer choice, but it recently banned competitive suppliers from offering contracts with market-based variable pricing.

As Baxter feared with the AT&T monopoly, states that left regulated electric monopolies in the retail supply business have seen these monopolies grow at the expense of competition. Quarantining the monopoly appears to be the single most effective approach to bringing about robust retail competition. It may be the *only* effective approach.

BUILD PLATFORM MARKETS

Once the delivery system monopoly has been quarantined from generation and retailer interests, two policy issues remain: what rules should govern regulated delivery service, and what rates should apply. The delivery company will remain a local monopoly, and therefore its terms of service and rates will continue to be regulated by the state government. To support the growth of competition and innovation, the rules and rates should be as neutral as reasonably possible with respect to producer and consumer technologies, retailer business models, and customer classes.

Environmental policy goals and other social policy goals are best dealt with directly rather than trying to engineer distribution rules to achieve policy outcomes. The regulated distribution system rules should not operate to discriminate in favor or against, say, renewable power technologies or customers with self-generation capability. Interconnection standards should be developed and harmonized across distribution utilities within a state and across states. Widespread standardization of technical requirements will minimize regulatory barriers to entry for distributed energy resources and other customer systems such as electric vehicles or residential batteries. The primary policy goal in developing such standards should be to support permissionless innovation while ensuring that customer equipment does not hamper system performance.

> *The primary goal in developing interconnection standards should be to support permissionless innovation while ensuring that customer equipment does not hamper system performance.*

The wires company is the physical platform for delivering power to and from retail customers. This physical platform should be complemented with a market platform to help buyers and sellers on the grid come together in ways that coordinate the use of the power delivery system. This local delivery system integrated with an energy market is best conceived as a platform market.

One proposal for platform market organization is the Independent Distribution System Operator (IDSO) model: an independent entity charged with planning functions and operational control of the distribution grid that is separated from ownership of the distribution system assets. The proposal resembles the integrated wholesale markets and transmission system operations of regional transmission organizations such as the New York Independent System Operator (ISO), PJM, and the Midcontinent ISO. IDSOs are recommended for distribution utilities with a high degree of distributed energy resource penetration as better able to offer non-discriminatory access and transparency while reducing market power concerns.

The IDSO split of asset ownership and control is especially critical if the distribution utility has not been well quarantined from generation and retailing interests. The critical independence is from economic interests in specific generation assets or retailer services. The rules governing the platform market and use of the grid will be important to fostering innovation.

As an illustration of this point, consider the potential of smart meters and the data they make available. Utilities frequently wish to monopolize control over customer-related data, but consumers can benefit from (carefully managed) sharing of data with energy retailers and other service providers. Smart meters can be important innovation enablers that lower costs and aid in achieving customer goals. Both the value of electrical energy to consumers and the cost to suppliers can vary dramatically over the course of a day. Smart meters can track how much electricity is flowing across the instrument throughout the day and share that information with retail suppliers and customer energy management systems, enabling more sophisticated market and energy consumption strategies. The old analog meters, read manually once a month, would block many potentially valuable business models. A smart-metered distribution utility that withholds detailed data even from the consumer can just as easily block potentially valuable services.

While most distribution utility costs reflect capital investments, reliable operation of the distribution system requires energy consumption and may involve some transactions between the distribution utility and energy suppliers (or flexible consumers). The IDSO model readily lends itself to transparent, competitive procurement processes. To the extent the distribution system does engage in the procurement of services from energy market participants, such services must be obtained through a transparent, competitive process so as to avoid creation of any conflicts of interest. The distribution platform utility should not itself be a market participant.

DISTRIBUTION UTILITY RATES

The clash of public goals can lead to politicized utility rate cases. Efficiency advocates, renewable energy supporters, and other environmental interests join industrial and commercial consumers and state consumer advocates to lobby public utility commissions into tilting the rate design one way or another. "Not-In-My-Back-Yard" activists show up to protest planned projects. Utilities want to boost their rates of return. Sometimes, regulatory decisions spill over into court cases. The consequences can be large enough to justify these efforts, but the product is not necessarily reliable power at the most reasonable cost.

Policies governing rate cases must shift to support retail competition. There are two parts to this issue: first, how costs of the regulated "wires" utility and related wholesale costs are recovered from retail power suppliers; and second, how retail power suppliers recover their expenses from end-use customers. The better the rules governing regulated utility rates, the more dynamic the retail energy market will be.

Quarantining the monopoly dramatically shrinks the rate case challenge because distribution system expenses are only one-quarter to one-third of the typical electric bill, but the remaining monopoly will still have regulated rates. Such rates should be designed to recover revenue requirements while remaining as neutral as possible toward the diverse business plans of grid users.

Decoupling the distribution utility's revenue recovery from energy sales is one step toward neutrality. Decoupling provides for periodic rate adjustments to ensure the utility recovers its revenue requirement, neither more nor less. Energy efficiency advocates promote decoupling as a way to remove a bias toward energy sales created by traditional rate designs. From the point of view of supporting competition, the value of decoupling is a way of further quarantining the monopoly. If increased throughput boosts a utility's rate of return, then the utility's interests will be biased toward some customer plans and against others. Decoupling enhances the quarantine by reducing that bias.

In addition to paying for use of the regulated grid facilities, retail power suppliers must acquire and pay for balancing energy and other distribution grid support services through the IDSO's platform market. Efficiency will be enhanced by pricing that balances energy and grid services in ways that reflect real-time conditions on the grid. The best such pricing method is distributed locational marginal pricing (DLMP). While DLMP introduces some complexity to the market, it is far superior to simpler alternatives.

To further support competition, the regulated rates and platform market expenses should be recovered from retail power suppliers rather than directly from end-use consumers. The retailer may simply pass through the utility charge as a few lines on its bill or it may bundle in the charge in some manner. Innovative approaches to consumer rates will be enhanced if the manner in which retailers pass through distribution charges is not dictated by regulators.

Individual consumers need not be exposed to continuously variable, sometimes unpredictable market prices in order to achieve economic efficiency. So long as competitive retail suppliers must cover the costs of grid-usage by their customers, retail suppliers will have the incentive to offer contracts that work to encourage efficient use of the grid. Of course, automation via transactive technologies makes dynamic prices easier for customers to manage as well.

Advanced technologies such as digital smart meters enable rate designs that send more accurate price signals for both energy use and distribution system use. Instead of the still-common bundled flat rate, competitive retail suppliers could offer customers time-of-day sensitive rates, market-price rates, and other dynamic rate designs. Some competitive retail suppliers in Texas have offered customers "free nights and weekends," policies reminiscent of early cell phone rates. Dynamic energy pricing can allow customers to lower their bills by shifting their consumption (e.g., running the dishwasher) from times of day when the grid is at its peak use and costs are high. When customers are encouraged to shift consumption away from peak, overall system efficiencies are improved, which lowers prices for even those consumers who subscribe to flat-rate services.

Automation and digital communications technology reduce transaction costs and make possible more granular, time-specific "wires" charges reflecting real-time costs of system resource use. Such an approach can promote overall system efficiencies and reduce cost-shifting among customers better than increasing fixed-cost allocations or raising demand charges—regulatory tools sometimes employed in response to growing levels of distributed energy resources.

THE ROLE OF THE REGULATOR

The role of the regulator will necessarily change. The regulator will remain engaged in cost-of-service regulation for the distribution system and therefore retain oversight over capital spending and service offerings. Standard cost-of-service rate regulation provides for a reasonable rate of return on capital investment, but it simply passes operating expenses on to customers without offering the utility other profit opportunities. As a result, regulated utilities can be biased toward "asset heavy" solutions to potential system concerns. The potential inefficiency is reduced when the regulated monopoly is limited to the wires-based portion of the system, but it remains a concern. Regulatory oversight of capital investment by the utility continues to be an important task.

However, regulator responsibility with respect to other expenses will shift toward ensuring a smoothly operating, competitive market. Most significantly, regulators will oversee the rules of the platform markets. This aspect of the regulatory mission should be guided by three interrelated principles: innovation, competition, and dynamism.

Many state regulators have found it valuable to establish online information clearinghouses for competitive retail offerings like powertochoose.org in Texas and papowerswitch.com in Pennsylvania. Centralizing and standardizing the presentation of consumer information makes it easier for customers to shop.

Such systems are not without controversy. Some competitive retail suppliers in Texas have carefully designed rate offerings to appear first in most search results, even though few customers will achieve an average rate as low as advertised. The standardization of information presented on state websites may overly focus consumer attention on price or customer ratings and inadvertently impede the ability of competitive retail suppliers to innovate on other product margins. Nonetheless, information clearinghouses appear to encourage competition.

THE RELIABILITY CHALLENGE

Utilities have pushed back against unbundling of vertically integrated companies by raising reliability issues. Reliability concerns were frequently front-and-center when retail restructuring debates began two decades ago. Similarly, with the debate over implementation of the Public Utility Regulatory Policies Act a decade and a half earlier, reliability concerns were frequently cited in defense of the established way of doing things. With each step toward competition it has become clear that reliability can be preserved on the system outside of vertically integrated monopoly control.

With the right rules governing retail markets, price signals will help coordinate customer actions and system needs. Operators should find reliability easier to manage.

Reliability remains a priority for the distribution company and for the regulator. Many reliability practices would remain the same as today, from proactive tree-trimming to participation in the electric utility industry's mutual assistance network for post-storm service restoration.

However, the information and communications technologies constituting the smart grid open up exciting possibilities. Smart grid technologies and their transactive nature mean that reliability need not be a "one size fits all" kind of service. A home energy management system could selectively turn off power to certain rooms or appliances during grid emergencies or during times of high prices, with no effort from or disruption of the homeowner. Smart grid technologies make it feasible for a retailer to offer contracts that interact with the consumer's energy management system. Rather than the coarse tools of brownouts or rolling blackouts in emergency conditions, a smoothly managed curtailment of low-value power consumption would be the first response. With the right rules governing retail markets, price signals will help coordinate customer actions and system needs; operators should find reliability easier to manage.

CONCLUSION

Can it work? Yes. While no one-size set of policies will fit everywhere, several states have shown that greater consumer choice in electric power works.

States including Pennsylvania, Maryland, and Illinois are taking further steps toward empowering consumers. In Texas, most consumers can choose from among hundreds of different power contracts featuring a range of environmental and other attributes. Consumers with residential solar can sign up for a net metering contract through a competitive retail power supplier—no contentious state policy battle necessary.

The wires remain regulated by the state utility commission, as do a number of other features of the electric industry, but within the bounds of the rules consumers find a wide range of choices. Among the innovations around the distribution edge are product offerings that bundle in smart home thermostats or other home energy management options with electric power service.

Current business models and regulatory practices governing electric utilities discourage innovation and make it more difficult for energy resources to flow to consumers in an effective, efficient, value-maximizing manner. But innovation is happening around the edges of the distribution utility, and pressure is building for a new wave of regulatory reforms.

Will such reforms boost consumer choice or lead to a more politicized electric industry? There is an opportunity to cut back monopoly power, promote greater customer choice and customer responsibility for energy production and use, and let consumers get more of what they want from the electric power industry. Building an open, competitive distribution grid will do the most to broaden the opportunities for development of an innovative, dynamic, consumer-focused electric power industry. Supporters of economic freedom should engage this reform effort. R

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THE STATE OF NEW HAMPSHIRE

BEFORE THE

PUBLIC UTILITIES COMMISISON

DE 19-197

Electric and Natural Gas Utilities

Development of a Statewide, Multi-use Online Energy Data Platform

<u>Testimony of Samuel Nash Vautier Golding</u>

On behalf of
Local Government Coalition

August 17, 2020

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I. Introduction and Qualifications

Q. Mr. Golding, would you please state your name, business address, and occupation?

A. My name is Samuel Nash Vautier Golding. My business address is 12 S. Spring Street, Concord, NH 03301. I am president of Community Choice Partners, Inc., a consultancy that specializes in the design and operation of power enterprises operating in competitive markets and is dedicated to maximizing democratic, informed decision-making in the energy industry. Our clients reflect the diversity of the energy industry and have included: city and county governments, municipal and investor owned utilities, Community Power Aggregation ("CPA") agencies, energy technology and software companies, labor unions and electrical contractor associations, and a variety of consumer advocate, environmental and social justice nonprofits.

Q. Please describe your formal education and relevant professional experience.

A. I received an undergraduate degree in International Political Economy from Colorado College in 2006. I entered the utility industry in 2007 and assumed responsibilities that focused on evaluating the performance of demand-side management programs, conducting electricity and natural gas demand-side management and demand response potential studies at the utility and state territory levels, tracking hundreds of distributed energy resource technologies and customer-facing smart grid applications emerging across organized electricity markets, and contributing to 'Utility of the Future' strategies. These experiences revealed the limitations of utility operations and state regulatory governance models in terms of responsibly managing technological change and maximizing public benefits.

In 2011, I became the managing director of the consultancy that originally created Community Choice Aggregation ("CCA"), and later founded Community Choice Partners in 2013. Based on my professional experience operating and designing CCA agencies, I created the "CCA 2.0" and "CCA 3.0" maturity models for the California CCA industry (which delineate specific structural improvements to CCA operations and joint action governance models, respectively) and helped to educate and align industry stakeholders in this capacity in California.[1]

In New Hampshire, I am informally advising a coalition of municipalities that are forming the "Community Power New Hampshire" Joint Action enterprise ("CPNH") as a means to extend sophisticated power agency operations, unbiased advice and regulatory intervention support to all Community Power Aggregations that launch throughout the state. My activities supporting the development of this initiative and market over the last year have included, in addition to direct work products: discussions and correspondence with the Governor's Office of Strategic Initiatives and Office of Consumer Advocate, legislators, regulatory professionals, local elected officials and staff; presentations to local energy committees, the Conservation Law Foundation's Municipal Roundtable, and Clean Energy New Hampshire's Local Energy Solutions conference; and briefings to Commission staff regarding the drafting of CPA market rules as well as participation in technical workshops and stakeholder meetings to discuss related matters.

Q. Have you prepared a summary of your qualifications and experience?

A. Yes. Exhibit 1 to my testimony summarizes my qualifications and experience.

Q. Have you previously submitted testimony in regulatory proceedings?

A. I have previously submitted testimony to the California Public Utilities Commission on behalf of the Utility Consumers Action Network (UCAN), a ratepayer advocacy nonprofit, in regard to San Diego Gas & Electric's Electric Procurement Revenue Requirement forecast,

[1] For example, refer to my "Community Choice 2.0 & 3.0 Tutorial Workshop" agenda: https://app.box.com/file/433445758440

with a focus on the inaccuracies in utility forecasting caused by market settlement cost shifts stemming from the inappropriate withholding of customer usage data from Community Choice Aggregators by the utility on an operational basis (Application 20-04-014).

Q. Describe your involvement in DE 19-197 up until this point.

A. I have participated actively in technical sessions and in informal conversations with stakeholders throughout this docket process. In addition, I facilitated Q&A calls for parties during which two vendors presented on their relevant experiences in other organized electricity markets. These were recorded and sent to the docket list, [2] along with a separate recording that one of the vendors had previously made for the docket list.[3]

Q. Please summarize any additional electric regulatory experience.

A. In New Hampshire, I participated in the PUC's informal workshop regarding rule drafting for Community Power Aggregation (a proceeding for which has yet to formally open), and have facilitated bilateral calls between the CPNH coalition, PUC staff, OCA, utilities, and other stakeholders regarding the rule drafting process, with a particular focus on utility data sharing and related matters.

I am also party to Case Number 14-01211 in New York (Proceeding on Motion of the Commission to Enable Community Choice Aggregation Programs), where I submitted descriptions of Community Choice operating and governance models during the initial rule drafting process, and in Docket No. 20-05-13 (Study of Community Choice Aggregation) in Connecticut, which recently opened and where I participated in the first technical workshop. In the California market, I have prepared regulatory filings for the County of Los Angeles (A.14-

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[2] Recordings available online:
https://transcripts.gotomeeting.com/#/s/38ee31a47a913e07d9059f4bc737a3bf03b154fca86543a82f293e6cc3fc2960
[3] Recording available online: https://app.box.com/s/qjkbae4skxpzxhrwkktxp1z50xvv7mhl

05-024) and for the ratepayer advocate nonprofit UCAN (R.17-06-026), both on the subject of the expansion of the Community Choice industry and corresponding market. I also protested SCE Advice Letter No. 3781-E, on the grounds that restricting access to interval usage data degrades the accuracy of Community Choice forecasting capabilities, and independently submitted to the Commission the compilation "*Energy Risk Management Policies of Community Choice Aggregators*" and the report "*The Theory and Evolution of Community Choice in California*". [4] The latter included a detailed description of Community Choice operating models along with a summary of deficient utility business processes and data access barriers that jeopardize the innovative potential and financial competitiveness of Community Choice agencies.

II. Overview of Testimony

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to provide the Commission with context regarding the current state of the competitive retail market and the new Community Power Aggregation market that will soon launch in New Hampshire, along with relevant insights regarding how fully restructured markets rely on market frameworks for governance and operations in practice, such that the Commission may make an informed decision in this docket, particularly in regard to how best to structure governance of the statewide data platform to align with electric utility restructuring mandates under RSA 374-F.

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[4] Refer to: Samuel Golding, "The Theory and Evolution of Community Choice in California", 11 June 2018. Available online: http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/Community%20Choice%20Partners_DraftGreenBookComments.pdf; and Samuel Golding, "Energy Risk Management Policies of Community Choice Agencies", 11 July 2018. Available online: http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/Community%20Choice%20Partners_CustomerChoiceSupplementalComments.pdf.

Q. Please summarize your testimony.

A. My testimony characterizes: the current state of public confidence in the utility industry; the extent and performance of the competitive retail market in New Hampshire; the structure, performance metrics and governance framework used in fully restructured competitive retail markets; my observations regarding New Hampshire's default service practices in relation to the goals of the Electric Utility Restructuring Act; recent controversies regarding utility investments in the retail value chain that structurally foreclose market-driven innovation in favor of utility-controlled innovation; the statutory authorities, business model and political drivers of CPAs and how they are naturally aligned with the development of market frameworks as called for under RSA 53-F; and the anticipated expansion and sophistication of New Hampshire's CPA market due to the rapid progress of the Community Power New Hampshire joint-action initiative.

My testimony concludes by recommending that the Commission adopt a market framework for governing the statewide data platform, for the sake of facilitating a number of reforms necessary to begin aligning New Hampshire's market structure, operational practices and utility infrastructure investment decisions with the Electric Utility Restructuring Act.

III. Detailed Discussion of the Issues and Proposed Conditions

Q. How does the establishment of a statewide, multi-use online energy data platform relate to The Electric Utility Restructuring Act (RSA 374-F)?

A. SB 284 was authorized by the Legislature explicitly "in order to accomplish the purposes of electric utility restructuring under RSA 374-F" [5] The purposes of RSA 374-F[6] include:

[5] Available online: https://legiscan.com/NH/text/SB284/id/2012441/New_Hampshire-2019-SB284-Amended.html
[6] Available online: http://www.gencourt.state.nh.us/rsa/html/XXXIV/374-F/374-F-mrg.htm

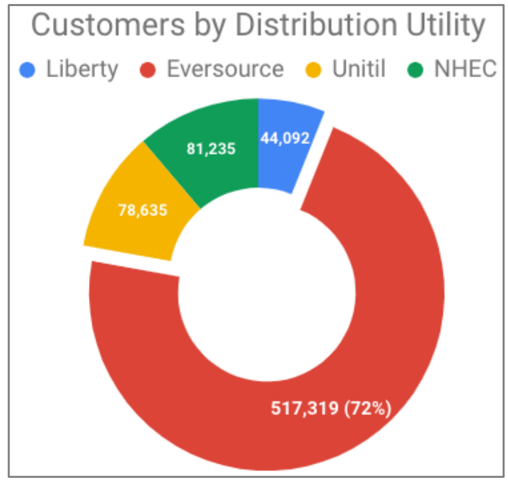
(1) The "development of competitive markets for wholesale and retail electricity services", "a more efficient industry structure and regulatory framework", and "unbundling of prices and services" as a means to these ends;

(2) Consistency with part II, article 83 of the New Hampshire constitution, specifically that "Free and fair competition in the trades and industries is an inherent and essential right of the people and should be protected against all monopolies and conspiracies which tend to hinder or destroy it.", a corresponding reliance on competitive markets to provide "incentives to operate efficiently and cleanly", "new and improved technologies " and "appropriate price signals", so as to "improve public confidence in the electric utility industry"; and

(3) The incorporation by reference to fifteen "interdependent policy principles" that were "intended to guide the New Hampshire public utilities commission" — including that the "commission should adapt its administrative processes to make regulation more efficient and to enable competitors to adapt to changes in the market in a timely manner. The market framework for competitive electric service should, to the extent possible, reduce reliance on administrative process."

I recommend that the Commission consider the statewide data platform as the backbone of the market framework called for under The Electric Utility Restructuring Act. Expansive, reliable and transparent data interchange and analysis must be sufficient to facilitate the nimble decision-making and rule changes necessary to not unduly delay innovation in market operations, and also sufficient in terms of tracking the range of metrics that the Commission and others should rely upon to analyze and support the performance of the market going forward.

Q. How would you characterize the current state of public confidence in the electric utility industry?



A. While it is difficult to provide a definitive or comprehensive answer, I can offer relevant observations regarding Eversource, which is the largest distribution monopoly in the state, as shown in the graph to the right:

I found it notable that 300 people reportedly gathered last year to celebrate the rejection of Eversource's Northern Pass Transmission project by burning a wooden effigy of a transmission tower. This is a picture from that event, published in the Union Leader:[7]

I would also direct the Commission to the article "This Means War", published in December 2019 by Don Kreis, who leads New Hampshire's Office of Consumer Advocate ("OCA").

The article pertains to Eversource's investment in retail electric meters and refers to testimony of Paul Alvarez of The Wired Group, a consultancy hired by the OCA. It reads, in part:

"We have a theory about why Eversource made such an imprudent choice, and it is not pretty. By 2013, when [Eversource] made the decision to install meters that could not provide interval usage data, it was clear that such data presented several types of

[7] Union Leader, "16-foot effigy of transmission tower burned to celebrate demise of Northern Pass," 18 August 2020. Available online: https://www.unionleader.com/news/business/energy/16-foot-effigy-of-transmission-tower-burned-to-celebrate-demise-of-northern-pass/article_f3d3e94d-2ffc-598e-8ea6-8f958cfc8e77.html

economic harm to [Eversource]," Alvarez testifies. "For example, research indicates that the time-varying rates AMI meters make possible can reduce both system peak demand and energy use. "[Eversource] profits increase when the Company invests in the transmission and distribution infrastructure required to satisfy system peak demand, biasing the Company against time-varying rates and peak-time rebate programs," Alvarez continues. "[Eversource] profits decrease when energy sales volumes fall between rate cases, biasing the Company against the conservation potential offered by AMI meters." Disallowing that $42 million investment as imprudent would send a message to utility shareholders everywhere that in New Hampshire we expect investor-owned utilities to act in the best interests of their customers if they expect a return on their investment."[8]

Mr. Alvarez also publishes "Customer Value Rankings" annually that compare "the benefits customers receive from utilities … to the funds utilities spend, and for which customers must pay".[9] According to a 2017 study published in The Electricity Journal, which was authored by Mr. Alvarez and the National Renewable Energy Laboratory, Eversource's subsidiary Public Service Company of New Hampshire scored relatively low in the ranking: 85th out of 102 utilities surveyed.[10] (The utility also came in 91st out of 105 in terms of customer satisfaction in a related survey.[11])

[8] Don Kreis, "This Means War," IndepthNH.org. 21 December 2019. Available online: http://indepthnh.org/2019/12/21/electric-rate-cases-in-nh-this-means-war/
[9] Available online: http://www.utilityevaluator.com/customer-value-rankings.html
[10] Paul Alvarez and Sean Ericson, "Measuring distribution performance? Benchmarking warrants your attention", The Electricity Journal (31, 2018). Available online: https://nebula.wsimg.com/aeda0aa942afd82b7b05f3bc8bdfd83c?AccessKeyId=490265DE4F8DABB7CA08&disposition=0&alloworigin= 1
[11] The Wired Group, "2018 Customer Satisfaction Survey". Available online: https://nebula.wsimg.com/e63753ee4a7d49577733972d88958b86?AccessKeyId=490265DE4F8DABB7CA08&disposition=0&alloworigin=1

It is also relevant to note that Eversource's subsidiaries Western Mass Electric Company and Connecticut Light and Power ranked even lower in terms of customer value, at 99th and 97nd, respectively. Most recently in Connecticut, the utility has come under what appears to be severe criticism due to widespread outages during Tropical Storm Isaias, to the extent that one of the longest-serving state representatives called for a breakup of the utility, explaining that "Eversource has become a multi-state conglomerate... It's proven that it's gotten too big to deliver reliable service".[12]

On the basis of these observations, I believe it is reasonable to conclude that public confidence in New Hampshire's largest utility, at least, may not be very high.

Q. Would you refer to New Hampshire's current market as "fully restructured"?

A. No. In the USA, the only market that has fully restructured is ERCOT in Texas. There are a number of additional organized electricity markets, particularly in Europe and Oceania, that have fully restructured as well.

Q. How would you characterize New Hampshire's current market?

A. I would characterize it as partially restructured. Horizontal separation of transmission, generation and supply from distribution and retail has been accomplished, and distribution utilities no longer own wholesale generation (though it took until 2019 for Eversource to complete its generation divestiture despite the fact that the Legislature enacted the Electric Utility Restructuring Act in 1996, i.e. the first restructuring act in the nation).

However, utilities have not been quarantined to operating the distribution grid, and instead remain integrated within the retail market in ways that I believe structurally disadvantage

[12] Ridgefields' HamletHub, "State Rep. John Frey Calls for Eversource to be Dismantled", 10 August 2020. Available online: https://news.hamlethub.com/ridgefield/life/67277-state-rep-john-frey-calls-for-eversource-to-be-dismantled

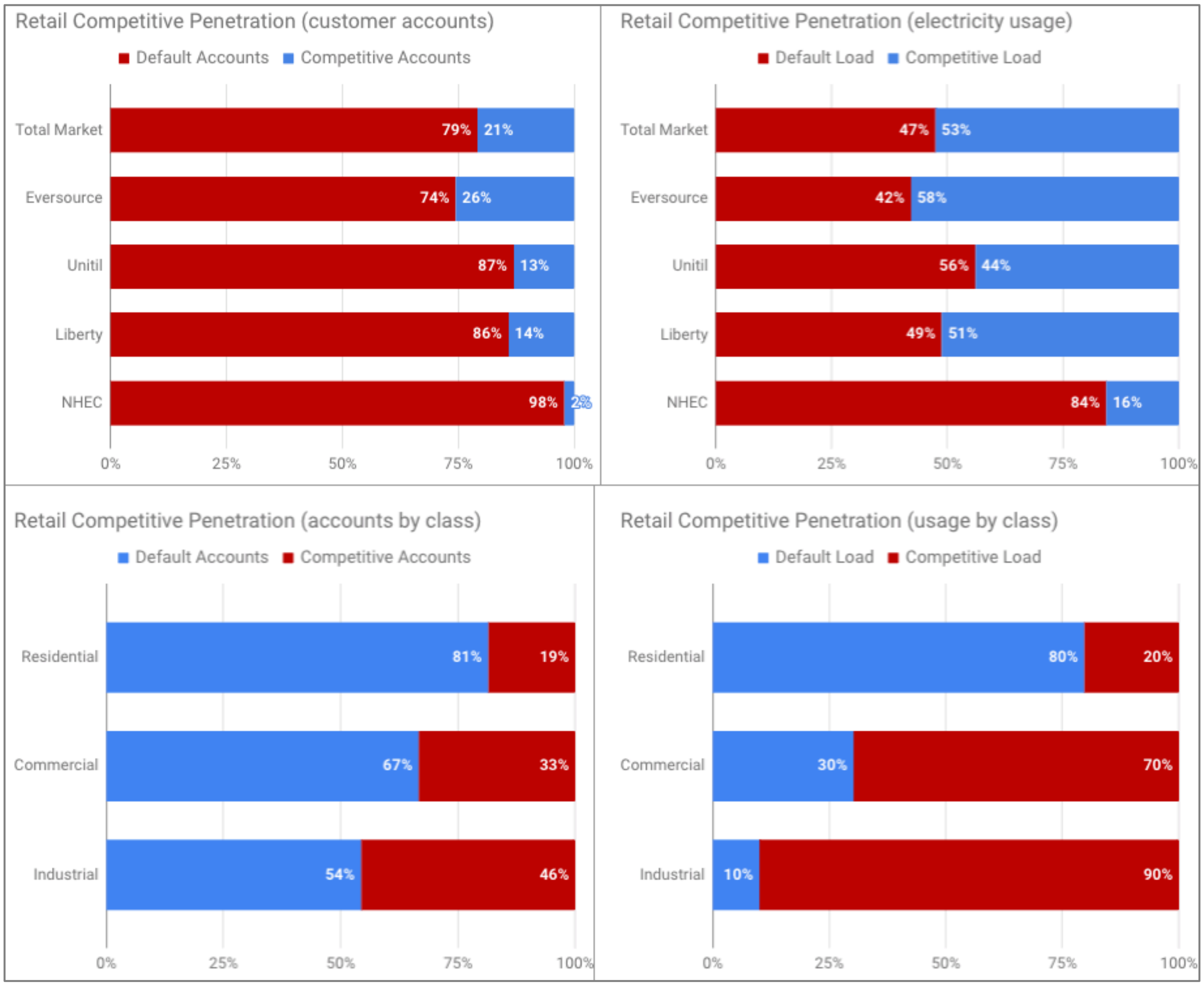
retail competition and foreclose retail innovation and choice in services for the majority of customers.

Moreover, it appears that almost all decision-making is still carried out through administrative procedures and not through a transparent and responsive "market framework" that would "enable competitors to adapt to changes in the market in a timely manner" as called for under RSA 374-F.

The lack of a holistic, responsive and market-based decision-making framework means that decisions regarding the functionality of the retail market remain heavily, and almost certainly unduly, mediated by the monopoly distribution utilities.

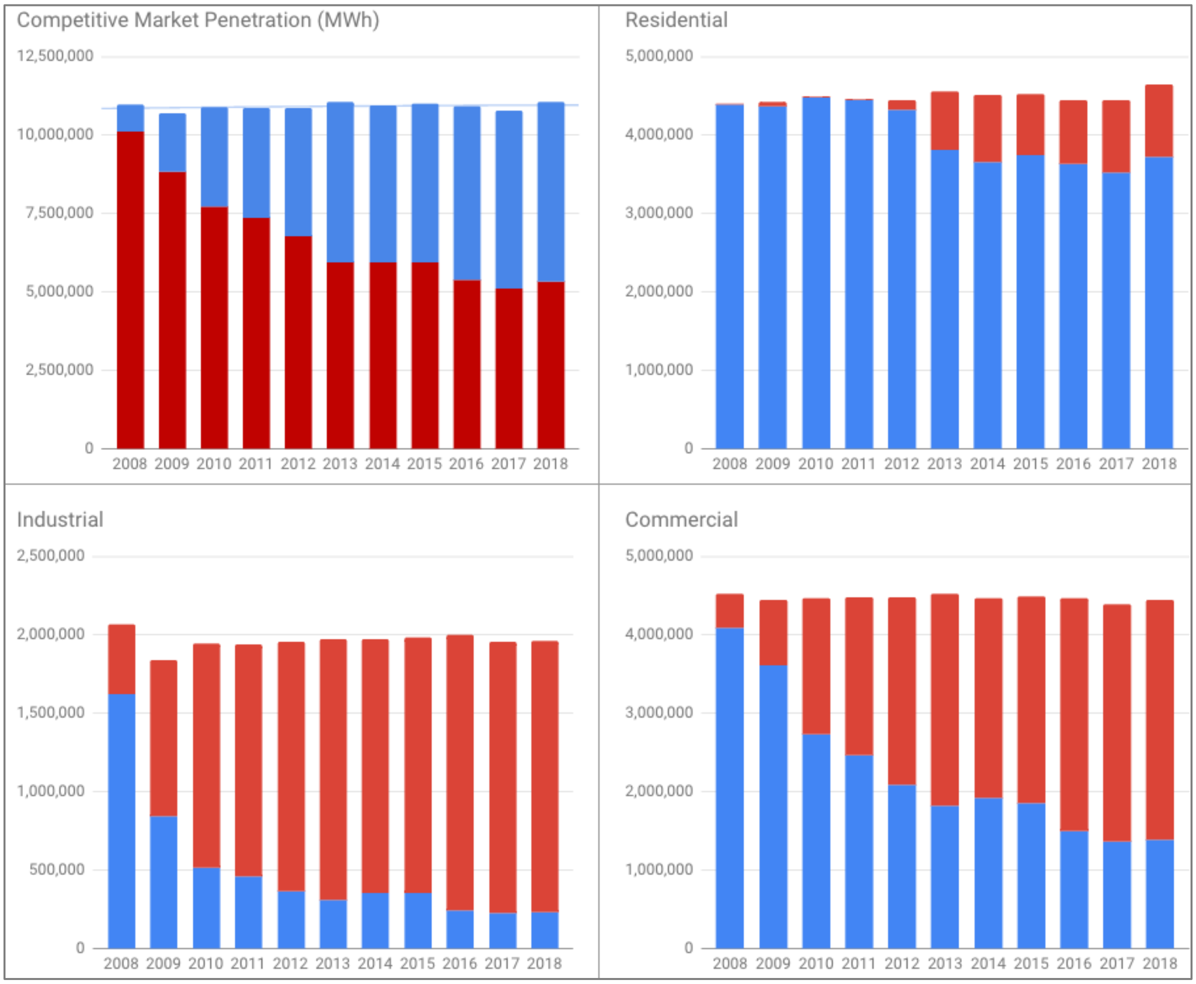
Q. What is the current state of retail market competition in New Hampshire?

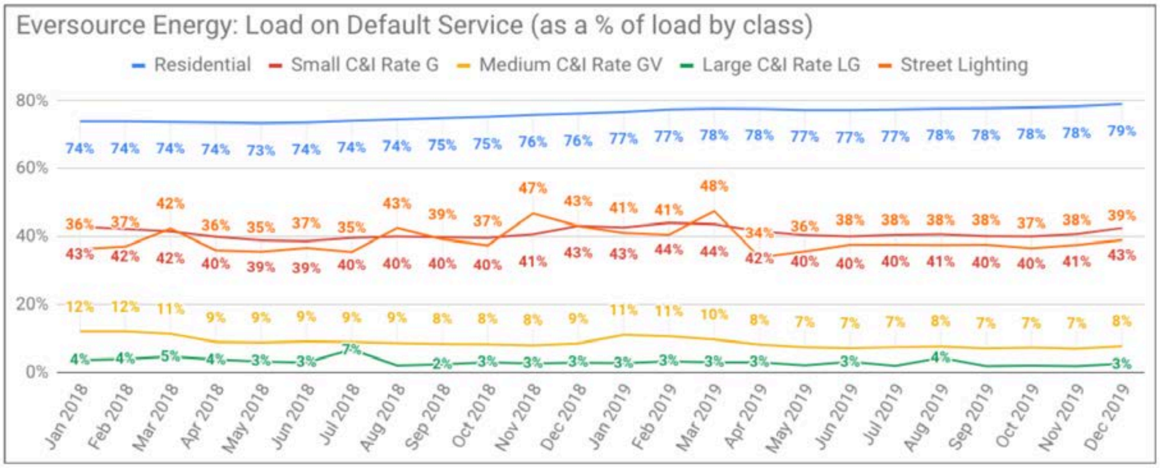
A. Approximately four out of five customers remain on default service provided by the distribution utilities, while the customers on competitive supply account for about half of total electricity usage. Based on EIA 861 datasets from 2018, I have prepared the following graphs to show the penetration of retail market competition by utility:

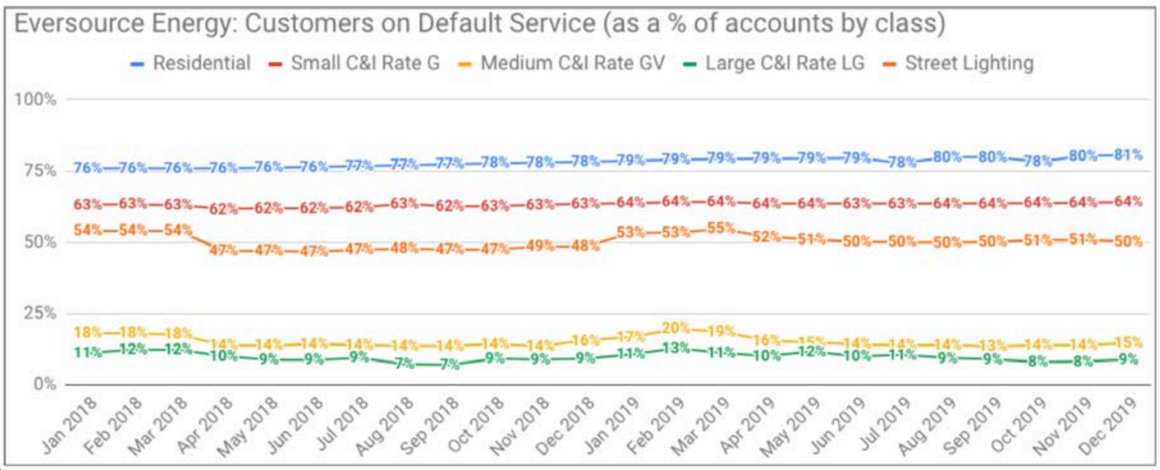


There are also 143 registered aggregators listed on the Commission's website.[13] These entities do not take title to power, but rather act as energy advisors and brokers to customers. Despite this, New Hampshire's competitive retail market appears to have seen little growth since approximately 2013. The graphs below, prepared based on EIA 861 datasets for 2008 through 2018 along with more recent quarterly migration reports for Eversource specifically, show the extent of the competitive retail market overall and by customer sector:

[13] Website available online: https://www.puc.nh.gov/Consumer/Aggregators.html

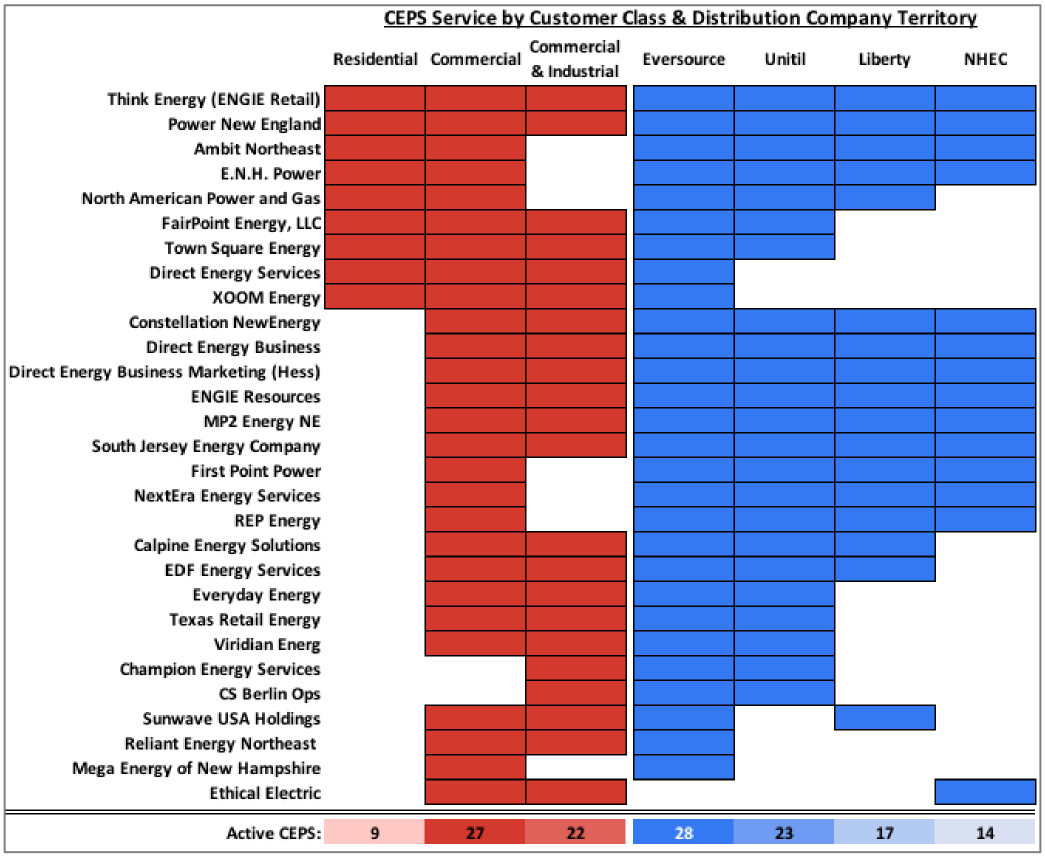

Competitive Market Penetration (MWh)
12,500,000
10,000,000
7,500,000
5,000,000
2,500,000
0
2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
Residential
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
Industrial
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
Commercial
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018





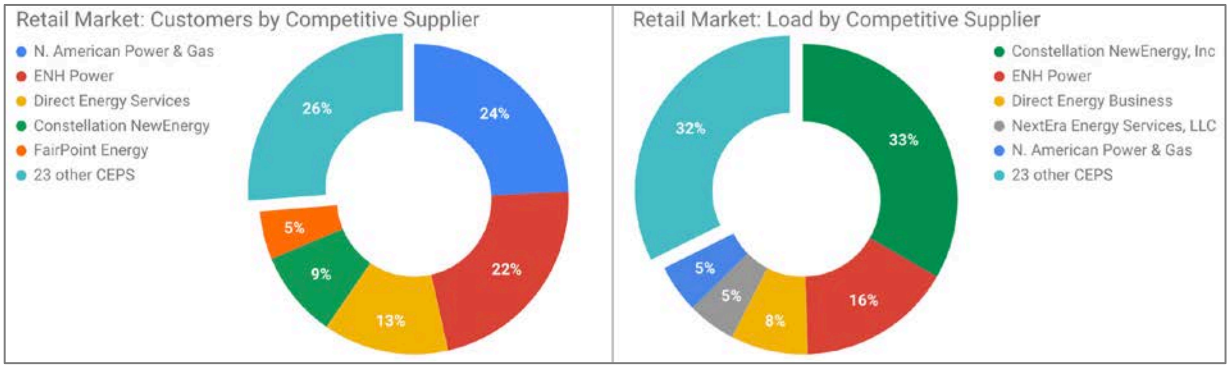
Competition appears weak within the small commercial class and particularly anemic in the residential sector. The table below, based on data from the PUC's website,[14] shows the 29 Competitive Electric Power Supplier ("CEPS") actively offering service to different customer classes across the four distribution utility territories open to customer choice:

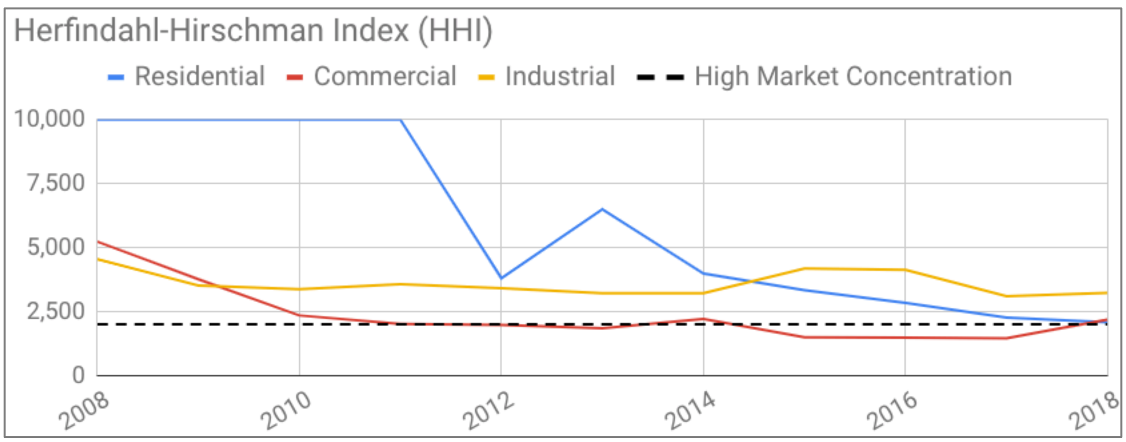
[14] Website available online: https://www.puc.state.nh.us/Consumer/Residential%20Suppliers.html

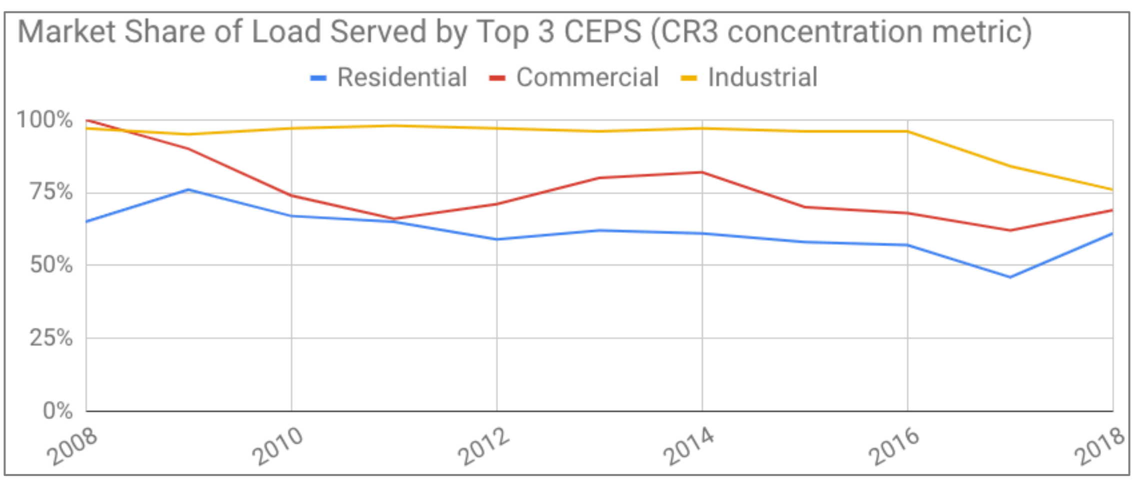


Apparently, out of the 29 CEPS currently offering service in New Hampshire, only 9 offer service to residential customers and only 4 of those serve all four distribution utility territories. Only 2 CEPS offer service to all customer classes across all utilities.

Based on EIA 861 datasets, the charts below show the market share of the 28 CEPS serving customers in 2018 along with two metrics to measure market power and concentration: the Herfindahl-Hirschman Index (HHI score) and concentration ratio of the 3 largest CEPS based on their percentage of load served (CR3). Note that 2018 market share and CR3 are calculated relative to the active retail market (i.e. excluding customers on default service from the baseline).[15]

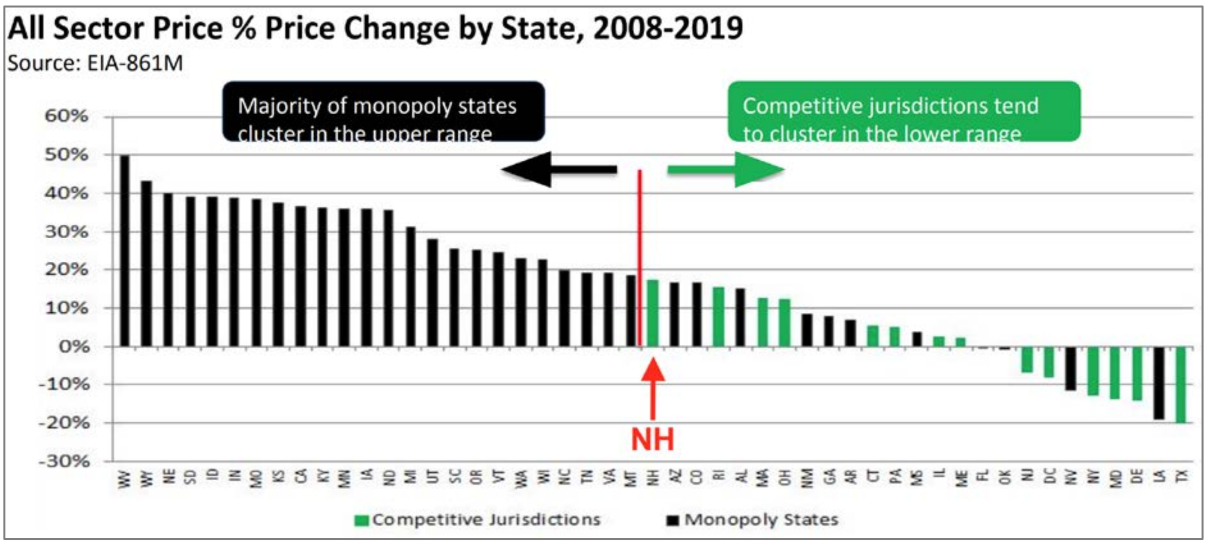






[15] Also note that Constellation NewEnergy and Constellation Energy Services were combined in certain years, as they were formally combined in 2017. See online here: https://www.puc.nh.gov/Regulatory/Docketbk/2016/16-869/LETTERS-MEMOS-TARIFFS/16-869_2017-09-05_CES_NOTICE_MATERIAL_CHANGE.PDF

In terms of the market's overall performance relative to other states in terms of price changes, the chart below is taken from the Retail Energy Supply Association (based upon EIA 861 data and covers the period 2008 through 2019):



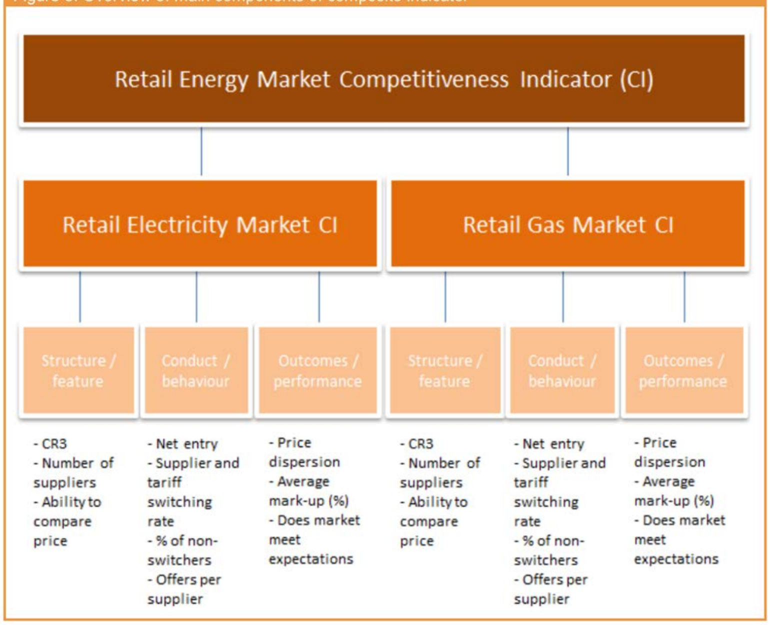
Q. What other metrics are used to track the maturity of retail energy markets?

A. The Texas ERCOT market tracks the number of retailers and number of products offered, distinguishing between residential and non-household sectors, retail price trends compared to their last regulated rate, unique visitors to the "Power to Choose" website (a one-stop shopping portal), and the number and tenor of complains overall and by retailer. These are reported to their Legislature in annual "Scope of Competition in Electric Markets in Texas" reports.[16]

European state regulators have been collaborating for over a decade to harmonize market structures that promote retail competition and have developed more granular metrics to do so that take into account the diversity of member state market structures and enabling infrastructure (e.g. smart meters). Below is a useful, if somewhat dated, high-level graphic in this regard:

[16] Website available online: https://www.puc.texas.gov/industry/electric/reports/scope/Default.aspx

Figure 8: Overview of main components of composite indicator



[17]

The Council of European Regulators (CEER) developed a joint roadmap and framework to evolve and harmonize mature retail energy markets across states by 2025. Their annual "self-assessment reports" summarize key market properties, metrics and gap analyses across states. The "8 key properties critical for a well-functioning market" identified are described as:[18]

- **Low concentration within a relevant market** where, in general, a high number of suppliers and a low market concentration are seen as one of the indicators of a competitive market structure.
- **Low market-entry barriers** in order to facilitate market entry and growth for new market actors (i.e. suppliers and third parties) as well as innovation (including demand response).

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[17] IPA Advisory Limited, "Ranking the Competitiveness of Retail Electricity and Gas Markets: A proposed methodology," Agency for the Cooperation of Energy Regulators. 4 September 2015. Available online: https://www.acer.europa.eu/en/Electricity/Market%20monitoring/Documents_Public/IPA%20Final%20Report.pdf

[18] "CEER Roadmap to 2025 Well-Functioning Retail Energy Markets: 2018 Self-Assessment Status Report", Council of European Energy Regulators. 30 October 2019. Available online: https://www.ceer.eu/documents/104400/-/-/89206356-85ff-9977-1ba9-3a8262fe00e3

- **A close relationship between wholesale markets and retail prices** to ensure that consumers receive correct price signals, which is an important incentive for demand response. In addition, the mark-up between wholesale and retail prices reveals whether consumers are paying a fair price.
- **A range of offers, including demand response**. In a well-functioning market retailers' ability to offer a significant number of commercial options is coupled with consumers' ability to compare the offers and take informed decisions.
- **A high level of awareness and trust**, which is an important precondition for consumer participation.
- **The availability of empowerment tools** such as a verified price comparison tool, historical consumption data and a standardized supplier switching process.
- **Sufficient consumer engagement** where switches, renegotiations and prosumers are assessed on a yearly basis. In general, a well-functioning market is one in which a significant number of consumers engage with the market on a regular basis.
- **Appropriate protection**: In well-functioning retail energy markets, consumers enjoy an appropriate level of protection and there are specific measures to protect those defined as vulnerable customers

The 25 metrics used to track progress within each of the 8 key properties above are summarized in the table below:[19]

[19] "CEER Roadmap to 2025 Well-Functioning Retail Energy Markets: 2018 Self-Assessment Status Report", Council of European Energy Regulators. 30 October 2019. Available online: https://www.ceer.eu/documents/104400/-/-/89206356-85ff-9977-1ba9-3a8262fe00e3

Metric #	KEY PROPERTY	HARMONISED DEFINITIONS OF METRICS
1	Low Concentration within a relevant market	Herfindahl-Hirschman Index
2	Low market entry barriers	Time needed and cost of accessing well-functioning wholesale markets and licencing/balancing regimes
3		Percentage of consumers connected to "bundled" DSOs
4		Percentage of consumers with regulated energy prices
5		Number of common standards for consumer data & for DSO-supplier contract or existence of data hub
6		Availability of time-of-use metering and – where applicable – additional fee paid by the consumer to be able to have time-of-use prices vs. traditional metering
7	Close relationsship between wholesale markets and retail prices	Correlation between wholesale and retail energy prices
8		Mark-up between wholesale and retail energy prices
9	A range of offers, including demand response	Availability of a variety of pricing and billing options
10		Availability of value added services for implicit demand response and self-generation
11		Availability of online offers
12		Availability of contracts guaranteeing the origin of energy
13		Availability of explicit demand response offers
14	High level of awareness and trust	Percentage of consumers knowing they can switch supplier
15		Percentage of consumers who know that DSOs are responsible for the continuity of supply and, where applicable, of metering
16		Percentage of consumers trusting the energy market
17	Availability of empowerment tools	Percentage of consumers having access to at least one independent and verified PCT
18		Percentage of consumers having access to online historical consumption info
19		Percentage of consumers having access to standardised supplier switching process (and its duration)
20	Sufficient consumer engagement	Supplier switching rate
21		Percentage of inactive consumers
22		Percentage of prosumers
23	Appropriate protection	Time between notification to pay and disconnection for non-payment
24		Percentage of disconnections due to non-payment
25		Percentage of suppliers using min standards for key info in advertising and bills

Q. How are fully restructured markets governed in practice?

A. Fully restructured markets rely on a market-based institutional decision-making framework to replace retail regulation (administrative regimes) wherever appropriate to do so.

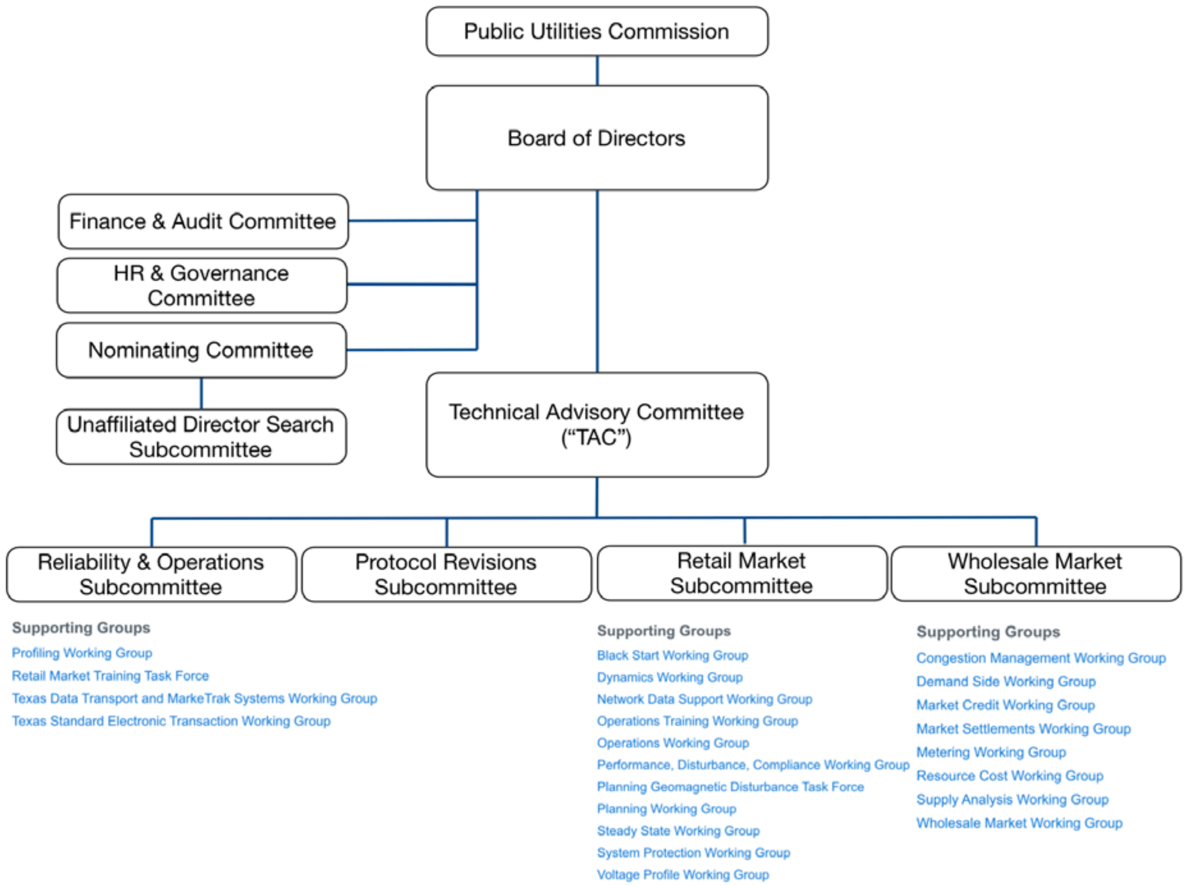
Governance is structured as a participatory process within which market participants act in a collaborative fashion, overseeing the necessary business processes and change management protocols to ensure that the functions previously performed by distribution utilities are carried out by non-utility entities in an optimal fashion. Data sharing and transparency is, of course, a necessary and foundational component of a market-based governance regime (more so than under political regimes e.g. retail regulation).

The Texas ERCOT market provides an example of a market framework governance regime:

- The ERCOT Board of Directors is a “16-member "hybrid" board consisting of: independent members (unaffiliated with the power industry), consumers and representatives from industry market segments”[20] that meets every month.
- The Technical Advisory Committee (TAC) is similarly constituted and “makes recommendations to the board regarding ERCOT policies and procedures and is responsible for prioritizing projects through the protocol revision request, system change request and guide revision processes.”[21]
- There are four main subcommittees that report to the TAC (Protocol Revisions, Reliability and Operations, Retail Market and Wholesale Market), and a number of working groups and task forces that form as needed to inform decision-making on more targeted issues.

I have prepared the organization chart below based on a survey of ERCOT’s website, which provides substantial training materials, meeting notices and records, committee and subcommittee governance documents and membership lists, and a complete set of market rules and operating procedures (such as guides for commercial operations, data transport, load profiling, etc., and Standard Electronic Transaction "swimlanes", which are reference documents outlining the business process lifecycle for retail market transactions):

[20] Website available online: http://www.ercot.com/committee/board
[21] Website available online: http://www.ercot.com/committee/tac



Below is a table showing the current Technical Advisory Committee members representing each "customer segment":[22]

Consumer	Residential: Shawnee Claiborn-Pinto – OPUC Residential: Eric Goff Commercial: Phillip Boyd – City of Lewisville Commercial: Chris Brewster – City of Eastland Industrial: Garrett Kent – CMC Steel Texas Industrial: Bill Smith – Air Liquide
Cooperative	John Dumas – Lower Colorado River Authority Clif Lange – South Texas Electric Cooperative Roy True – Brazos Electric Power Cooperative Michael Wise – Golden Spread Electric Cooperative
Independent Generator	Bob Helton – Engie North America Ian Haley – Luminant Generation Colin Meehan – First Solar Bryan Sams – Calpine Corporation
Independent Power Marketer	Kevin Bunch – EDF Trading North America Jeremy Carpenter – Tenaska Power Services

[22] Document available online: http://www.ercot.com/content/wcm/key_documents_lists/27308/2020_Segment_Representatives.TAC.June.doc

	Clayton Greer – Morgan Stanley Resmi Surendran – Shell Energy North America
Independent Retail Electric Provider	Bill Barnes – Reliant Energy Retail Services Eric Blakey – Just Energy Texas Sandy Morris – Direct Energy Shannon McClendon – Demand Control 2
Investor Owned Utility	Walter Bartel – CenterPoint Energy Collin Martin – Oncor Electric Delivery Keith Nix – Texas-New Mexico Power Company Richard Ross – AEP Service Corporation
Municipal	Dan Bailey – Garland Power and Light Jose Gaytan – Denton Municipal Electric Alicia Loving – Austin Energy David Kee – CPS Energy

The key takeaway is that governance over the market framework must be structured in a manner to leverage and be responsive to the collective insights and requirements of market participants, which are naturally focused on assessing and removing barriers to operational efficiencies. This type of governance regime, in my opinion, is the foundation upon which market rules and enabling infrastructure investment decisions should be made in order to successfully promote decentralized coordination and market-based innovation.

Q. What are the key functional characteristics of a "fully restructured" market?

A. Broadly speaking, the purpose of any market is to allow entities that compete with one another to offer customers new products and services that efficiently balance supply and demand and create surplus value for society. Successful markets ensure that competitors have low barriers to entry, that common information and communication technology supports broad-based market innovation, that customers are both free to choose new products and services and protected from predatory behavior, and that particularly vulnerable customers are provided relief from acute hardship.

In the electric power sector, utilities perform a network function (connecting supply and demand) by operating the physical platform (the distribution grid) that delivers power to, from and across retail customers. It is both a natural monopoly and a horizontal segment, in that it is the bridge between the wholesale power grid and retail customers, within which unchecked monopoly power could easily foreclose retail market competition; consequently, it is a service regulated by the state.

This physical platform must be complemented with a market platform that facilitates transactions between the wholesale generation market, the distribution utility, and the non-utility entities that serve retail customers and manage portfolios of distributed energy resources.

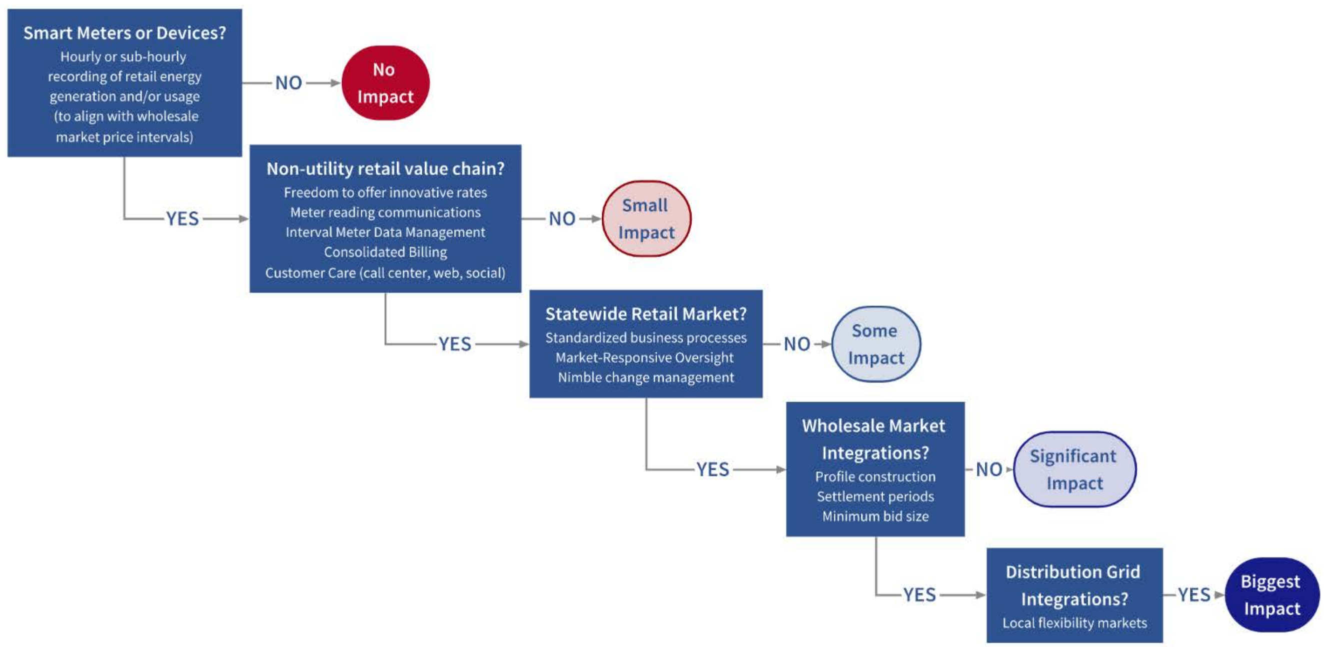
The generic objective of the market platform is to ensure that non-utility entities have low barriers to entry and are able to engage in "permissionless" innovation — particularly valuable in the current context of rapid technological change[23] — competing against one another to induce retail customers to choose new products and services that accurately reflect system costs and risk drivers, and which balance supply and demand more cost-effectively in relation to wholesale market dynamics and network constraints — and to do so in standardized fashion, regardless of which distribution utility happens to serve a given customer.

The practical process of such retail product innovation[24] requires non-utility entities to perform a linear and inter-related sequence of steps across the "retail value chain", which refers to the infrastructure and business processes that span customer-facing functions (metering, data management, rate structures, billing and customer engagement) and flow into wholesale market and network integration functions (e.g. settlement profile construction, non-utility consolidated billing protocols, interconnection standards, ADMS / DERMs integrations, etc.).

[23] Refer to Lynne Kiesling and Michael Giberson, "The need for electricity retail market reforms," Regulation. Fall 2017. Available online: https://www.cato.org/sites/cato.org/files/serials/files/regulation/2017/9/regulation-v40n3-4.pdf.

[24] For a list of innovative retail products, refer to page 25 of this report: Dr. Philip R. O'Connor, "Restructuring Recharged," Retail Energy Supply Association. April 2017. Available online: https://www.resausa.org/sites/default/files/RESA_Restructuring_Recharged_White%20Paper_0.pdf.

To illustrate these concepts, I have prepared a simple diagram[25] showing the inter-related nature of the retail value chain, market structure and system integrations along with the impact on retail product innovation. It is a "hierarchy of barriers" to be read from left to right:



Any barrier or non-alignment in the different functions that comprise the retail value chain will foreclose (preclude or raise the cost of) market innovation, as a problem in one step will cause unintended consequences or fully block progress in other steps. Thus, in a restructured market, monopoly power is carefully "quarantined" such that distribution utilities are "wires only" network companies that have little to no direct role in or control over the retail value chain and thus do not engage directly with customers, apart from receiving outage calls and interconnection requests.

In unbundling these functions from distribution utility service, regulators may choose to standardize enabling infrastructure directly through regulated (that is, socialized) investments.

[25] Based upon a similar diagram in the 2017 NordREG report "Flexible demand for electricity and power: Barriers and opportunities", available online: http://norden.diva-portal.org/smash/get/diva2:1167837/FULLTEXT01.pdf.

Smart Meters and data platforms are a prime example of such common, market-enabling infrastructure. For example, regulators in the Texas ERCOT market chose to direct distribution utilities to deploy AMI smart meters that record retail customer usage in 15-minute intervals, which aligns with the wholesale market price intervals. The interval data generated is sent by distribution utilities directly to the market operator for load settlements each trading day and also posted to the Smart Meter Texas[26] data platform for use by each customers' retailer (without requiring separate customer authorizations, as the market operator tracks customer switching) for load forecast submissions to the wholesale market operator and other such applications, as well as to various non-utility entities (with explicit customer authorization).

In Europe, CEER has established frameworks and guiding principles regarding the management of customer data for the purpose of encouraging competitive retail markets,[27] and various European countries have established data platforms similar to ERCOT in terms of data interchange and business processes, such as Denmark's Energinet data hub:

> "The purpose of the data hub is to ensure uniform communication methods and standardized processes for market participants in a non-discriminatory, objective and transparent way so as to create relatively low market entry barriers. All metering data an all necessary information for settlement purposes, e.g. electricity taxes and network tariffs, are collected in the data hub. Furthermore, the process of, for example, supplier switching, is handled in the data hub. The detailed requirements, rights and obligations of the relevant market participants in terms of the data hub, and thereby also the

[26]Website available online: https://www.smartmetertexas.com/aboutus

[27] Council of European Energy Regulators, "CEER Advice on Customer Data Management for Better Retail Market Functioning", 19 March 2015. Available online: https://www.ceer.eu/documents/104400/-/-/dbcc2cb1-5035-3a5e-6ba8-59de0d60915c

functionalities of the data hub, are set in regulations issued by Energinet within the framework of the Danish Electricity Supply Act."[28]

Alternatively, markets may establish standardized technical requirements for such infrastructure and processes for non-utility entities to adhere to in the provision of services. For example, the Australian Energy Market Operator has established "Meter Data Management Procedures"[29] and a "Guide to the Role of the Metering Coordinator".[30]

I have prepared the following table, based off of the Brattle Group's 2018 report "International Experiences in Retail Electricity Markets," to show how various organized electricity markets rely on market entities or regulated utilities to perform select retail value chain functions:[31]

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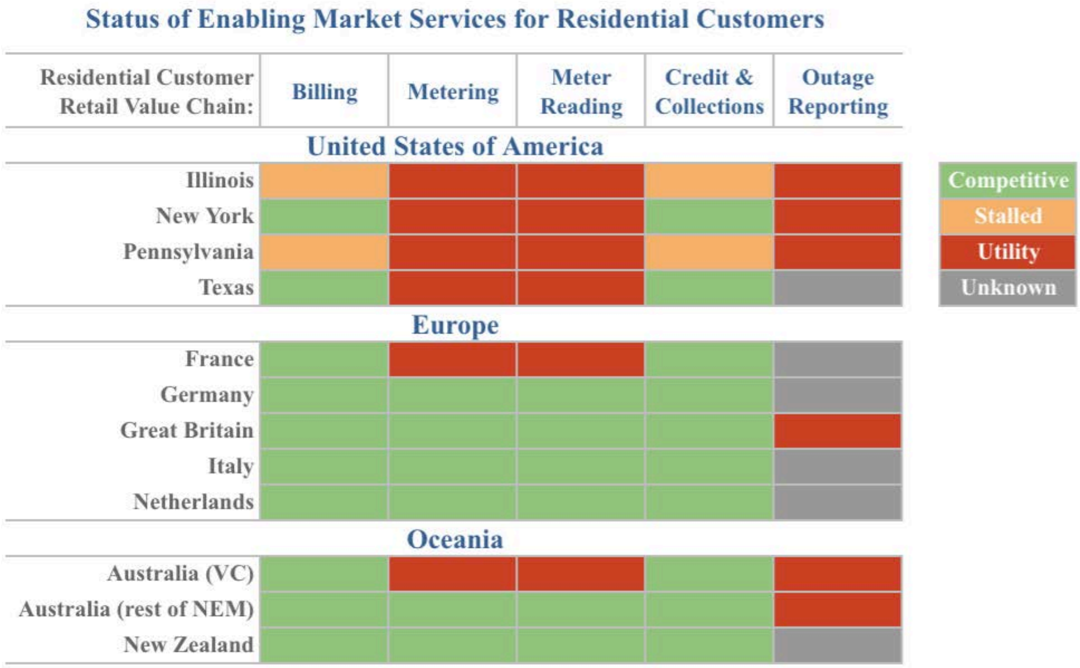
[28] Council of European Energy Regulators, "Roadmap 2018 Self-Assessment Status Report", at p. 22/74available online: https://www.ceer.eu/documents/104400/-/-/89206356-85ff-9977-1ba9-3a8262fe00e3.

[29] AEMO, "MSATS PROCEDURE: MDM PROCEDURES", 1 December 2017. Available online: https://www.aemo.com.au/-/media/Files/Electricity/NEM/Retail_and_Metering/Market_Settlement_And_Transfer_Solutions/2017/MSATS-Procedures-MDM-Procedure-V33.pdf.

[30] AEMO, "GUIDE TO THE ROLE OF THE METERING COORDINATOR", 1 December 2017.Available online: https://www.aemo.com.au/-/media/Files/Electricity/NEM/Retail_and_Metering/Accreditation/Guide-to-role-of-Metering-Coordinator.pdf.

[31]The Brattle Group, "International Experiences in Retail Electricity Markets: Consumer Issues", The Australian Competition and Consumer Commission. June 2018. Available online: https://brattlefiles.blob.core.windows.net/files/14257_appendix_11_-_the_brattle_group_-_international_experiences_in_retail_el___.pdf.



Fully restructured markets naturally rely on competitive entities to provide default service to customers, though the extent to which regulatory oversight over how the competitive market sets the default rates varies by jurisdiction. The table below is also based off of the aforementioned Brattle Group report:

Market Survey: Oversight of Default Supply Prices

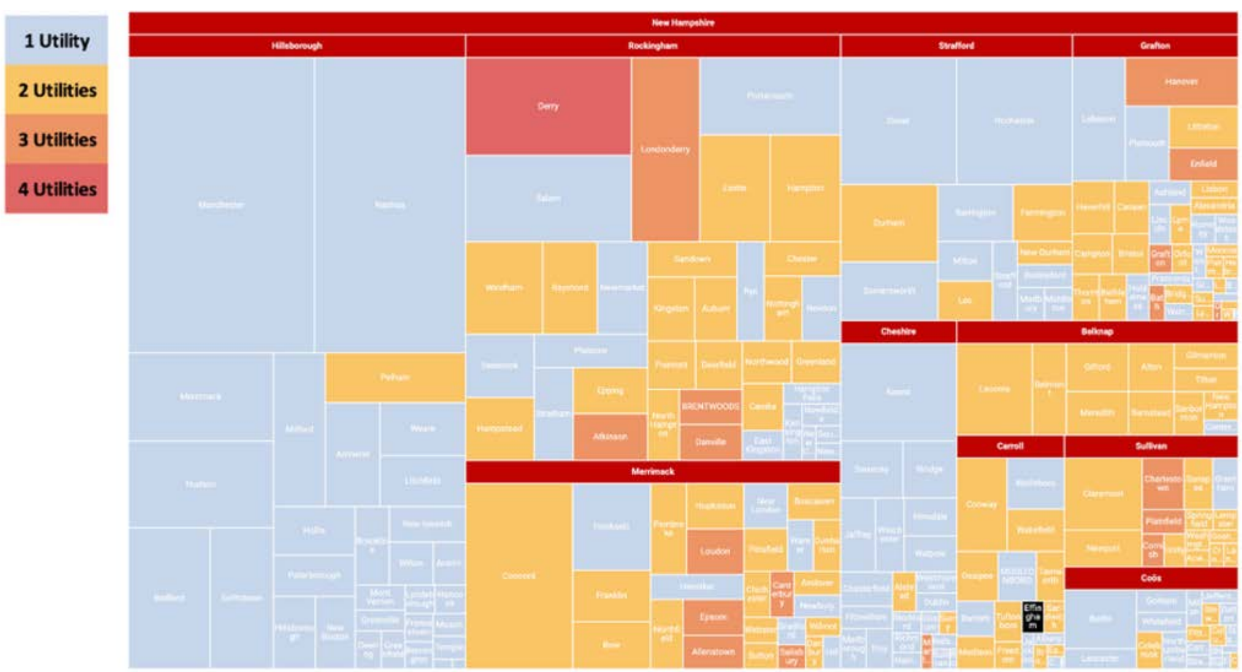
Market	Transitioning	Regulators
Texas*	United Kingdom	Pennsylvania**
Australia (NEM)	Italy	New York***
Germany	Netherlands	Illinois***
New Zealand		France

*Competitive Retailers provide default supply
**Distribution Utilities provide default supply
***Default Supply transitions to Market / Community Power (customers may opt-back to Regulators / Distribution Utilities)

Q. How would you characterize New Hampshire's current retail market structure?

Each distribution utility has been left responsible for default retail service, and therefore left in control of the retail value chain for most customers in their respective territories; each has differential capabilities and business processes in regard to the retail value chain (i.e. metering, meter reading, meter data management, billing systems, customer information management systems, call centers, local program administration, load forecasting and settlement profile construction, etc.).

The retail market remains operationally fragmented as a consequence, balkanized by utility territory instead of unified across the natural boundaries of the state. To visualize this aspect of the market structure I have prepared the heat map graphic below, in which each rectangle is a municipality sized by number of housing unit and grouped by county (i.e. under the red headings). As context, 116 of New Hampshire's 246 municipalities (47% of municipalities, and 42% of the population) are served by two or more distribution utilities:



On an individual utility basis, my impression is that there are a number of long-standing and inter-related inefficiencies that have reinforced one another in maintaining this administrative and structural regime. My general observations are as follows:

- Universal service has long-accustomed distribution utilities in general to view customers on an aggregate basis, and to allocate their resources accordingly — investing in metering, billing, customer care systems and associated staffing resources designed to manage the vast majority of customers as large, homogenous groups that do not require differential and customized retail services.
- This aggregate approach to customer portfolio management appears reinforced by the manner in which distribution utilities have been relied upon to provide default electricity supply to customers: under a nonselective wholesale portfolio strategy that simply procures fixed-price, load following supply for customer classes under short-term (e.g. 6-month) contracts. This strategy transfers all market price and swing risk throughout the contract term onto suppliers, which must price and embed the risk as a premium into supply costs (i.e. without regard to how retail customers could be engaged and incentivized to shift usage to lower-price market intervals and outside of capacity-constrained periods e.g. by using devices such as smart thermostats, water heater switches, storage systems, etc. coupled with predictive intelligence to shape demand).
- The distribution utilities' retail value chain has continued to be largely aligned with this nonselective procurement strategy: the utility is charged for electricity regardless of the market price or customer usage is at a given moment, passes through these charges to customers in a similar fashion, and has little incentive to modernize its retail value chain

(meters, communications, data management, billing and customer information systems, etc.) or associated wholesale processes (profile construction, load forecasting, market settlements, etc.). The usage of most default service customers is not individually recorded on an hourly or sub-hourly basis, but once a month — the utility load forecasting and settlement relies on statistically-derived load "profiles" that approximate what customers within a class are using, in aggregate and on average within a given hourly, and calibrated with upstream measurements of actual electricity flow (i.e. at substations).

- In this fashion, the current regime reinforces an unnatural separation of horizontal segments (wholesale and retail) that are actually highly interdependent, should be treated as such, and which require common enabling infrastructure and a market framework to reconnect in order to for market participants to allocate capital and manage costs more efficiently. This continued separation has foreclosed market driven innovation in promoting and integrating customer technologies,
- In this fashion, regulated utility default service appears to function in a way that *maintains* the unnatural separation of interdependent horizontal segments, and thus *elevates* risk, cost and capacity investments for customers. In essence, all customers pay more because certain customers are fundamentally driving up costs — above the level they otherwise would, if they were more actively engaged and provided with innovative retail services and technologies to assist them in modifying their usage to minimize wholesale cost/risk and infrastructure investments for peak generation, transmission and distribution network capacity (for themselves, and thus the entire customer portfolio).

The procurement strategy and retail value chain dynamics described above ignore the customer value that could be created on an individual retail customer and portfolio basis through a unified and competitive market framework. In my opinion, these structures, along with the administrative decision-making process and general perspective held by most stakeholders involved in those processes, collectively poses high barriers to the development of a competitive retail market in New Hampshire to serve the remaining four-fifths of customers.

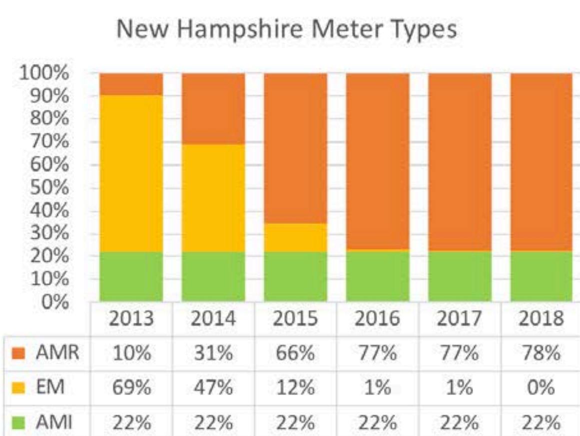
Q. Have distribution utilities' recent investment decisions in the retail value chain hindered or supported the development of a competitive retail market?

A. I believe that distribution utilities' recent investment decisions in the retail value chain have hindered the development of a competitive retail market.

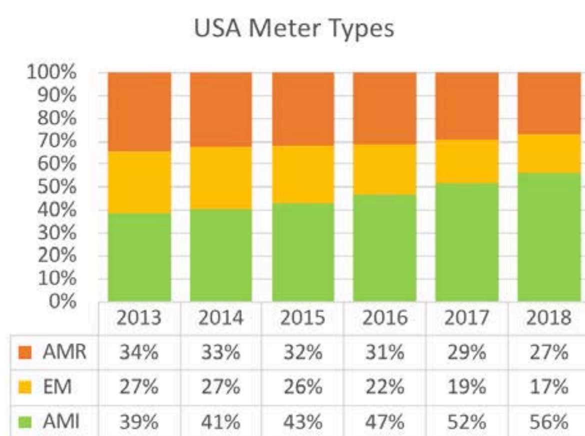
To take one example, Eversource is currently defending its decision to upgrade its retail customer meters and associated data management, billing and customer information systems. They have done so in a manner that precludes the collection and dissemination of hourly or sub-hourly retail meter usage data, which the competitive market needs in order to cost-effectively create innovative retail products that reflect cost-risk drivers on the wholesale market and other horizontal segments of the electricity industry (e.g. generation, transmission and distribution network capacity constraints). Based off of their investment decision, the competitive market for most customers is constrained to settling load based on generic, class-average profiles, which forecloses innovation that would otherwise help individual customers (and thus in aggregate, the state as a whole) help to manage their energy costs and risks.

What I find most notable in this process is that, as Commission staff noted, Eversource began these upgrades based on its own internal evaluation and only informed the Commission after the infrastructure deployment had commenced.[32] In response to criticism that they should have installed a "smart meter" system capable of supporting interval data collection and thus market innovation, Eversource defended their decision by claiming that other investor owned utilities had made similar decisions that year (in 2012), and cited a Green Tech Media news article that "concluded that AMI or smart meter deployment was on a downward trend, due to a lack of stimulus funding to help cover the costs of AMI deployment."[33]

As context, I have prepared the following tables based on EIA 861 data showing the installation of smart meters ("AMI") compared to the meters Eversource installed ("AMR") to replace electro-mechanical meters ("EM") over the period 2013 through 2018 — in New Hampshire and for the country overall:



	2013	2014	2015	2016	2017	2018
AMR	10%	31%	66%	77%	77%	78%
EM	69%	47%	12%	1%	1%	0%
AMI	22%	22%	22%	22%	22%	22%



	2013	2014	2015	2016	2017	2018
AMR	34%	33%	32%	31%	29%	27%
EM	27%	27%	26%	22%	19%	17%
AMI	39%	41%	43%	47%	52%	56%

Eversource's decision stands in contrast to the direction of its peers across the industry — notwithstanding their cherry-picking of examples and a speculative news article to the contrary.

32 DOCKET NO. DE 19-057, "Direct Testimony of Richard Chagnon", 20 December 2019. At p. 31-32. Available online: https://www.puc.nh.gov/Regulatory/Docketbk/2019/19-057/TESTIMONY/19-057_2019-12-23_STAFF_TESTIMONY_CHAGNON.PDF

33 Docket No. DE 19-057, "Rebuttal Testimony of Penelope McLean Connor", 3 March 2020. At pp. 17-18. Available online: https://www.puc.nh.gov/Regulatory/Docketbk/2019/19-057/TESTIMONY/19-057_2020-03-04_EVERSOURCE_REBUTTAL_TESTIMONY_CONNER.PDF

Regarding the impact this decision had on the development of retail product innovation, Eversource defended its decision by stating: “Further, it was reasonable to move forward with the AMR initiative because it takes time for new rates to incent behavior and it was unclear at the time whether the ultimate solution could be more dynamic than time-varying rates (“TVR”). Today, Eversource can accomplish peak load reduction without TVR, and with the maturation of demand management programs, such rates are not necessary to support customer participation in these programs.”[34]

What this situation demonstrates to me is that, under New Hampshire’s current governance framework, a monopoly distribution utility was allowed to unilaterally decide to invest in infrastructure that structurally foreclosed competitive retail market customer engagement and product innovation in favor of retail products and programs controlled by the utility directly — which necessarily must be governed through administrative proceedings.

I consider this to be anti-competitive behavior, carried out in the most structural way imaginable and without knowledge or permission of the Commission or market participants who should rightly have been fully engaged throughout the evaluation process.

Q. Do you expect that Community Power Aggregators will help to fully implement RSA 374-F?

A. Yes, I expect Community Power Aggregators (“CPAs”) will play a critical role in fully implementing RSA 374-F, both directly in carrying out their functions in the market and by advocating for rule changes and utility investment decisions that support the creation of a unified, innovative and competitive retail market.

[34] Ibid., at p. 4.

Under RSA 53-E, CPAs can become the default provider of competitive electricity service to retail electric customers. The retail value chain functions naturally fall within that responsibility, and my understanding is that CPAs have unique statutory authority to assume direct control or meaningful oversight of these functions:

- Electricity meter specifications and ownership, the alternate use of comparable intelligent monitoring devices, and the associated Information and Communications Infrastructure (ICT);
- Technical and business process requirements to use data in market operations (profiling, forecasting and settlements) and capacity cost allocations;
- Customer Information Systems (CIS) and customer care functions (apart from reporting outages and responding to interconnection requests, which would remain within the distribution utilities' natural domain);
- CPA consolidated billing;
- Local programs.

CPAs are competitive energy agencies that are overseen by communities. To perform their core operational functions, CPAs integrate different service providers and advisors that have evolved insights, platforms and institutional capacity in competitive markets, and employ a limited number of expert staff and independent advisors to ensure sufficient oversight and strategic direction. CPAs are thus a mechanism to rapidly expand the scope of competitive third-party expertise operating within a given market, to transfer such knowledge to the communities involved, and to bring these perspectives to bear on decision-making at the local and state levels.

The business model of a CPA is that of an aggregator,[35] which "acts as an intermediary between electricity end-users and [distributed energy resource] owners and the power system participants who wish to serve these end-users or exploit the services provided by these [distributed energy resources]."[36]

The business model of an aggregator is predicated on maximizing customer value, which requires considering and optimizing how individual customers use energy and the value they place on different products to meet their underlying needs (the customer's total energy value chain), creating new retail products, executing on customer engagement and education, facilitating project financing and development, and thereafter intelligently managing the customer relationship and integration of distributed energy resources into retail, wholesale and network markets to maximize the creation of value.

This task is beyond the capacity of any one enterprise, particularly given factors such as: the size and diversity of a CPAs customer portfolio, the pace at which technologies and consumer preferences are evolving, increasing opportunities for distributed energy resources, onsite storage and fuel-switching (e.g. beneficial electrification) that entail complex valuations and technology configurations, and so on.

As a consequence, the natural role of a CPAs is to position itself as a form of 'network manager' and 'aggregator of aggregators': connecting its customers to innovative companies that specialize in engaging customers and offering new technologies and enabling services, and then facilitating the necessary 'behind the scenes' processes and transactions required to integrate

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[35] Note that this term is a generic industry term, not to be conflated with the specific definition under PUC 2000.
[36] Scott Burger et al., "A Review of the Value of Aggregators in Electricity Systems", MIT CEEPR. January 2016. Available online: http://ceepr.mit.edu/files/papers/2016-001.pdf

these assets into portfolio risk management, power market operations, and system planning (and monetize them to the maximum degree possible).

CPAs are also naturally incentivized to lower wholesale cost and risk by unlocking retail demand flexibility and the intelligent management of distributed energy in new ways (i.e. in ways that incumbents are either unwilling or unable to do), because CPAs launch with no pre-existing assets and must therefore construct a wholesale book and portfolio strategy aligned with their retail usage profile.

Thus, active management of the CPA's retail cost / risk profile unlocks a source of competitive advantage, creating new value for individual customers and the aggregation overall. The practical process of doing so creates mutually beneficial relationships between the CPA and the third-party innovators relied upon to create new customer products:

- CPAs are able to capture a portion of the customer value created, strengthen customer relationships and brand recognition, lower costs and risks for the customer base overall (customer portfolio value) and gain competitive insights into evolving technology applications and market dynamics in ways that far exceed their internal capacity.
- Innovative energy companies gain new market opportunities, and a partner that has both the political legitimacy, technical knowledge and financial incentives to help the market function more efficiently over time. For example:
- CPAs are able to make decisions locally and rapidly to refine products and operations in response to market feedback and evolving dynamics;
- CPAs also can work over the longer-term with utilities, regulators and other stakeholders to modernize infrastructure, market processes and regulations.

In both cases, CPAs bring a valuable operational perspective that understands the types of competitive services that customers and communities want, and the evolving state of the commercial landscape.

CPAs can also create new value by leveraging their customer, community and inter-governmental knowledge and relationships to accelerate market opportunities and drive down transaction costs in unique ways. For example, by electrifying entire public transit fleets, or adopting reach codes and educating contractor networks to speed adoption of new technologies, and in numerous other ways that reflect local preferences.

The ‘network manager’ role of CPAs also leads to value creation on the grid infrastructure side of the business, as CPAs are naturally incentivized to aggregate grid-edge assets and encourage the development of new transactions and products with distribution utilities to manage local grid constraints and reduce stress on grid assets (to defer replacements and expansions).

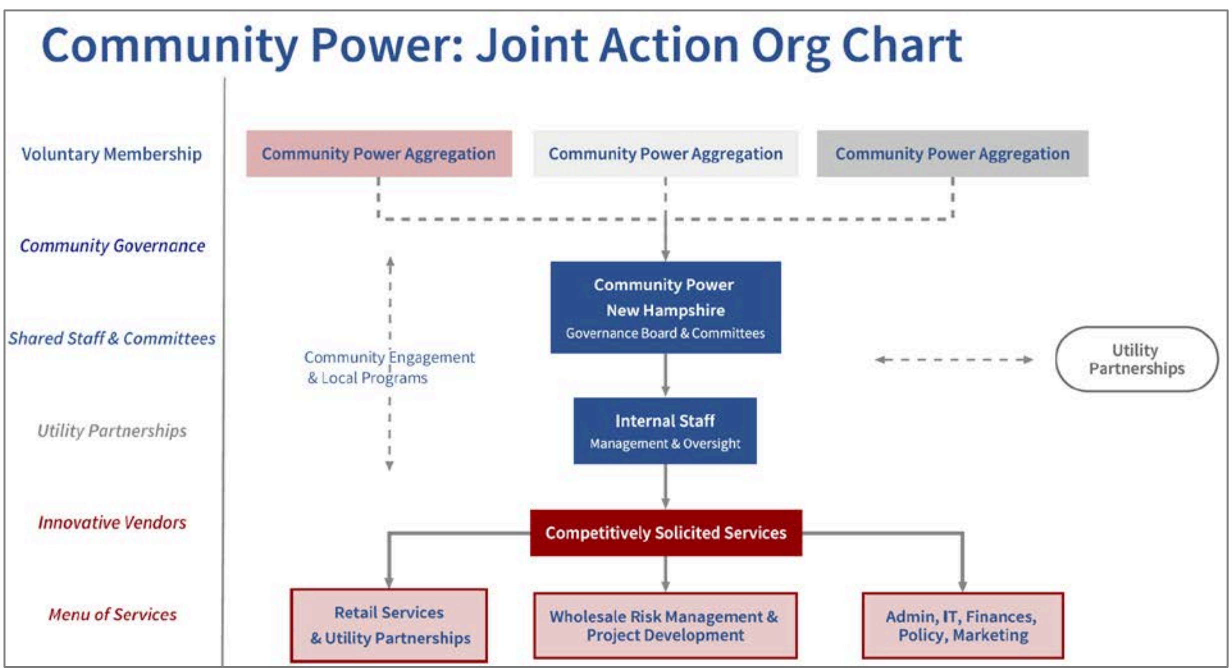
Lastly, aggregators naturally seek economies of scale and scope in order to lower the transactional costs associated with all of the above aforementioned activities. This encourages the formation of Joint Powers Authorities (also allowed under RSA 53-E), wherein multiple CPAs join together to share various services and programs deployed over their combined territories.

In these ways, the statutory authorities, business model and political drivers of CPAs are naturally aligned with the development of market frameworks as called for under RSA 53-F.

Q. On what timeline and manner do you expect the Community Power Aggregation market to develop in New Hampshire?

A. Assuming that the Commission authorizes the full authorities of CPAs enabled by RSA 53-E in market rules, I expect Community Power service to expand relatively rapidly in New Hampshire, both in terms of customers served and in extent of geographic territories, and in a manner that encourages operational and political coordination across individual CPAs for the explicit purpose of modernizing New Hampshire's competitive retail market.

Within that context, I have been informally advising a group of municipalities since December 2019 regarding the "Community Power New Hampshire"[37] initiative (CPNH) to establish an independent Joint Action Authority to provide shared services and political coordination on a statewide basis. Below is a high-level operating model diagram:



[37] Website available online: http://www.communitypowernh.org/

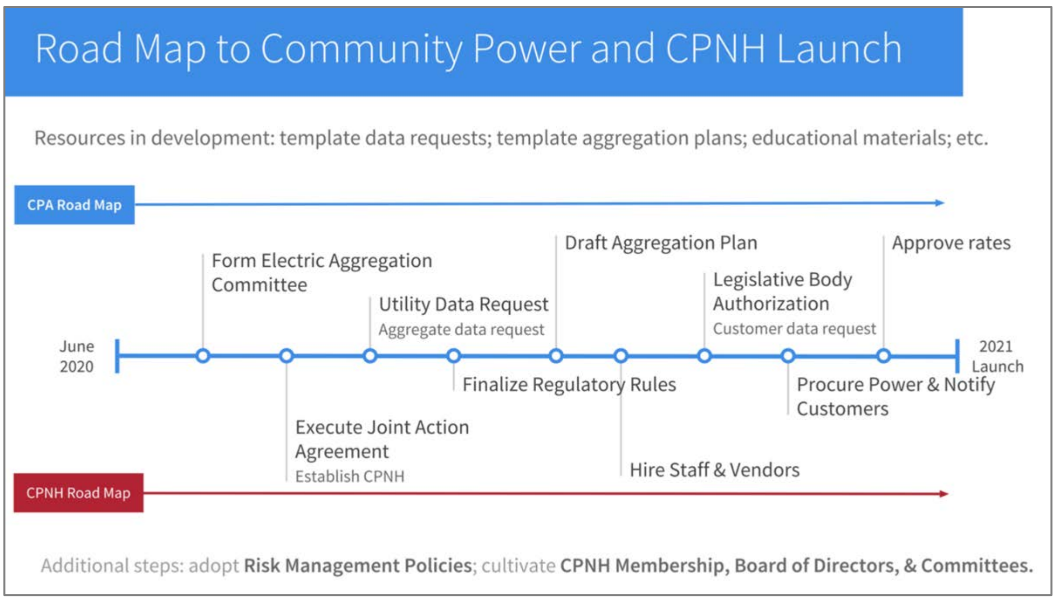
I have attached an article published in New Hampshire Municipal Association's Town & City magazine,[38] along with the agenda for CPNH's June 5th 2020 Community Power Summit that convened over 80 representatives from 30 municipalities interested in the initiative. These representatives were primarily local energy committee members, local elected officials and staff, and we estimated that the combined default supply load from the municipalities in attendance accounted for approximately 25% of the load currently served by distribution utilities. The following graphic and CPA market forecast table were based on an informal survey of attendees:

		Default Service Metrics (estimates based on downscaling 2018 / 19 actuals)			
Anticipated CPA Launch	Municipalities	CPA Accounts	CPA MWH / yr	% Statewide Default MWh	CPA Supply Receipts
2021	10	82,437	754,588	15%	$69,969,716
2022	7	33,482	302,118	6%	$27,589,655
TBD	14	24,109	216,710	4%	$20,006,927
Total	**31**	**140,028**	**1,273,416**	**25%**	**$117,566,299**

[38] Community Power New Hampshire, "Community Leaders Join Together to Develop Community Power New Hampshire", NHMA Town & City Magazine. May/June 2020. Available online: https://www.nhmunicipal.org/town-city-article/community-leaders-join-together-develop-community-power-new-hampshire.

Most recently, four municipalities have taken the lead in drafting a Joint Powers Agreement to establish CPNH as an independent entity and have issued a request for legal services to finalize the draft agreement by mid-September 2020.[39]

The joint action agency intends to launch member CPA programs in "early 2021" and provides the following high-level process and timeline for participating communities in their online FAQ:[40]



Q. How does the establishment of a statewide, multi-use online energy data platform relate to Community Power Aggregations authorized under SB 286?

A. My testimony has explained how the statutory authorities, business model and political drivers of CPAs are naturally aligned with the development of market frameworks as called for under RSA 53-F — and how the CPA market should be expected to grow rapidly and in an operationally-coordinated fashion under the Community Power New Hampshire joint action

[39] Website available online: https://lebanonnh.gov/bids.aspx?bidID=143
[40] CPNH, "COMMUNITY POWER SUMMIT FAQ & GUIDELINES," July 2020. Available online: http://www.communitypowernh.org/uploads/1/3/1/3/131383190/community-power-faq_june-30-2020.pd f

enterprise. Consequently, I urge the Commission to fully anticipate and leverage the role of CPAs in terms of helping to govern the design, implementation and evolution of the statewide data platform.

Q. How should the statewide, multi-use online energy data platform be governed?

A. The energy industry as a whole, particularly the electricity industry, is now in a period of rapid, system-wide and fundamental technological transformation that is arguably rendering administrative approaches to retail regulation outdated, inefficient and unable to meet the challenge of accelerating market distortions and shifting consumer choice expectations. A market framework that creates a continuous process of rapid, decentralized coordination to manage the complexity of these challenges is clearly warranted going forward.

Based on my evaluations of New Hampshire's current retail market structure, the state has a long way to go in seeing through The Electric Utility Restructuring Act (RSA 374-F) to completion. I believe that New Hampshire as a whole can make relatively rapid progress in establishing a unified, modern and competitive retail electricity market — provided that the Commission directs stakeholders work together in a market framework that elevates the role of market participants, and does not continue to provide monopoly utilities with undue influence over the operational data interchange protocols, business processes and retail customer value chain infrastructure investments upon which retail competition succeeds or fails in practice.

A sensible, if not necessary, first step in making meaningful progress in this regard is the establishment of a market framework that aligns with the purposes of the Electric Utility Restructuring Act — specifically, the guiding principal therein that the "commission should adapt its administrative processes to make regulation more efficient and to enable competitors to adapt to changes in the market in a timely manner. The market framework for competitive electric service should, to the extent possible, reduce reliance on administrative process."

The backbone of any such market framework is expansive, reliable and transparent data interchange — the establishment of which is the focus of this proceeding — sufficient to facilitate the nimble decision-making and rule changes necessary to not unduly delay innovation in market operations, and also sufficient in terms of tracking the range of metrics that the Commission and others should rely upon to analyze the performance of the market.

When designing the governance framework, I urge the Commission to consider how customers and municipalities are the best judges of how to meet their own requirements and preferences in the market, but that they are often not able to be fully informed or engaged in the decision-making process. They should be freely supported by a competitive industry in this capacity — e.g. Community Power Aggregators, CEPS, brokers, innovative distributed energy aggregators, etc. — that understands how to meet their requirements better than distribution utilities do. Further, competitive market entities have incentives and technical abilities that are more aligned with retail market innovation compared to distribution utilities. Therefore, the governance framework should be primarily designed to fully engage and leverage these market stakeholders in the decision-making process.

In that context, I would also urge the Commission to fully consider how CPAs are unique in terms of their local control governance, democratic legitimacy, technical knowledge and default customer base responsibilities in terms of both wholesale risk management and retail value chain functions. They have both the incentives and the authority to meaningfully contribute to the Commission's complex task of seeing through the Electric Utility Restructuring Act to its completion.

In support of this recommendation, my testimony has provided several examples of how fully restructured markets have created nimble governance frameworks reliant upon market participants and customer representatives to continuously reform and evolve operating rules and data exchange procedures. I would recommend that the Commission look to how the Texas ERCOT market has structured its governance, specifically their Technical Advisory Committee (TAC) charter, customer representative segments and subcommittee protocols, which I have attached for reference. Additional governance [41]materials are available online. The Commission could implement a similar market-based framework in this proceeding, giving due consideration to the elevated role that market participants, and CPAs in particular, should be expected to play within this governance framework. The Commission should also consider employing a hearing officer, when necessary, in elevating any governance matters to the Commission to resolve.

Q. Does this conclude your testimony?

A. Yes.

[41] Website available online: http://www.ercot.com/committees

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MOTIVATION

Community
Collaboration
Bipartisanship
Effectiveness
Adaptation
Resilience
Affordability
Innovation

CAPACITY

Awareness
Originality
Teamwork
Leadership

EXPERTISE

Agency Design
Agency Operations
-Risk Management
-Origination
-Distributed Energy
-Retail Products
-Regulatory Affairs
-Compliance
-Budgeting
-Change Management
Board Engagement
Public Engagement
Industry Connections

PROFILE

Political Economist, analyst and executive management consultant.

Architect of Community Choice agency governance and operating models, utility partnerships, regulatory strategies and market reforms.

Educator recognized as an industry expert, technologist & strategist.

Advisor to Community Choice agencies, Investor Owned Utilities, public power, municipalities, public advocates, labor and civic groups, and technology firms.

EXPERIENCE

- **Community Choice Partners, Inc.**
  Principal Consultant & Founder 2013- Present

  Architect of Community Choice "2.0 & 3.0" maturity models.
  Advisor to executives and senior staff on agency design and operational realignments, key performance indicators, vendor assessments, staffing plans and culture, regulatory intelligence and strategies, public relations and political campaigns, and stakeholder education.

- **Local Power, Inc.** 2011 - 2013
  Managing Director

  Consultancy that created Community Choice Aggregation.
  Responsibilities included managing projects, staff, and daily operations, in addition to consulting on financial modeling, Distributed Energy and customer-facing smart grid applications.

- **KEMA, Inc.** 2007 - 2011
  Senior Energy Analyst

  Global leader in Smart Grid and utility management consulting.
  Responsibilities included tracking hundreds of emerging technologies, Distributed Energy forecasting for states and utility territories, supporting grid integration simulations and 'Utility of the Future' management consulting teams.

EDUCATION

Bachelor of Arts, International Political Economy 2006
Colorado College
Study Abroad: Fudan University & Maastricht University
Thesis: "*Retreat from Kyoto*", analyzing why and how Federal energy policy became increasingly undemocratic over a period of 40 years.

SELECT PROJECT QUALIFICATIONS

UTILITY CONSUMER ACTION NETWORK

Nonprofit "utility watchdog" in San Diego. Lead expert in Phase 2 PCIA workshops and proceeding. Analysis of utility retail value chain barriers, cost shifting implications, and mitigating solutions re: structural market reform.

Q1 2019 — ONGOING

IBEW LOCAL 11 & NECA LOS ANGELES

Local labor union & electrical contractors association. Engaged to educate broad range of stakeholders in Los Angeles on CCA 2.0 & 3.0 design and the PCIA reform risk through reports, meetings and board presentations. Initial focus on "South Bay" and "West Side" cities that subse-quently joined the Clean Power Alliance. Work products received endorsements from: a Governor of the California Independent Grid Operator (CAISO), the former Assistant General Manager of the Northern California Power Agency (NCPA), the Chair of the Democratic Party Environmental Caucus, the California Alliance for Community Energy (CACE), the Executive Director of 350.org, the Sierra Club Angeles Chapter, and other civic organizations.

Q3 2016 — Q1 2017

COUNTY OF LOS ANGELES

Drafting and submittal of "PCIA Homework" filing to CPUC. Summarized extant PCIA methodology, methodological flaws that would have to be reformed prior to further growth of CCA industry, and a variety of related issues (e.g. IRP coordination, POLR, CAM). Recommended procedural steps for CPUC along with CCA 2.0 & 3.0 design strategies for the industry to manage near-term risks. Subsequent recognition for correctly identifying 'over the horizon' issues that are challenging the industry at present.

Q1 2016

CITY OF SAN DIEGO

Subcontractor to the Protect Our Communities Foundation. Correctly identified that San Diego was sufficiently large to trigger the reformation of the PCIA (an 'industry first'). Recommended a partial enrollment strategy to manage regulatory risk, and provided CCA energy and financial proforma forecasts accompanied by CCA 2.0 design advice. **Q4 2013 — Q4 2014**

LONG BEACH ENERGY RESOURCES DEPT

Engaged by municipal utility staff to support their CCA feasibility study effort. Review of bid submissions, scope of work negotiations with multiple contractors, regular project management support, analytical peer review, education for city staff on CCA issues and assistance in coordination with operational CCAs, public power entities and SCE over the course of the project.

Q2 2018 — Q4 2019

EAST BAY COMMUNITY ENERGY

Expert review and advice in the selection of a portfolio man-ager to assist in the launch and early-stage operations of the CCA; strategy discussions to evolve front-office structures and risk management capabilities.

Q4 2017

SONOMA CLEAN POWER

Technical, financial and strategic consulting services during Phase 2 and 3 (full enrollment) through staff onboarding: load & revenue forecasting; customer data analytics (CCA INFO Tariff and utility EDI data); power supply contract management; procurement support including forecasting of open energy and capacity positions; validation of invoiced PPAs and CAISO wholesale market pass-through costs (charge codes); a variety of monthly, quarterly and annual compliance reports (EIA, CAISO, CEC and CPUC); select regulatory intelligence, business process streamlining & CCA staff tutorials; and program financial "proforma" modeling (for internal budgeting & to support creditworthiness assessments of the agency as a counterparty to suppliers).

Q4 2013 — Q4 2014

DISTRIBUTED ENERGY ASSESSEMENTS

2011 to 2013

SAN FRANCISCO PUBLIC UTILITIES COMMISSION
CALIFORNIA ENERGY COMMISSION (PIER)
CITY OF BOULDER, COLORADO

2007 to 2010

UTILITIES: PG&E, SCE, SDG&E, SoCalGas (CA); HECO, MECO, MELCO (HW); XCEL ENERGY, PRPA (CO); NIPSCO (IN).
STATES OF RHODE ISLAND, CONNECTICUT & MISSOURI
CALIFORNIA PUBLIC UTILITIES COMMISSION

CONFIDENTIAL CLIENTS

CCA Agency: CPUC proceeding survey and strategic advice on DER services & utility Grid Modernization

Q2 2019 — ONGOING

Investor Owned Utility: community partnership advice for markets in which CCA is not enabled

Q2 2019 —ONGOING

SPEAKING ENGAGEMENTS

The Waking Giant: Community Power Market Design (webinar). Municipal Sustainable Energy Forum. 15 July 2020.

Community Power: Design Insights for New Hampshire (panelist). Clean Energy NH's Local Energy Solutions Conference. 15 Nov 2019.

Impacts and Opportunities of Extending the Day Ahead Market to the Energy Imbalance Market (moderator) and **Aligning Transmission with Local Capacity Needs** (panelist). Infocast 11th Annual Transmission Summit West. 22-23 Oct 2019.

Community Power Design for New Hampshire. Conservation Law Foundation's Municipal Roundtable. 18 Sept 2019 & City of Lebanon Energy Action Committee. 29 Aug 2019.

Deep Decarbonization: Reforming Governance (webinar). Municipal Sustainability Forum. 23 July 2019.

Actionable Reforms to Governance and Operational Models to Rapidly Decarbonize Across Different Market Structures. Presentation at the National Renewable Energy Laboratory, workshop on "*Maximizing DER Value for All Stakeholders*". 30 May 2019.

Community Choice: Insights for Utility & Community Partnerships. CCA CEO panel + Q&A for the Board and Executives of an Investor Owned Utility. Q2 2019.

Meeting RPS Requirements in the Customer Choice Era. Panel with Monica Padilla and Amanda Singh. Infocast California Renewable Energy Procurement Summit. 30 April 2019.

Requirements to Operate a Community Choice Agency (presenter), **Data Analytics: Best Practices and a Vision for the Future** (moderator) and **Load Profiling and Other Fundamentals of Effective Procurement** (moderator). Infocast CCA Summit in San Francisco. 28-30 Dec 2018.

Community Choice Aggregation 101. Presentation to the American Public Power Association (at the CEO's request). 6 Sept 2018.

Emerging Opportunities in California. Panelist at The Business of Local Energy Symposium CCA Conference. 4 June 2018.

Energy & Community Choice Aggregation. Panelist with Nick Chaset, Pradeep Gupta and Don Bray. Association of Bay Area Governments (ABAG) General Assembly. 31 May 2018.

Community Choice 2.0 & 3.0 Insights. Interview for the Stratton Report. 15 May 2018.

CCA 2.0 and 3.0 Tutorial Workshop. Organizer of 8-hour workshop at the Infocast CCA Summit. 24 April 2018.

Community Choice Aggregation — Power to the Community. Panel with Ted Bardacke and Julia Pyper (Greentech Media) at the UCLA & USC Energy Innovation Conference. 16 April 2018.

Community Choice Aggregation: Best Practices, Lessons Learned & Distributed Energy Integration (webinar). Municipal Sustainability Forum. 30 Nov 2017.

What's your view of the PCIA exit fee debate and how does this relate to Community Choice 2.0 and 3.0? Interview for the Stratton Report. 15 Nov 2017.

Strategic Insights from Deconstructing CCA & IOU Economics. Presentation at the Infocast Community Choice Energy Summit. 14 Nov 2017.

LA Cities Meetup: CCA 2.0 & 3.0 Program Design Options + LACCE Review. Workshop presentation for the City of Santa Monica. 2 Nov 2017.

Expert Panel: Debate on California's Energy Future & Community Choice. Panel with Matthew Marshall and Gerry Braun. Municipal Sustainability Forum. 22 May 2017.

Executive Briefing: The Community Choice Aggregation Market. Panel with Mark Fillinger and Amanda Rosenberg. Solar Power Finance & Investment Summit. 21 March 2017.

Expert Panel: Updates on Community Choice Aggregation Structures in US, CA and NY Panel with Neil Alexander. Municipal Sustainability Forum. 18 April 2017.

Community Choice Aggregation: Program Design Evolution and Outlook (webinar). Municipal Sustainability Forum. 17 Jan 2017.

SELECT PUBLICATIONS & ANALYSES

Community Power Design for New Hampshire. The Conservation Law Foundation's Municipal Roundtable. 18 September 2019.

Bill is step toward true community energy. The Concord Daily. Community Choice Partners, Inc. 23 July 2019.

SB 286-FN-Local, Relative to Aggregation of Electric Customers by Municipalities and Counties. Strategy memo to the New Hampshire Governor's Office of Strategic Initiatives. Community Choice Partners, Inc. 17 July 2019.

Understanding the Community Choice Energy (R)evolution in California. LinkedIn article. Community Choice Partners, Inc. 15 Oct 2018.

Energy Risk Management Policies of Community Choice Agencies. Comments to the California Public Utilities Commission "Customer Choice En Banc". Community Choice Partners, Inc. 2018.

The Theory and Evolution of Community Choice in California. Comments on the California Public Utilities Commission "draft Green Book". Community Choice Partners, Inc. 2018.

Protest Letter to SCE Advice Letter No. 3781-E. Comments to the California Public Utilities Commission. Community Choice Partners, Inc. 2018.

Advanced Energy Services: Interviews with Five Leading Portfolio Management Companies. South Bay Clean Power initiative. Community Choice Partners, Inc. 2017.

CCA Financial Strategy and Regulatory Risk Analysis. South Bay Clean Power initiative. Community Choice Partners, Inc. 2017.

CCA 2.0 & 3.0 Business Plan. South Bay Clean Power initiative. Community Choice Partners, Inc. 2017.

Response of the County of Los Angeles to Optional Homework Assignment in Preparation for the March 8 Workshop on PCIA Reform. Comments to the California Public Utilities Commission. Community Choice Partners, Inc. 2016.

CCA 2.0 as a Service: Bid in Response to RFP 15-001. Submission to Redwood Coast Energy Authority. Community Choice Partners, Inc. 2016.

San Luis Obispo Renewable Energy Secure Community. California Energy Commission, Public Interest Energy Research (PIER). Local Power, Inc. 2013.

CleanPowerSF (various reports and proforma results). San Francisco Public Utilities Commission. Local Power, Inc. 2013.

Boulder's Energy Future: Localization Portfolio Standard – Electricity and Natural Gas. City of Boulder, Colorado. Local Power, Inc. 2011.

Fast Automated Demand Response to Enable the Integration of Renewable Resources. Lawrence Berkeley National Laboratory and KEMA, Inc. 2012.

Assessment of the Benefits and Costs of Seven PIER-Supported Projects. California Energy Commission. KEMA, Inc. 2010.

Review of Energy Efficiency Program Savings Estimations in Annual Reports and Measurement and Evaluation Studies. California Energy Commission. KEMA, Inc. 2010.

Missouri Statewide DSM Market Potential Study. Missouri Public Service Commission. KEMA, Inc. 2010.

Colorado DSM Market Potential Assessment. Xcel Energy. KEMA, Inc. 2010.

Connecticut Electric Residential, Commercial, and Industrial Energy Efficiency Potential Study. Connecticut Energy Conservation Management Board. KEMA, Inc. 2010.

Platte River Authority Climate Action Plan. Platt River Power Authority. KEMA, Inc. 2009.

Pacific Gas & Electric SmartAC™ 2008 Residential Ex Post Load Impact Evaluation and Ex Ante Load Impact Estimates. PG&E. KEMA, Inc. 2009.

Final Report: Pacific Gas and Electric SmartAC™ Load Impact Evaluation. PG&E. KEMA, Inc. 2008.

2004/2005 Statewide Express Efficiency and Upstream HVAC Program Impact Evaluation. CPUC, CEC, PG&E, SCE, SDG&E, SoCalGas. Itron and KEMA, Inc. 2008.

COMMUNITY POWER SUMMIT

"By Communities, For Communities"

Friday, June 5th, 2020

1 PM to 4 PM

Dear Community Leaders of New Hampshire,

Thank you for accepting this invitation to join your fellow community leaders, and town, city, and county staff and officials for this three hour online interactive workshop on Community Power.

The Community Power Law (RSA 53-E) enables local governments (cities, towns, and counties) to become the default electricity providers for their residents and businesses – to offer innovative customer services and local programs, to competitively procure electricity supply, and to work with regulators, utilities, and businesses to modernize our electricity system. Community Power Aggregations (CPAs) represent an enormous opportunity for our communities and our state as a whole, and it is you, our state's local and community leaders, that are now equipped with the authority and the tools to lead the evolution of our electricity system.

In this workshop, we will come together to learn about Community Power and efforts to establish Community Power New Hampshire (CPNH), a locally governed public power nonprofit to provide enabling services to participating CPAs. We look forward to collaborating with you in leading the development of New Hampshire's Community Power marketplace.

Sincerely,

CPNH Organizing Group

www.communitypowernh.org

COMMUNITY POWER SUMMIT SCHEDULE

12:45 PM — 1:00 PM: ***log-in early for assistance using the online platform (optional)***

1:00 PM – 1:40 PM: ***Welcome | Breakout Group Introductions | Context***

1:40 PM – 2:10 PM: ***Keynote by Girish Balachandran, CEO of Silicon Valley Clean Energy | Q/A***

2:10 PM – 3:40 PM: ***CPNH Joint-Action: Panel Discussion & Breakout Groups | Report Back***

3:40 PM – 4:00 PM: ***Road Map to Community Power and CPNH Launch | Adjourn***

COMMUNITY POWER SUMMIT PURPOSE

1. Build understanding of Community Power and CPNH Joint Action
2. Foster peer-to-peer engagement and relationship building
3. Hear new insights and concerns to inform the organizational design of CPNH
4. Assess which resources should be prioritized and developed to enable Community Power implementation for participating communities

ZOOM VIRTUAL MEETING GUIDELINES & TIPS

- You can control whether you see all the participants or just the speaker by going to the top right corner of your Zoom screen and toggling between Gallery View and Speaker View.
- **Please mute your microphone when you are not speaking.** You can find the microphone by hovering over the bottom of the screen with your cursor. The microphone will be on the far-left side. Click on the microphone icon and it will toggle between Mute and Unmute.
- **If you want to speak or ask a question, please type an asterisk (*) into the Chat box.** We will use these asterisks to create a "stack" of participants who would like to speak. We will call on participants in the order that they sent an asterisk.
- You can **find the Chat by hovering over the bottom of the Zoom screen** and looking for the Chat icon. Click on the icon and a Chat area will appear on the right side of your Zoom screen. To send an asterisk to the Chat, go to the bottom of the Chat area (where it says "To: Everyone"), type an asterisk (*) and hit Return.

COMMUNITY POWER SUMMIT AGENDA

Welcome | Breakout Group Introductions | Context

1 PM – 1:40 PM

The Summit will begin with a short summary of "*How to Use Zoom*" and "*Guidelines for Participating in Virtual Meetings*."

We will then set the stage with an overview of the Summit Agenda & Purpose, along with a review of the opportunities Community Power presents to democratize energy governance, lower energy costs, spur decarbonization and local renewable energy development, and harness market competition to drive innovation in electricity markets.

Afterwards, all participants will be divided into random breakout groups of five and be asked to:

1. Briefly introduce themselves;
2. Share a 60-second story of one energy project their community is proud to have implemented (or looks forward to implementing).

We will then regroup before transitioning to our keynote speaker.

Keynote by Girish Balachandran, CEO of Silicon Valley Clean Energy | Q&A

1:40 PM – 2:10 PM

Girish Balachandran
Chief Executive Officer

SILICON VALLEY CLEAN ENERGY

Silicon Valley Clean Energy (SVCE) is redefining the local electricity market in Santa Clara County, California, by providing its residents and businesses with new renewable and carbon-free clean energy choices at competitive rates. For the thirteen communities that govern SVCE, the community-owned agency serves as the official electricity provider — on a mission to reduce dependence of fossil fuels by providing carbon-free, affordable and reliable electricity and innovative programs at-scale across all communities.

As the Chief Executive Officer, Girish Balachandran develops and implements strategies to empower the Silicon Valley Clean Energy (SVCE) team and community to achieve its ambitious decarbonization goals. Girish leads the passionate employees of SVCE as they creatively solve challenges in the electric supply, built environment and transportation sectors. Girish has more than 29 years of experience in California utilities, including serving as the General Manager of Riverside Public Utilities (RPU) and Alameda Municipal Power (AMP) and previously working for the City of Palo Alto Utilities.

- *Participants who have questions are invited to type their questions, or to type an asterisk ("*") into the Zoom Chat during the presentation.*
- *After the Keynote, participants who have indicated they have a question for the speaker by typing an asterisk ("*") into the Zoom Chat will be called upon to ask their question.*
- *We will follow-up to answer any questions left unaddressed (due to time constraints).*

CPNH Joint Action: Panel & Breakout Group Discussions | Report Out

2:10 PM – 3:40 PM

CPNH JOINT ACTION PANEL DISCUSSION (45 minutes)

The communities of Hanover, Lebanon, Nashua, and Cheshire County are leading an effort to establish CPNH as a new, locally governed public power nonprofit to provide enabling services to Community Power Aggregations through a voluntary and flexible membership structure.

Representatives from these communities will provide an update on the status of CPNH development in a panel discussion format.

Joint Action Panelists

Julia Griffin is the Town Manager of Hanover, a position she has held since 1996. Prior to that, she was City Manager for the City of Concord. As Hanover staff for the Sustainable Hanover Committee, she spends considerable time working on sustainability and renewable energy programs for the Town and its residents.

Clifton Below is serving his 3rd term on the Lebanon City Council where he serves as Assistant Mayor and Chair of the Lebanon Energy Advisory Committee (which acts as the Lebanon Electric Aggregation Committee pursuant to RSA 53-E:6). He served as a Public Utilities Commissioner for the State of New Hampshire (2005-2012) and in the state legislature as a Representative and Senator (1992-2004) where he always served on the energy committees.

Mr. Below is the primary author of SB286 (the Community Power Law) and co-authored RSA 374-F (the "*Electric Utility Restructuring Act*").

Rod Bouchard is Assistant County Administrator for Special Projects & Strategic Initiatives for Cheshire County. He serves as senior manager for operational issues with Cheshire County. Mr. Bouchard has over 40 years of experience in information technologies with firms such as AT&T's Advanced IP division, Intel On-line Services, The Hartford Insurance Group, and Computer Systems Research of Avon, CT (where he was a principal partner).

Doria Brown is the Energy Manager for the City of Nashua, where she works on energy efficiency projects, greenhouse gas accounting, and energy procurement.

Prior to her work with the City of Nashua, Ms. Brown was the Sustainability Specialist at Worthen Industries, where she helped to implement the manufacturing company's sustainability programs.

Ms. Brown graduated from Franklin Pierce University with a BS in Environmental Science (concentrating in Hydrology and Chemistry), enjoys working in the industry and thinks that *"It's an amazing time to be in Energy in New Hampshire!"*

JOINT ACTION BREAKOUT GROUPS (45 minutes)

Following the Panel Discussion, attendees will be divided into twelve separate Breakout Groups:

- Each breakout group will have approximately 6-8 participants.
- The Facilitator will open the breakout group by reading aloud the purpose of the breakout group:

  "To facilitate engagement and discussion among participants, and to collect comments, questions, and feedback. Not all questions will be answered during the breakout session, but questions will be recorded and collected for follow up after the Summit."

  The facilitator will be responsible for ensuring each participant has opportunity to contribute to each discussion question (including themselves), and for keeping the group on-track and on-time.
- Each Breakout Group will include a "CPNH Affiliate and Note-Taker" (who has been involved with the organizing of CPNH). This person will answer questions about CPNH (to the best of their ability at this early stage) and will take notes.

Discussion Questions for Participants

1. What is your name, affiliation, and in one sentence, one thing you would like your community to achieve through Community Power? *(5 minutes)*
2. What unanswered questions or concerns do you have about Community Power or about CPNH? *(10 minutes)*

(We will follow-up to address any unanswered questions, which will also inform CPNH's next steps.)

3. Is your community interested in participating in CPNH? *(25 minutes)*
   a. What's your understanding of how the organization would function in practice?
   b. What level of participation would your community expect to contribute to CPNH's governance, oversight of staff & operations, legislative affairs, other committees, etc.?
   c. What resources should CPNH committees prioritize developing and sharing to enable participating member communities to implement Community Power?
   d. What's the best way for communities to collaborate prior to the formal launch of CPNH?
4. Facilitator invites each Breakout Group Member to share any closing thoughts? *(5 minutes)*

Roadmap to Community Power & CPNH Launch | Adjourn

3:40 PM – 4 PM

Following the Breakout Groups, CPNH affiliates will share one key takeaway from the discussions with collective group.

We will conclude the Summit with a roadmap from today through the launch of CPNH and the first-mover Community Power Aggregations, next steps, and closing remarks.

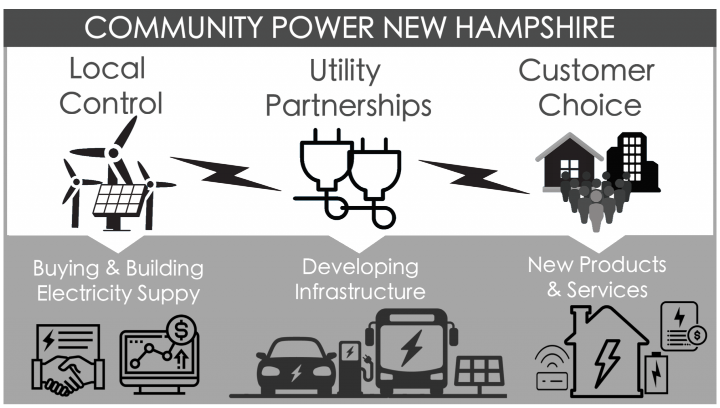
Post-Summit, attendees will receive:

1. Additional follow-up materials;
2. Responses to any questions left unaddressed (due to time constraints).

Community Leaders Join Together to Develop Community Power New Hampshire

This article is authored jointly by a coalition of community representatives and supporting partners working to form Community Power New Hampshire

New Hampshire's Community Power law (SB 286; RSA 53-E) became effective October 1, 2019. It authorizes local governments (cities, towns, and counties) to become the default electricity provider for their residents and businesses — to offer innovative customer services and programs that communities want, to competitively procure electricity supply, and to work with regulators, utilities and competitive businesses to modernize our electrical grid and market infrastructure.



Unlocking the full range of municipal authorities enabled by RSA 53-E could be a game changer for our communities, local infrastructure and the competitive retail electricity market. Successful implementation requires coming up to speed on industry best-practices, navigating complex regulations, coordinating across utilities, and contracting for an array of sophisticated services. That takes a level of expertise and scale beyond the capacity of many municipal governments — now more than ever, given the COVID-19 crisis and our economic outlook.

We believe that joining together to launch Community Power programs is the surest way to create a more coordinated, competitive, decarbonized, and locally governed electricity sector. That's why our group — representing energy committees, town managers and sustainability staff, elected officials, city energy managers, county administrators, and regional planning commissions — is developing Community Power New Hampshire (CPNH).

CPNH is being designed as a new joint action legal entity — governed by communities to serve communities under a voluntary and flexible membership structure — to clear the way for cities, towns, and counties across New Hampshire to launch Community Power programs in 2020 and 2021. Each community will help oversee the enterprise, while controlling their individual electricity rates, program services and policy goals. Once formed, CPNH will competitively enlist best-in-class service providers to support the launch of initial Community Power Programs and provide new members with a menu of services. As CPNH grows, all members will benefit from greater economies of scale, proven best-practices and expert regulatory and policy engagement — all of which supports the evolution of our statewide competitive retail market.

To guide the design of CPNH, we have identified the following goals for Community Power Programs (CPPs), some of which may be prioritized over others by different communities:

1. Strengthen local control and choice: CPPs may craft their own energy portfolios and evolve them over time, set rates for their customers, and allocate surplus revenues for their community.
2. Control and reduce cost: CPPs will have access to competitive rate offerings relative to their utility's de-fault energy service, and the ability to better manage electricity cost drivers (e.g. capacity costs).
3. Accelerate decarbonization through renewable energy: CPPs may procure renewable energy by purchasing Renewable Energy Credits, contracting with existing renewable energy generators, or enabling construction of new renewable energy systems.
4. Stimulate competitive, local markets to benefit customers and communities: CPPs will enable market-driven innovation in customer services and distributed energy technologies (including dynamic and real-time pricing options, onsite generation,

HR REPORT: Proposed "Card Check" Union Election Bills – Historical Context for an Old Proposal

NHARPC CORNER: Rail Trail Planning in New Hampshire Enhancing Transportation, Recreation, Economies, and Health

TECH INSIGHTS: Is Your IT Ready to Support Remote Work?

energy storage, electrification of transportation and heating sectors, and energy efficiency).

5. Modernize infrastructure to strengthen markets and energy resiliency: CPPs may further enable retail market innovation, Smart Cities and energy security for critical facilities through the targeted deployment of advanced meters and communications, distributed energy technologies and microgrids — working in partnership with distribution utilities and others to modernize our shared infrastructure and regulations.
6. Enhance local and regional coordination: CPPs may collaborate on electrifying transportation, streamlining permitting for innovative technologies, and removing other barriers to progress — working together with Regional Planning Commissions, counties, and other partners and coordinating with the Public Utility Commission and Legislature.

CPNH development activities are organized into the four working groups listed below. We're working together upfront to leverage our collective re-sources, minimize staff time and avoid duplicative overhead — and invite local governments interested in Community Power to join and support any area of interest:

Governance Agreement

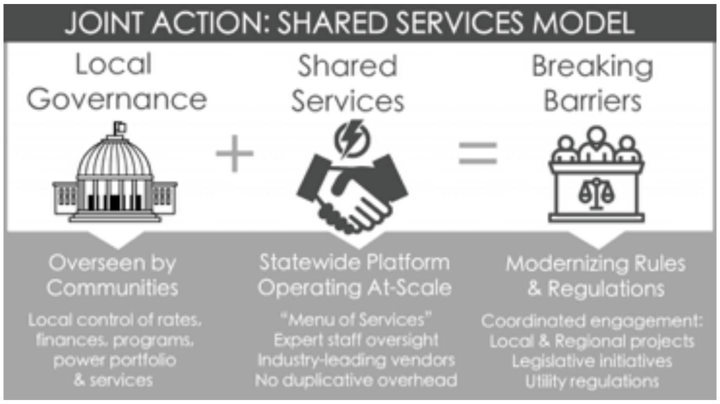
Municipal attorneys are reviewing a Joint Powers Agreement (authorized by RSA 53-A), a contract among local governments to create CPNH. Over the coming months, we will work together to refine the details including the process by which additional local governments may join CPNH.

Regulatory and Legislative Engagement

The Public Utilities Commission is considering a rulemaking process that will affect Community Power programs. Coordination with electric distribution utilities is an important part of Community Power, and the process for enabling the full range of authorities granted by RSA 53-E needs to be clarified by the Commission. CPNH organizers are already actively engaged in this regulatory process.

Operating Model Design

CPNH will likely rely on expert staff for oversight along with competitive service providers for operations, including: (1) active management of a diversified portfolio of wholesale energy contracts and participation in ISO New England electricity markets, and (2) retail customer services including meter communications, data management, call centers and billing.



Careful thought will be given to how CPNH's in-house expertise and contracted services will evolve with the market over time.

Community Engagement

Municipalities across New Hampshire, seventy of which have Local Energy Committees, are interested in how Community Power could offer meaningful control over their energy future.

We believe CPNH is the most efficient and pragmatic way to secure that objective and invite other communities to join our initiative. Over the coming months, we will provide toolkits and templates, and work with partners like NHMA, Clean Energy NH and Regional Planning Commissions to spread the word.

Learn more about CPNH and how to join via our website: **www.CommunityPowerNH.org**.

Save the Date: CPNH will host a virtual Community Power Summit on Friday June 5th.

NH Community Power coalition members:

Town of Bristol: Paul Bemis, Bristol Energy Committee

Town of Harrisville: Mary Day Mordecai , Ned Hulbert, Planning Board

Town of Hanover: Julia Griffin, Town Manager; April Salas, Sustainability Director

City of Lebanon: Clifton Below, Assistant Mayor; Tad Montgomery, Energy and Facilities Manager

City of Nashua: Doria Brown, Energy Manager

Cheshire County: Rod Bouchard, Assistant County Administrator / Special Projects and Strategic Initiatives

Community Power NH supporting partners:

Dori Drachmann, Co-founder, Monadnock Sustainability Hub

Dr. Amro M. Farid, Thayer School of Engineering at Dartmouth

Samuel Golding, President, Community Choice Partners

Jill Longval, Rockingham Planning Commission

Henry Herndon, Clean Energy NH

Electric Reliability Council of Texas Technical Advisory Committee Procedures

TAC Approved: May 29, 2020

Effective as of June 1, 2020

ERCOT
Technical Advisory Committee Procedures

These Technical Advisory Committee (TAC) Procedures are based upon incorporated provisions of the ERCOT Bylaws. Upon amendment of the ERCOT Bylaws, these Procedures should be reviewed to ensure consistency with any Bylaws revisions.

I. FUNCTIONS OF TAC

A. Duties
The TAC shall make recommendations to the Board as it deems appropriate or as required by the Board and perform any other duties as directed by the Board. TAC shall have the authority to create subcommittees, task forces and work groups, as it deems necessary and appropriate to conduct the business of TAC. TAC shall review and coordinate the activities and reports of its subcommittees.

B. Studies
The TAC shall itself, through its subcommittees, or through ERCOT staff, make and utilize such studies or plans as it deems appropriate to accomplish the purposes of ERCOT, the duties of its subcommittees and the policies of the Board. Results of such studies and plans shall be reported to the Board as required by the Board.

C. Prioritization of Projects Proposed by the Market
The TAC shall be responsible for setting the priority of projects approved through the NPRR, SCR and guide revision processes. TAC may delegate the responsibility for recommending the priority of market projects to one of its subcommittees.

II. MEMBERSHIP

A. Qualifications and Appointment
TAC Representatives, as defined in the ERCOT Bylaws Section 3.1, TAC Representatives, shall be elected or appointed according to the provisions of the ERCOT Bylaws and procedures established by the ERCOT Board. An Entity and its affiliates that are Members of ERCOT shall have no more than one representative on TAC.

B. Term of Representatives
TAC Representatives shall be selected annually in December of each year for service in the following calendar year.

C. Membership
The TAC shall be comprised of Representatives of Members from each Market Segment as defined in the ERCOT Bylaws: Independent Retail Providers (and Aggregators), Independent Generators, Independent Power Marketers, Municipals, Cooperatives, Investor Owned Utilities, and Consumers. The Corporate Members of each Segment are responsible for electing or appointing their Representatives to TAC. In addition, the ERCOT Chief Operating Officer (COO) or the ERCOT CEO's designee shall be an ex-officio, non-voting member of TAC. If a Member elects to

engage a consultant to represent them at TAC and/or TAC subcommittees, such consultant shall disclose the Entity or Entities it is representing at each meeting.

D. Vacancies
Vacancies shall be filled in the manner prescribed by the ERCOT Bylaws.

III. CHAIR AND VICE-CHAIR

A. Qualifications and Appointment
As provided in the ERCOT Bylaws, the Chair and Vice-Chair shall be elected by TAC and confirmed by the ERCOT Board.

B. Duties
The Chair shall be responsible for setting the agenda and presiding over all TAC meetings. The Chair shall also report to the Board on behalf of TAC. The Vice-Chair shall act as Chair at TAC meetings in absence of the Chair.

C. Election Process
ERCOT staff will open the floor for nominations for the Chair. Once nominations have been closed, TAC Representatives will cast votes on the nominations for Chair. If there is more than one nomination, ballots will be used for casting votes. Each TAC Representative will be allowed one vote. The candidate receiving a simple majority (51%) of TAC Representatives voting will be elected. If no simple majority is reached, ERCOT staff will identify the two candidates receiving the most votes and conduct another vote. Votes will be conducted until either a simple majority of the TAC is reached or an acclamation of TAC. Following election of the Chair, the Chair election process will be utilized for selecting the Vice-Chair.

IV. MEETINGS

A. Quorum and Action
As provided in the ERCOT Bylaws: Fifty-one percent (51%) of eligible, Seated Representatives of TAC shall constitute a quorum required for the transaction of business; and abstentions do not affect calculation of a quorum. Each voting member represented on TAC may designate, in writing, an Alternate Representative who may attend meetings, vote on the member's behalf and be counted toward establishing a quorum. Each voting member represented on TAC may designate in writing a proxy who may attend meetings and vote on the member's behalf, but shall not be counted toward establishing a quorum. If the TAC Representative wishes to designate an Alternate Representative or proxy, a notification of the designation of such Alternate Representative or proxy must be sent to ERCOT and shall be valid for the time period designated by the TAC Representative. TAC Representatives may participate in the meeting via telephone, but may not vote via telephone and participation via telephone shall not count towards a quorum.

B. Meeting Schedule

The TAC and its subcommittees shall meet as often as necessary to perform their duties and functions.

C. Participatory Voting:

As provided in the ERCOT Bylaws, each Segment may choose to utilize "Participatory Voting" as follows:

If a Segment chooses to engage in Participatory Voting, each TAC Representative elected to serve and present at the meeting shall be required to vote the decision of the majority of Corporate Members of their Segment in attendance at a TAC meeting. A Corporate Member may delegate an employee or agent other than the Member representative to vote on its behalf for purposes of Participatory Voting. If a Corporate Member of a Segment using Participatory Voting is unable or does not wish to attend a TAC meeting, such Member may deliver a written proxy, at any time prior to the start of the meeting to a Participatory Voting delegate of any Member of the same Segment. A Corporate Member delegate in attendance at a TAC meeting may give written proxy to a Participatory Voting delegate of any Member of the same Segment during such meeting. If the consumer Segment chooses to utilize "Participatory Voting", each consumer type (retail, commercial and industrial) with representative(s) present shall each have equal voting strength in determining how the TAC Representatives of the Segment shall vote.

D. Notification

As provided in the ERCOT Bylaws, all meetings of the TAC shall be called by the Chair and all such meeting notices shall be sent in writing (including e-mail or fax) to each member at least one week prior to the meeting. All agenda items requiring a vote of TAC must be noticed for a vote with supporting documentation published at least one week prior to the meeting. Material that becomes available less than one week prior to the meeting may be considered if a majority of the TAC agrees to consider the additional material. An emergency meeting of the TAC may be held with less than one week notice if a majority of the members of TAC consent to the meeting. Any ERCOT Member may request notification of TAC meetings.

E. Conduct of Meetings

The Chair shall preside at all meetings and is responsible for preparation of agendas for such meetings. In the absence of the Chair, the Vice-Chair or another TAC Representative shall preside at the meeting. The Chair, or the presiding Member, shall be guided by Appendix A, ERCOT Meeting Rules of Order, in the conduct of the meetings. ERCOT staff shall be responsible for recording minutes of TAC meetings and distributing such minutes and other communications to all members of TAC and any other parties who express an interest in receiving such information. TAC meetings and TAC subcommittee meetings may be attended by any interested observers; provided, however, persons may be excluded from portions of TAC meetings and TAC subcommittee meetings where third party confidential information is presented or discussed (e.g., confidential vendor or bid information and generation unit information). Participants shall disclose the Entity or Entities they are representing at each TAC and/or TAC subcommittee meeting.

F. Voting

In matters determined by the Chair to require a vote of TAC, or when any TAC Representative requests a vote on an issue, each TAC Representative shall have one vote. As provided in the ERCOT Bylaws, an act of TAC requires affirmative votes of: (i) two-thirds of the Eligible Voting Representatives of TAC; and (ii) at least 50% of the total Seated Representatives. For purposes of voting on TAC, TAC representatives shall not have their votes included in the total number of votes from which the requisite percentage of affirmative votes is required for action if: (i) they are not present and have not designated a proxy, or (ii) they abstain from voting.

G. Electronic Mail Voting

In matters determined by the Chair to require a vote of TAC which are urgent or otherwise require action prior to the next meeting, a vote via electronic mail (e-mail vote) may be utilized. A request for an e-mail vote can only be initiated by the Chair or Vice Chair. An e-mail vote is permitted provided a notification is distributed to the TAC distribution list that includes a detailed description of the issue or proposition and accompanied by supporting documentation. For e-mail votes, a quorum of Standing Representatives must participate in the vote. Participation requires casting a vote or abstaining. Votes shall be submitted to ERCOT for tallying by the close of two Business Days after notification of the vote. Votes are tallied in the same manner as a regular meeting. The final tally shall be distributed to the TAC distribution list and posted on the ERCOT website.

V. SUBCOMMITTEES

A. Duties

Subcommittees shall make recommendations to TAC as they deem appropriate or as required by TAC and shall perform any other duties as directed by TAC.

B. Alternate Representatives and Proxies

Each Standing Representative of a subcommittee may designate in writing an Alternate Representative who may attend meetings, vote on the Standing Representative's behalf and be counted toward establishing a quorum. Each Standing Representative of a subcommittee (except for the Protocol Revision Subcommittee (PRS)) may designate, in writing, a proxy who may attend meetings and vote on the member's behalf, but shall not be counted toward establishing a quorum. If the Standing Representative wishes to designate an Alternate Representative or proxy, a notification of the designation of such Alternate Representative or proxy must be sent to ERCOT and shall be valid for the time period designated by the Standing Representative. Alternate Representatives, if not employed by the voting member thereby represented, must be confirmed in writing by such member (signed by a duly authorized representative of the member).

C. Chair and Vice Chair

Unless otherwise directed by TAC, the Standing Representatives of each subcommittee shall elect a Chair and Vice-Chair from the subcommittee's standing membership for a term of one year on a calendar year basis. The Chair and Vice-Chair shall be confirmed by TAC. Each Chair shall be responsible for setting the agenda and presiding over respective subcommittee meetings. The Chair shall also report on subcommittee activities and present recommendations to TAC. The Vice-Chair shall act as Chair at subcommittee meetings in the absence of the Chair.

D. Meetings and Notification

The subcommittee Chair is responsible for calling meetings as often as necessary for the subcommittee to perform its duties and functions. Meeting notices shall be sent to each Standing Representative, the subcommittee distribution list, and posted on the ERCOT website at least one week prior to the meeting, unless an emergency condition requires a shorter notice.

In addition, subcommittee meetings are attended by ERCOT Staff person(s) who coordinate ERCOT support of the meeting, including meeting arrangements, meeting minutes, and ERCOT Staff participation in the meeting.

E. Appeal Procedures

Any Entity that demonstrates it is affected by a TAC subcommittee decision (including but not limited to those listed in Protocol Section 21, Revision Request Process) may appeal the TAC subcommittee vote to TAC utilizing the following process:

1. Any appeal (including requested relief) must be submitted to ERCOT (RevisionRequest@ercot.com) within seven days after the date of the TAC subcommittee vote.
2. Appeals shall be heard at the next regularly scheduled TAC meeting that is at least seven days after the date of the requested appeal.
3. The appropriate TAC subcommittee Chair or Vice-Chair shall designate a TAC subcommittee advocate to defend the TAC subcommittee vote prior to the TAC meeting.
4. ERCOT shall notify the TAC and the relevant TAC subcommittee of the appeal and the TAC subcommittee advocate.
5. The appealing party and the TAC subcommittee advocate shall provide a position statement to ERCOT prior to the TAC meeting. Any other interested Entity may also provide a position statement to ERCOT prior to the TAC meeting. Position

statements should be submitted to ERCOT by no later than 1700 Central Prevailing Time on the day prior to the TAC meeting.

6. ERCOT will distribute all position statements to the TAC.
7. The TAC Chair or Vice-Chair will allocate a designated amount of time on the agenda for consideration of the appeal allowing for the appealing party, TAC subcommittee advocate, and any Entities providing position statements to address the TAC on the TAC subcommittee vote.
8. An appeal of a TAC subcommittee vote does not require a motion by the TAC. TAC shall vote on the appealing party's requested relief after consideration of the appeal. If the TAC vote fails to grant the appealing party's requested relief, the appeal shall be deemed rejected by TAC unless at the same meeting TAC later votes to recommend approval of, defer, remand or refer the issue. The rejected appeal as well as any other TAC votes shall be subject to appeal pursuant to ERCOT Board Policies and Procedures, Section VIII. Appeal Procedures.
9. The TAC Chair or Vice-Chair may override any deadline in this Section for good cause shown.

An expedited process may be utilized for appeals of (a) TAC subcommittee votes related to decisions on items designated as Urgent; or (b) any other TAC subcommittee vote that the TAC Chair or Vice-Chair designates as urgent. Such appeals must be submitted to ERCOT (RevisionRequest@ercot.com) within 48 hours after the end of the relevant TAC subcommittee meeting and shall be heard at the next regularly scheduled TAC meeting.

F. Working Group/Task Force

1. Comments or Revision Requests. Working groups and task forces must obtain approval from the governing TAC subcommittee (or TAC if the working group or task force reports directly to TAC) prior to submitting to ERCOT for official posting of new Revision Requests or comments on Revision Requests when the governing TAC subcommittee (or TAC if the working group or task force reports directly to TAC) is not the next approval authority of such new Revision Requests or comments.

2. Chair and Vice Chair. Participants at working group and task force meetings will offer nominations for Chair and Vice Chair which will be subject to approval by TAC or the governing TAC subcommittee.

G. Standing TAC Subcommittees

There shall be four standing TAC subcommittees with representatives as follows:

1. Retail Market Subcommittee (RMS); Reliability and Operations Subcommittee (ROS); and Wholesale Market Subcommittee (WMS)

Membership: Membership shall consist of one to four Standing Representatives from each Segment elected or appointed by the voting members of the respective Segment, with the exception of the Consumer Segment. The Consumer Segment shall consist of three subsegments (Residential, Commercial, and Industrial). The number of Standing Representatives for each Segment shall be determined by the TAC members representing that Segment. Standing Representatives, if not employed by the voting member thereby represented, must be confirmed in writing by such member (signed by a duly authorized representative of the member). These will be the voting members of the subcommittee. ERCOT shall appoint appropriate staff member(s) to attend and participate in the subcommittee meetings. A Member entity and its affiliates that are also ERCOT Members shall have no more than one representative per TAC subcommittee as it pertains to Section V. G. 1.

Quorum: At least one Standing Representative from each of four Segments and a majority of the Standing Representatives must be present at a meeting to constitute a quorum. Standing Representatives may participate in the meeting and vote via telephone, but participation via telephone shall not count towards a quorum.

Votes: Each Segment shall have a Segment Vote of 1.0 except the Consumer Segment, which shall have a Segment Vote of 1.5. Segment Votes shall be equally divided into Fractional Segment Votes among the Standing Representatives, designated Alternate Representatives and proxies of each Segment that cast a vote. The Consumer Segment Vote shall be equally divided into a Fractional Segment Vote of 0.5 for each of the three subsegments. The Fractional Segment Vote for each subsegment of the Consumer Segment is allocated to the Standing Representatives, designated Alternate Representatives, and proxies of the subsegment casting a vote. For the Consumer Segment, if no Standing Representative from a subsegment is present at a meeting, the Consumer Segment vote is allocated equally to the subsegment(s) that cast a vote. If a representative from a subsegment abstains from a vote, the fraction of the Consumer Segment Vote allocated to such representative is not included in the vote tally.

Voting: Only Standing Representatives, their designated Alternate Representative, or proxy may vote. A motion of the subcommittee passes when a majority (unless a two-thirds vote is required for the motion as prescribed in Appendix A, ERCOT Meeting Rules of Order) of the aggregate of the Fractional Segment Votes are (i) affirmative, and (ii) a minimum total of three. The results of all votes taken will be reported to TAC, whether or not the vote passed.

Abstentions: In the event that a voting member, their designated Alternate Representative, or proxy, is not present during a roll call vote, or abstains from voting, that member's fractional vote will be reallocated equally among the remaining voting members of that Segment; except for the Consumer Segment.

E-Mail Voting: An e-mail vote is permitted provided a notification is distributed to the subcommittee distribution list that includes a detailed description of the issue or proposition. A request for an e-mail vote can only be initiated by the Chair or Vice Chair. A quorum of Standing Representatives must participate in the e-mail vote. Participation requires casting a vote, or abstaining. Votes shall be submitted to ERCOT for tallying by the close of two Business Days after notification of the vote. Votes are tallied in the same manner as a regular meeting. The final tally shall be distributed to the subcommittee distribution list and posted on the ERCOT website.

2. Protocol Revision Subcommittee (PRS)

The PRS is mandated by the ERCOT Protocols.

Membership: Membership shall consist of two Standing Representatives from each Segment. Each Standing Representative may designate in writing an Alternate Representative who may attend meetings, vote on the Standing Representative's behalf and be counted toward establishing a quorum. However, Standing Representatives at PRS may not assign proxy

Quorum: In order to take action, a quorum must be present. A quorum is defined as at least one Standing Representative in each of at least four Segments.

Votes: At all meetings, each Segment shall have one Segment Vote. The representative of each Voting Entity, present at the meeting and participating in the vote, shall receive an equal fraction of its Segment's Vote, except for the Consumer Segment which shall be divided into three subsegments (Residential, Commercial, and Industrial) that receive one third of the Consumer Segment Vote. Within each Consumer Segment subsegment, the representative of each Voting Entity casting a vote shall receive an equal fraction of its subsegment's vote. For the Consumer Segment, if no representative from a subsegment casts a vote, such subsegment's fractional vote is allocated equally to the subsegment(s) that cast(s) a vote. For purposes of counting votes in the Consumer Segment, an abstention shall not be considered as a cast vote.

Voting Entities: Entities entitled to vote (Voting Entities) are ERCOT Corporate Members, ERCOT Associate Members, and ERCOT Adjunct Members. Voting Entities must align themselves each calendar year with a Segment for which they qualify or, for Adjunct Members, a Segment to which they are similar. Voting Entities that align themselves with a Segment must be aligned with that same Segment for all TAC subcommittees, and remain aligned with that Segment for the entire calendar year. For each Subcommittee that is part of Section V. G. 2., a Member entity and its affiliates that are also ERCOT Members must designate one Segment in which to participate and vote for the Subcommittee term regardless of the Segment for which the entity or its affiliate qualifies. Once the designation is made an entity and its affiliates may not vote in another Segment for one calendar year in that Subcommittee; provided, however, that if due to changed circumstances Members subject to such designation become no longer affiliated, the Members no longer affiliated shall each, upon notifying ERCOT, thereafter be eligible to participate and vote in the Subcommittee in a Segment for which it is eligible. If multiple affiliates attend a meeting, the Corporate Member shall designate the Voting Entity.

If Alternate Representatives are not employed by the voting member thereby represented, they must be confirmed in writing by such member (signed by a duly authorized representative of the member). Voting Entities must be present at the meeting to vote as they are not allowed to vote via the telephone or to designate a proxy.

Voting: Only one representative of each Voting Entity present at the meeting may vote. Voting Entities may be represented by a direct employee, or may file a letter of agency designating an individual not directly employed by the Voting Entity to vote on its behalf. Agents holding letters of agency for more than one Voting Entity may vote on behalf of only one Voting Entity at any particular meeting.

A motion of the subcommittee passes when a majority (unless a two-thirds vote is required for the motion as prescribed in Appendix A, ERCOT Meeting Rules of Order) of the aggregate of the fractional Segment Votes are (i) affirmative, and (ii) a minimum total of three. The results of all votes taken will be reported to TAC, whether or not the vote passed.

Abstentions: In the event that a representative of a Voting Entity abstains from a vote, the Segment Vote is allocated among the members casting a vote. Abstentions within the Consumer Segment shall be addressed as described above.

E-Mail Voting: An e-mail vote is permitted provided a notification is distributed to the subcommittee distribution list that includes a detailed description of the issue or proposition. E-mail votes for PRS are primarily conducted for administrative purposes. A request for an e-mail vote can only be initiated by the Chair or Vice Chair. For e-mail votes, each Standing Representative shall have one vote and a quorum of Standing Representatives must participate in the vote. Participation requires casting a vote or abstaining. The affirmative votes of eight Standing Representatives shall be the act of the subcommittee by e-mail vote. Votes shall be submitted to ERCOT for tallying by the close of two Business Days after notification of the vote. A PRS e-mail vote on a request for Urgent Status shall be submitted to ERCOT for tallying within 48 hours. The final tally shall be distributed to the subcommittee distribution list and posted on the ERCOT website.

VI. VOTING AT REMOTE MEETINGS FOR TAC AND TAC SUBCOMMITTEES UNDER EXTENUATING CIRCUMSTANCES DECLARATION

Under extenuating circumstances (an emergency or public necessity, including but not limited to an imminent threat to public health or safety, or a reasonably unforeseen situation) and after consulting with the TAC Chair and Vice Chair, the ERCOT General Counsel may declare that remote voting is permitted for TAC and TAC Subcommittee duties and functions. A notice will be sent to all ERCOT Members and a Market Notice will be sent to all Market Participants when such a declaration begins and when the return to normal meeting procedures resumes. Any such meeting must use conference telephone or other similar communications equipment, or another suitable electronic communications system, including videoconferencing technology or the Internet, or any combination, if the telephone or other equipment or system permits each person participating in the meeting to communicate with all other persons in the meeting. Participation in a meeting shall constitute presence in person at such meeting, except where a person participates in the meeting for the express purpose of objecting to the transaction of any business on the ground that the meeting is not lawfully called or convened. In such meetings, TAC and TAC Subcommittees may vote via such electronic communications system. If necessary as determined by the Chair and Vice Chair, validation of the votes taken via such electronic communications system will be conducted after the meeting.

VII. AMENDMENT

These Procedures may be amended upon motion by any member of TAC and approval of that motion by vote of TAC, provided such amendment may not be in conflict with the ERCOT Bylaws, Board Procedures, or Board resolutions. The ERCOT Board may, upon its own motion, amend these Procedures upon reasonable notice to the TAC membership.

Appendix A, ERCOT Meeting Rules of Order

Introduction:

These rules of order provide parliamentary procedure at all TAC and TAC Subcommittee meetings and are intended to ensure order and fairness in the decision making process. The minimum quorum to convene a meeting shall be as described in the TAC Procedures for each respective stakeholder group. Robert's Rules of Order shall guide stakeholder meetings in all areas not addressed by the ERCOT Protocols, ERCOT Bylaws, TAC Procedures, subcommittee charters, or these rules. Any conflicts between these rules and Robert's Rules of Order shall be determined in favor of these rules.

Main Motions

Main motions are used to present new business, such as action to be taken on Revision Requests, concepts, and methodologies.

Main Motion Examples:

YOU WANT TO:	YOU SAY:	2ND?	DEBATE?	AMEND?
Endorse "X" methodology	I move to endorse "X" methodology	Yes	Yes	Yes
Take action as defined in Protocol Section 21 on an NPRR (e.g., recommend approval, reject, defer decision, refer or remand)	I move to recommend approval of NPRR	Yes	Yes	Yes

Secondary Motions

Secondary motions address procedural issues and assist with the order and management of the meeting. They are applicable to pending main motions and discussion items equally.

Secondary Motion Examples:

YOU WANT TO:	YOU SAY:	2ND?	DEBATE?	AMEND?
Close the meeting	I move to adjourn	Yes	No	No
Take break	I move to recess for	Yes	No	Yes
Lay aside temporarily	I move to table/defer	Yes	Yes	Yes
Return to a previously tabled item	I move to remove from the table the item regarding*	Yes	Yes	Yes
Stop debate and vote	I call the question*	Yes	No	No

Limit or extend debate	I move that debate be limited/extended to*	Yes	No	No
Refer to another stakeholder group	I move to refer the motion/discussion to	Yes	Yes	Yes
Modify the wording of a motion	Will you accept a friendly amendment to	No	No	No
Modify the wording of a motion	I move to amend the motion to	Yes	Yes	Yes
Withdraw motion	I withdraw my motion	No	No	No
Reconsider a previous motion	I move to reconsider	Yes	Yes	Yes
Ask a question on the rules	Question on the rules/point of order	No	No	No
Suspend the rules of Notice	I move to waive notice for*	Yes	Yes	No

** Requires a two thirds vote in favor for approval.*

Motion Descriptions:

Table:
This motion postpones a discussion item indefinitely or for a specified time. If a time is specified the group may return to the discussion item prior to the expiration of the specified time with the adoption of a motion to *take from the table*. If no time to return to the item was specified the chair may direct the return to the item at their discretion.

Call the question:
This motion closes debate and is applicable only to the immediately pending motion. Once adopted, no further debate is allowed and a vote on the pending question must immediately be conducted. If a *motion to call the question* is adopted while an amendment is pending, then a vote is taken immediately on the amendment. Once the vote on the amendment is complete, then debate on the main motion may continue. To be applicable to a main motion, a *motion to call the question* must be adopted while the main motion is immediately pending. This motion requires a two thirds vote in favor for approval.

Limit/Extend debate:
The *motion to limit debate* requires that all debate regarding a particular pending motion be completed before the expiration of a specified amount of time. The allotted time for discussion may be extended through a *motion to extend debate*. The chair must immediately conduct a vote on the pending motion at the expiration of time. This motion requires a two thirds vote in favor for approval.

Refer:
The Chair may, without objection by any voting member, direct any discussion item to any working group or task force of the subcommittee, or request review by any other TAC Subcommittee. If adopted, this motion requires the Chair to take this action per the direction of the motion.

Friendly Amendment:
This is a request to revise the language of a pending motion and is directed at the mover and second of a pending motion. If accepted by the mover and the second, the pending motion is amended without the need for action by the group. If the friendly amendment is opposed by either the pending motion mover or the second, then the pending motion remains in its original form. If the friendly amendment is accepted by the mover, but opposed by the main motion second, and the second is withdrawn, the Chair may solicit an alternate second. If an alternate second is provided, the pending motion is amended without the need for action by the group. This motion has the same class and rank order as the more formal *motion to amend*. A pending motion may also be amended through the formal amendment process (see "Amend" below).

Amend:
If adopted, this motion revises the language of the pending motion regardless of opposition by the pending motion mover or second. This motion itself requires a second and is adopted by a vote of the group per TAC Procedures.

Waive Notice:
The usual course of business for TAC and TAC Subcommittees is to post and distribute a meeting agenda indicating items upon which respective groups will be voting at least one week in advance. Adoption of a *motion to waive notice* authorizes a vote upon items with insufficient notice. This motion requires a two thirds vote in favor for approval.

Withdraw:
This is a unilateral action by the mover or the second of a pending motion. If the mover withdraws, the pending motion is terminated. If the second withdraws, then the motion remains as a properly laid motion without a second for which any other member may second. A *withdrawal* by either the mover or the second ceases to be available once the Chair has begun the vote on the motion or while a *motion to call the question* is pending.

Reconsider:
This motion renews consideration of a particular item or motion previously considered during the current meeting. The mover of a *motion to reconsider* must be a member that voted on the prevailing side of the motion to be reconsidered, and must clearly identify the motion or action to be reconsidered. Once a *motion to reconsider* has been adopted by the committee, any member may move to void, amend or, reinstate the motion or decision that is reconsidered. If a *motion to reconsider* has been adopted regarding a particular item, but no further action is then taken, the previous motion or decision remains in effect as if the *motion to reconsider* had not been adopted. For the purposes of this paragraph, a meeting held over multiple days shall

be considered as a single meeting if it is held by the same stakeholder group and the days of the meeting are contiguous.

ERCOT TAC Representatives – 2020

Consumer	Residential: Shawnee Claiborn-Pinto – OPUC Residential: Eric Goff Commercial: Phillip Boyd – City of Lewisville Commercial: Chris Brewster – City of Eastland Industrial: Garrett Kent – CMC Steel Texas Industrial: Bill Smith – Air Liquide
Cooperative	John Dumas – Lower Colorado River Authority Clif Lange – South Texas Electric Cooperative Roy True – Brazos Electric Power Cooperative Michael Wise – Golden Spread Electric Cooperative
Independent Generator	Bob Helton – Engie North America Ian Haley – Luminant Generation Colin Meehan – First Solar Bryan Sams – Calpine Corporation
Independent Power Marketer	Kevin Bunch – EDF Trading North America Jeremy Carpenter – Tenaska Power Services Clayton Greer – Morgan Stanley Resmi Surendran – Shell Energy North America
Independent Retail Electric Provider	Bill Barnes – Reliant Energy Retail Services Eric Blakey – Just Energy Texas Sandy Morris – Direct Energy Shannon McClendon – Demand Control 2
Investor Owned Utility	Walter Bartel – CenterPoint Energy Collin Martin – Oncor Electric Delivery Keith Nix – Texas-New Mexico Power Company Richard Ross – AEP Service Corporation
Municipal	Dan Bailey – Garland Power and Light Jose Gaytan – Denton Municipal Electric Alicia Loving – Austin Energy David Kee – CPS Energy

Electric Reliability Council of Texas

RETAIL MARKET SUBCOMMITTEE PROCEDURES

TAC Approved
May 24, 2018

Effective as of June 1, 2018

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ERCOT
Retail Market Subcommittee

Subcommittee Structure

The structure of the subcommittee is included in the Technical Advisory Committee Procedures, Section V, Subcommittees. The Retail Market Subcommittee (RMS) will follow the election process as described in the Technical Advisory Committee Procedures, Section III, Chair and Vice-Chair, C, Election Process.

Scope

The Retail Market Subcommittee (RMS), reporting to the Technical Advisory Committee (TAC), evaluates, and reviews issues related to the operation of the retail market in the ERCOT Region and makes recommendations for improvement, when deemed appropriate, to TAC. The RMS will be responsible for monitoring Public Utility Commission (PUCT) rulings as they apply to Retail Markets and Retail Market Participants and ensure that PUCT requirements are reflected in the ERCOT Market Guides and Protocols. The guiding principle behind the work of the RMS is to help ensure an efficient and nondiscriminatory retail market for all Market Participants.

The functions of this subcommittee include oversight of, but are not limited to:

- Retail transactions and business processes
- Retail market testing
- Retail Reports and Extracts
- Data Transport
- Retail Metering
- Market Participant communication needs for retail operations issues
- Load Profiling
- Retail Market Training

The subcommittee will also promptly prepare and submit a revision request for any issues identified that require a change to the ERCOT Protocols and Guides. The subcommittee shall communicate with other TAC subcommittees, and shall report back to the RMS on a regular basis. Furthermore, the subcommittee will review Nodal Protocol Revision Requests for effects on the retail market.

The subcommittee will report to TAC on a regular basis or as otherwise directed by TAC. The subcommittee will continually evaluate subcommittee functions to identify those that could potentially be performed by ERCOT and submit any recommended changes to TAC. The subcommittee chair will normally attend TAC meetings.

Standing and Ad Hoc Working Groups

In order to discharge its responsibility, the subcommittee may form standing working groups and temporary or ad hoc working groups with representation of each working group being appointed or approved by the subcommittee. The members of the working group shall elect from amongst themselves a chair and vice chair, subject to confirmation by the RMS, for a one-year term on a calendar year basis or until the working group is no longer required. The subcommittee will direct these working groups, make assignments and retire the working groups as necessary.

All subcommittee working groups are responsible for reporting planned activities/projects and results to the subcommittee for review and to submit any budget requirements to the subcommittee to be forwarded to TAC for approval. All working group actions are subject to subcommittee review. Materials submitted by working groups that require RMS approval will be submitted to RMS members for review one week prior to the scheduled RMS meeting.

2020 RMS Goals

TAC Approved June 24, 2020

1. Align Retail Market Subcommittee Goals with TAC goals and the strategic vision of the ERCOT Board of Directors.
2. Maintain rules that support Retail Market processes and promote market solutions that are consistent with PURA and PUC.
3. Collaborate with WMS to ensure the incorporation of demand response and load participation in the Wholesale market including participation in the ERCOT annual demand response survey.
4. Support ERCOT's initiatives to develop retail processes for integrating or transitioning Load into ERCOT as needed.
5. Explore and implement Retail Market enhancements, process improvements, cost efficiencies, and evaluate lessons learned from previous events.
6. Maintain market rules that support open access to the ERCOT retail market.
7. Continue to work with ERCOT to develop Protocols and other market improvements that support increased data transparency and data availability to the market.
8. Assess and develop Retail Market training initiatives that may include ERCOT's Learning Management System's (LMS) online modules and Instructor Led Market Training courses and/or webinars.
9. Assess and improve communications and notifications processes for all Market Participants including ERCOT.
10. Work with ERCOT staff and Transmission and Distribution Service Provider staff to address issues and facilitate improvements to market rules pertaining to load profiling as reflected in the ERCOT Protocols and the Load Profiling Guide.
11. Monitor Retail Load Profiling Annual Validation.
12. Support retail system testing and implementation and continue to monitor performance post-implementation.
13. Support ERCOT's Summer preparedness efforts including Mass Transition drill and associated workshops.

ERCOT RMS Representatives – 2020

Consumer	Chris Brewster – City of Eastland Shawnee Claiborn-Pinto – OPUC
Cooperative	Christian Powell – Pedernales Electric Cooperative Connie Hermes – South Texas Electric Cooperative Daniel Kueker – Brazos Electric Power Cooperative Frank Wilson – Nueces Electric Cooperative
Independent Generator	John Schatz – Luminant Generation Angela Ghormley – Calpine Corporation
Independent Power Marketer	John Moschos – Tenaska Power Services Emily Black-Huynh – EDF Trading North America
Independent Retail Electric Provider	Eric Blakey – Just Energy Norm Levine – Direct Energy Kyle Patrick – Reliant Energy Retail Services Amir Khan – Chariot Energy
Investor Owned Utility	Jim Lee – AEP Service Corporation Debbie McKeever – Oncor Electric Delivery Diana Rehfeldt – Texas-New Mexico Power Company Kathy Scott – CenterPoint Energy
Municipal	Wayne Callender – CPS Energy Timothy Crabb – City of College Station Robert Heimer – Austin Energy David Werley – Bryan Texas Utilities

Electric Reliability Council of Texas

RELIABILITY AND OPERATIONS SUBCOMMITTEE PROCEDURES

TAC Approved
March 23, 2017

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ERCOT
Reliability and Operations Subcommittee

Subcommittee Structure

The structure of the subcommittee is included in Section V. of the Technical Advisory Committee (TAC) Procedures.

Scope

The Reliability and Operations Subcommittee (ROS), reporting to the TAC, evaluates and reviews ERCOT system studies and is responsible to review operations of ERCOT in relation to system security, Operating Guides application, and emergency operations. The ROS will be responsible for monitoring Public Utility Commission (PUCT) rulings as they would apply to Market Participants responsible for reliability and ensure that PUCT requirements are reflected in the Operating Guides and Protocols. The ROS performs such other duties as it deems appropriate and makes recommendations to TAC. It is the TAC's expectation that the subcommittee chairs will coordinate with each other, particularly on issues being addressed in one subcommittee that may have an impact on or require input from another subcommittee.

The primary functions of ROS are the development, review and maintenance of Operating Guides, Planning Guides, and other planning criteria and the review of ERCOT reports and operations related to the reliable operation of the ERCOT System. The ROS will perform ERCOT Protocol required review of Ancillary Service provision and commercially significant constraints. The ROS will periodically review ERCOT reports and procedures relating to planning assessment, Partial Blackout or Blackout restoration procedures, coordination of protective relay settings, operational communication facilities, operating reserve obligations, emergency operations, abnormal system conditions, transmission interconnections to generation, coordination of Outage schedules and other activities as they apply to reliability and operations. The ROS will review ERCOT Protocol revisions as they may impact ERCOT System reliability and operations.

The subcommittee will report to the TAC on a regular basis or as otherwise directed by the TAC. The Subcommittee chair will normally attend TAC meetings.

Standing and Ad Hoc Working Groups

In order to discharge its responsibility, the subcommittee may form standing working groups and temporary or ad hoc task forces with representation on each working group being appointed or approved by the subcommittee. The subcommittee chair, with subcommittee approval, will appoint the chair for each working group to the shorter of a one-year term on a calendar year basis or until the working group is no longer required. The subcommittee will direct these working groups and make assignments as necessary.

Black Start
Dynamics
Network Data Support

Operations Training
Operations
Outage Coordination
Performance, Disturbance, and Compliance
Planning
Resource Data
Steady State
System Protection
Voltage Profile

The Subcommittee may form other standing working groups and temporary or ad hoc task forces on an as needed basis.

All subcommittee working groups are responsible to report planned activities/projects and results to the subcommittee for review and to submit any budget requirements to the subcommittee to be forwarded to TAC for approval. All working group actions are subject to subcommittee review.

Working Group/Task Force Comments or Revision Requests

ROS Working Groups and Task Forces shall submit Revision Requests and comments per paragraph (F) of Section V, Working Group/Task Force Comments or Revision Request, of the TAC Procedures.

Electric Reliability Council of Texas

WHOLESALE MARKET SUBCOMMITTEE PROCEDURES

TAC Approved
May 25, 2017

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ERCOT
Wholesale Market Subcommittee

Subcommittee Structure

The structure of the subcommittee is included in Section V. of the TAC Procedures.

Scope

The Wholesale Market Subcommittee (WMS), reporting to the Technical Advisory Committee (TAC), evaluates, and reviews issues related to the operation of the wholesale market in the ERCOT Region and make recommendations for improvement, when deemed appropriate, to TAC. The WMS will be responsible for monitoring Public Utility Commission (PUCT) rulings as they apply to Wholesale Markets and Wholesale Market Participants and ensure that PUCT requirements are reflected in the ERCOT Market Guides and Protocols. The guiding principle behind the work of the WMS is to help ensure an efficient and nondiscriminatory wholesale market for all Market Participants.

The functions of this subcommittee include, but are not limited to:

- Provide input into changes to Ancillary Services provisions of the Protocols
- Provide policy input into evaluations of Resource adequacy in the ERCOT Region
- Involvement in the Settlement rules review and compliance process at the QSE level
- Review and comment on Settlement metering standards and guides
- Monitor of Ancillary Service market operation, Competitive Constraints and congestion
- Review/monitor the dispatch process and dispatcher behavior

The subcommittee will also promptly prepare and submit a revision request for any issues identified that require a change to the ERCOT Protocols. The subcommittee shall communicate with other TAC subcommittees, and shall report back to the WMS on a regular basis. Furthermore, the subcommittee will review Nodal Protocol Revision Requests for effects on the wholesale market.

The subcommittee will report to TAC on a regular basis or as otherwise directed by TAC. The subcommittee will continually evaluate subcommittee functions to identify those that could potentially be performed by ERCOT and submit any recommended changes to TAC. The subcommittee chair will normally attend TAC meetings.

Standing and Ad Hoc Work Groups

In order to discharge its responsibility, the subcommittee may form standing work groups and temporary or ad hoc work groups with representation on each work group being appointed or approved by the subcommittee. The subcommittee chair, with subcommittee approval, will appoint the chair for each work group to the shorter of a one-year term on a calendar year basis or until the work group is no longer required. The subcommittee will direct these work groups and make assignments as necessary.

All subcommittee work groups are responsible to report planned activities/projects and results to the subcommittee for review and to submit any budget requirements to the subcommittee to be forwarded to the TAC for approval. All work group actions are subject to subcommittee review.

Electric Reliability Council of Texas

PROTOCOL REVISION SUBCOMMITTEE PROCEDURES

December 1, 2011

ERCOT
Protocol Revision Subcommittee

Purpose

These procedures are intended to define the roles of participants in the Protocol Revision Subcommittee (PRS), the process for addressing revisions requests, and the relationship with the Technical Advisory Committee (TAC) and other TAC Subcommittees.

Subcommittee Structure

The structure of the PRS is included in Section V. Subcommittees, of the TAC Procedures. The PRS will follow the election process as described in the Technical Advisory Committee Procedures, Section III, Chair and Vice-Chair, C, Election Process.

Scope

The PRS, reporting to the TAC, is responsible for reviewing and recommending action on formally submitted Nodal Protocol Revision Requests (NPRRs) and System Change Requests (SCRs) ("Revision Request"). PRS may refer Revision Requests to working groups or task forces that it creates or to existing TAC subcommittees, working groups or task forces for review and comment on the Revision Requests; however, the PRS shall retain ultimate responsibility for the processing of all Revision Requests. The PRS is also responsible for assigning a recommended priority and rank for any Revision Requests and guide revisions that require an ERCOT project for implementation.

The procedure and timeline for addressing Revision Requests is detailed in Protocol Section 21, Revision Request Process.

Urgent Revision Requests

Protocol Section 21.5, Urgent Nodal Protocol Revision Requests and System Change Requests, defines Urgent Revision Requests. Revision Requests meeting the criteria will require special processing by the PRS. The following addresses the procedure the PRS will follow when presented with a Revision Request for which Urgent status is requested.

1. If a submitter requests Urgent status, the complete Revision Request is forwarded to the e-mail distribution list of the PRS and Urgent status will be considered at the next regularly scheduled PRS meeting or, if PRS leadership deems necessary, a special meeting of the PRS.

2. If the PRS acts to grant the Revision Request Urgent status, the Urgent Revision Request will be considered on an urgent timeline as outlined in Protocol Section 21.5.

TAC

The PRS shall communicate and submit a PRS Report to TAC for all Revision Requests submitted to and reviewed by the PRS according to the timeline described in Protocol Section 21.

1. The PRS shall respond to clarifying questions from TAC, relating to the PRS Report.

2. The PRS shall respond to a Revision Request that has been remanded to PRS from TAC with an amended PRS Report.

Emergency and Special Meetings

Emergency and special meetings will be called at the discretion of the PRS Chair or Vice-Chair to facilitate discussions related to Revision Requests and/or guide revisions.

2020 PRS Goals
TAC Approved June 24, 2020

- Process NPRRs and SCRs in accordance with Protocol Section 21, Revision Request Process.
- Review the Business Case for each NPRR and SCR that requires an ERCOT project for implementation to ensure that it provides adequate justification for the project.
- Assign a recommended priority and rank for each NPRR, SCR, and guide revision that requires an ERCOT project for implementation.
- Consider requests and assignments from the ERCOT Board and TAC in a timely and diligent manner.
- Review Other Binding Documents (OBDs) annually for elimination or incorporation into Protocols/Market Guides.
- Review aging projects at least annually and make recommendations if additional actions are needed.

COMMUNITY CHOICE PARTNERS
SECURING YOUR COMMUNITY'S ENERGY FUTURE

July 17, 2019

The Honorable Chris Sununu
The Governor of the State of New Hampshire
N.H. State House
107 North Main Street
Concord, NH 03301

Re: SB 286-FN-Local, Relative to Aggregation of Electric Customers by Municipalities and Counties

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Dear Governor Sununu,

I write in support of enacting SB 286. After reviewing the proposed bill and related materials, and interviewing local stakeholders, I have concluded that — in comparison to the states that currently allow[1] or are considering enabling[2] Community Choice Aggregation — New Hampshire has put forward the most technically expert conception of this policy framework to date.

By way of introduction, I am the former Managing Director of the consultancy Local Power, Inc., which co-wrote the original enabling legislation in Massachusetts and California, have worked to evolve the governance and operating models of Community Choice agencies for a decade, and advise on utility and community partnerships more broadly.

In contrast to more limited conceptions of Community Choice, SP 286 is best viewed as a key strategic initiative to support both the modernization of New Hampshire's electric grid and its competitive retail power market — because its proponents:

1. Have demonstrated a clear view of how to tackle the underlying IT infrastructure and regulatory barriers that are currently holding back private-sector innovation in the retail electricity industry;
2. Intend Community Choice initiatives to work collaboratively with utilities and other stakeholders to enhance New Hampshire's Grid Modernization decision-making process; and
3. Understand how Community Choice initiatives should thereafter 'fill gaps' in the retail value chain, by working with the private sector to accelerate customer adoption of new technologies and services.

Now more than ever before, it is a strategic imperative that governance becomes nimbler and more operationally-informed in order to address how technology is changing in the power sector. SB 286 would set this process in motion for New Hampshire. Its proponents intend to use Community Choice as a vehicle to educate local elected officials, businesses and citizens on how to remove barriers to private-sector innovation — from an operational, 'real world' perspective. For a number of reasons, this is the '*missing link*' that has held back the evolution of the power industry.

The 'technical' part is not hard to explain at a conceptual level. Every day, more and more customers have technologies that can <u>intelligently</u> shift electricity usage to lower-priced wholesale market intervals (smart thermostats, water heater controls, batteries and the like). But if you have ever tried to actually

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[1] Community Choice markets: Massachusetts, New York, New Jersey, Rhode Island, Ohio, Illinois and California

[2] Community Choice under consideration: Virginia, Arizona, New Mexico, Oregon, Maryland, and Connecticut

use the data from your utility meter to do something like this, you will know that it is impossible. Almost all customers in Liberty and Eversource territories lack interval meters, and while Unitil was an early adopter of interval meters, the design of their communications architecture has imposed severe constraints. The quality and availability of data is not reliable, and the time interval of the data supplied isn't aligned with wholesale requirements. This has prevented retailers from providing innovative products to all but the largest customers. **There are few enabling services for the majority of customers, because New Hampshire lacks the IT infrastructure required to support an advanced market.**

Like many states, New Hampshire is about to tackle this 'Grid Modernization' challenge. **What should concern you is the fact is that, despite all the accompanying fanfare, investments in Advanced Metering Infrastructure across the country have largely built a '*bridge to nowhere*.'** As the industry is currently structured, none of the stakeholders involved in the design process have demonstrated the requisite motivation, technical knowledge, customer-oriented culture and sense of urgency required to actually animate an innovative retail market.

We know how we got here. State regulatory commissions and utility practices evolved over a century when electricity usage patterns were predictable, centralized infrastructure could be administered in a siloed, top-down fashion, and there was no Internet. **Procedurally and culturally, the decision-makers involved in Grid Modernization initiatives invariably adopt incremental approaches that produce '*one step forward, two steps back*' results — because what we need is actually a '*systems thinking*' re-design that incorporates consumer preferences, local infrastructure and private sector innovations.** It is a costly mistake that has been repeated time and again, creating missed opportunities and market distortions. It is not necessarily anybody's fault, but after so many years, it has become clear that we need to involve stakeholders who want to fix the market from a competitive, operational point of view.

Simply put, everything has changed in the power industry except how we allow ourselves to make decisions — and evolving beyond the '*institutional and cultural inertia*' that defines regulated decision-making is our biggest challenge. I urge you to consider SB 286 within this context:

- The power industry — Grid Modernization efforts in particular —is caught in a '*catch-22*':
  - Utilities, regulators consumer advocates, etc. lack situational awareness regarding new technologies, third-party services and the infrastructure and products different communities and customer groups actually want — that is not their job.
  - Similarly, it is not the job of innovative companies to inform the regulated process governing IT infrastructure decisions — few, if any, invest the time and resources required to participate.
  - The consequent '*knowledge gap*' in the decision-making process leads to Grid Modernization schemes that fail to support an advanced retail market — structurally and for years.
- SB 286 has been designed to bridge this gap, by relying on Community Choice initiatives to:
  - Leverage private-sector partners to rapidly educate local officials and stakeholders throughout the state on what the '*front lines*' of the competitive retail electricity business requires in practice;
  - Collaborate across technology vendors, utilities, energy suppliers, regulators, policy-makers, civic and business associations, and customers to identify regulatory, business process and IT infrastructure "*bottlenecks*" that preclude advanced retail services; and
  - Work together to share new information and remove barriers, so that innovative technologies, services and market competition function seamlessly to satisfy customer expectations.

No other state has '*connected the dots*' in such a profound fashion, and the potential benefits for New Hampshire are already becoming apparent. Consider these three recent examples:

1. Unitil deployed Advanced Metering Infrastructure that has proven operationally insufficient and been under-utilized by retail customers as a consequence;
2. Eversource deployed an outdated Automated Meter Reading system incapable of communicating interval usage, and is now facing cost-recovery protests by consumer advocates as a consequence;
3. **Liberty Utilities is already working with the City of Lebanon on interval meter, dynamic retail pricing, and distribution grid integration pilots — and future collaborations with "Lebanon Community Power" (under SB 286) would strengthen their broader Grid Modernization efforts.**

Looking ahead, after the intelligent data infrastructure and business processes have been put in place, customers will need to be educated on the new opportunities and offered innovative products. Most people do not want to spend an inordinate amount of time reviewing energy supply contracts and technology performance agreements line by line, every few months. **All customers want the convenience of trusted vendors offering convenient services in a functioning marketplace, and it is our responsibility to create it**.

Proponents of SB 286 have a clear view of how properly-designed Community Choice programs will play a key enabling role in making this vision a reality for New Hampshire — by simultaneously:

1. Working with innovative private-sector partners to expand market access — lowering barriers to contracting opportunities while ensuring that customers are treated fairly;
2. Working with utilities and technology firms to deploy the right 'block and tackle' IT infrastructure, business services and retail products — so new technologies and services deliver customer benefits;
3. Working with wide range of public and private stakeholders to ensure that the market structure continues to evolve and embraces new technologies — under a nimble, flexible mode of governance.

The power industry must keep up with the times. Customer adoption of new technologies can create immense value for society, provided that governance affords the flexibility to do so. Conversely, uninformed and inflexible governance will steer the market into inefficient and unstable outcomes. **SB 286 would ensure that New Hampshire takes the right path — and would provide critical leadership for other states evaluating how best to modernize their electricity grids and competitive retail markets.**

Please reach out directly if I can assist your staff in further evaluating this opportunity. I am available to meet at the State House, via phone (415) 404-5283 or via email golding@communitychoicepartners.com

Samuel V. Golding

President
Community Choice Partners, Inc.

CLEAN ENERGY NH
Your Voice in All Energy Matters

February 17, 2021

Representative Michael Vose, Chair
House Science, Technology, & Energy Committee
Submitted via email

Testimony on HB225, relative to the calculation of net energy metering payments or credits

Dear Chairman Vose and members of the Committee,

Clean Energy NH (CENH) is a non-profit membership-based organization. We are New Hampshire's leading clean energy advocate that is dedicated to supporting policies and programs that strengthen our state's economy by encouraging a transition to renewable energy and promoting energy efficiency.

CENH strongly opposes HB 225 which would reduce the net metering credit from the appropriately set and reviewed rate to the wholesale rate.

In 2016, the General Court passed HB1116 which tasked the Public Utilities Commission (PUC) with developing an "alternative net metering tariff" and the PUC was required to take into consideration several factors including "an avoidance of unjust and unreasonable cost shifting; rate effects on all customers;". The PUC, the NH regulated utilities and many interveners did just that and in an order issued in June 2017 set the net metering tariffs currently in effect which the PUC deemed to avoid any unjust or unreasonable cost shifting and to take into consideration any potential rate effects on all customers. This current net metering tariff includes a credit for exported electricity of the value of default service, transmission, and 25% of distribution for small systems up to 100kW in capacity and default service only for large systems between 100kW and 1MW. The PUC is continuing to study the value of distributed energy resources and will make adjustments to the net metering credit rate in the future if deemed necessary to avoid any unreasonable cost shifting therefore HB225 is not necessary.

Furthermore, a recent study by Synapse Energy Economics found that local solar generation had a value of at least 13.5cents/kWh simply energy and avoided capacity costs alone. I am including a copy of this study with our testimony and you can find this value in table 3 on page 7 of the report. HB225 proposes to reset the net metering credit in NH to the Local Marginal Price which in 2019 averaged 3.1cents/kWh and in recent months was even lower for example November 2020 was 2.5cents/kWh. This is not fair compensation for distributed generation and it is not how net metering was intended to function.

Distributed generation provides much more value to the grid and other customers than centralized wholesale power plants. Distributed generation reduces peak demand during critical events, which disproportionally drive electricity system costs. Distributed generation also contributes to fuel diversity, reduces line losses, and acts as a load reducer replacing default service load.

We are very concerned that this would change the net metering credit for all existing renewable energy installations as well as any new ones. The owners of these systems made investments based on existing state policy and an understanding that net metering would be in place for a duration of time. This change would severely harm the economics of those existing projects and we should not change state policy retroactively to harm those that made decisions based on the policies in place at the time.

CENH urges you to vote ITL on HB 225. Thank you for considering this input. I look forward to testifying at the hearing for this bill.

Sincerely,

Madeleine Mineau
Executive Director
Clean Energy NH
madeleine@cleanenergynh.org
607-592-6184

GRANITE STATE HYDROPOWER ASSOCIATION, INC.

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February 19, 2021

Representative Michael Vose, Chairman
N.H. House of Representatives Science, Technology, and Energy Committee
New Hampshire Legislative Office Building, Room 304
Concord, NH 03301

RE: HB 225 relative to the Calculation of Net Energy Metering Payments or Credits

Dear Chairman Vose and Honorable Members of the Committee,

The Granite State Hydropower Association (GSHA) appreciates this opportunity to testify on HB 225 relative to the Calculation of Net Energy Metering Payments or Credits. **GSHA strongly opposes HB 225 and urges this Committee to find the bill Inexpedient to Legislate (ITL).**

By way of brief background, GSHA is a voluntary, non-profit trade association for the small-scale hydropower industry in New Hampshire. Members of GSHA own and operate nearly 50 hydroelectric facilities located in 35 towns and cities throughout the state, totaling nearly 55 megawatts (MWs) of distributed generation. GSHA members produce an emissions-free, renewable, reliable and locally distributed source of electricity that provides important economic, recreational, and environmental benefits to New Hampshire. GSHA hydro facilities pay local and state property and business taxes, employ New Hampshire residents, and purchase local goods and services needed for operation and maintenance. Virtually all GSHA facilities are regulated by the Federal Energy Regulatory Commission (FERC), and all work closely with state agencies and local officials on public safety matters.

There are a number of reasons why GSHA is opposed to HB 225.

First, the PUC is nearing the end of an expansive process to study the value of distributed energy resources, which began in the summer of 2017 following Order No. 26029 in Docket DE 16-576,[1] and the Committee should allow that process to come to completion. That docket was opened pursuant to passage in 2016 of HB 1116 relative to net metering. All parties to the docket[2] – including utilities, consumer advocates, distributed generation advocates, and the Office of Energy and Planning – agreed to the "adoption of an alternative net metering tariff to be in effect during a period of time during which data would be collected, pilot programs would be implemented, and studies would be conducted."[3] For the past three and a half years, PUC staff and a diverse group of stakeholders have invested a significant amount of time and money, including the hiring of consultants, to undertake the appropriate research and analyses needed to better understand the value of distributed resources. One piece of this effort, a so-called Locational Value of Distributed

[1] DE 16-576 Development of New Alternative Net Metering Tariffs and/or Other Regulatory Mechanisms and Tariffs for Customer-Generators.
[2] GSHA was a party to the docket.
[3] DE 16-576, Order No. 26029, page 21.

Generation Study, was completed and filed with the PUC on August 21, 2020. The larger Value of Distributed Energy Resource (VDER) Study is expected to be completed no later than March 31, 2022. GSHA believes it would be bad public policy to do an end run around the study process which was carefully designed and agreed to by a broad group of stakeholders. **GSHA urges this Committee to honor the agreement reached by all stakeholders in DE 16-576 and allow the VDER Study to be completed so that decisions about fair and equitable net metering credits can take the study's findings into account**.

Second, as part of the settlement agreements reached in DE 16-576, **all parties to the docket agreed that customer-generators would be credited, at a minimum, at the utility's default service charge (additional credits for customer-generators below 100 kW were agreed to) until the VDER Study is completed, additional customer load and system data is collected, and the Commission opens a new proceeding** "to determine whether and when further changes should be made to the net metering tariff structure" they approved in Order No. 26029. Again, GSHA urges this Committee to honor this agreement reached in good faith by the stakeholders.

Finally, GSHA firmly believes that distributed generation resources provide benefits to electric ratepayers beyond the wholesale market price of the excess electricity these resources export to the grid. These benefits include avoided transmission costs, avoided distribution costs, avoided capacity costs, and avoided environmental costs. **A net metering credit set merely at the wholesale market price of electricity would significantly undervalue the true benefits of distributed generation and deny fair compensation to the owners of distributed resources**. As stated in the purpose statement of HB 1116 (2016):

> *"To meet the objectives of electric industry restructuring pursuant to RSA 374-F, including the overall goal of developing competitive markets and customer choice to reduce costs for all customers, and the purposes of RSA 362-A and RSA 362-F to promote energy independence and local renewable energy resources, the general court finds that it is in the public interest to continue to provide reasonable opportunities for electric customers to invest in and interconnect customer-generator facilities and receive fair compensation for such locally produced power while ensuring costs and benefits are fairly and transparently allocated among all customers."*

If this bill were to pass, instead of "promoting energy independence and local renewable energy resources", many of these resources would *go out of business*. For the reasons explained above, **GSHA respectfully urges this Committee to find HB 225 Inexpedient to Legislate**.

We greatly appreciate your time and consideration of this testimony and are happy to answer any questions or provide further information. Thank you very much.

Sincerely,

Bob King, President, Granite State Hydropower Association

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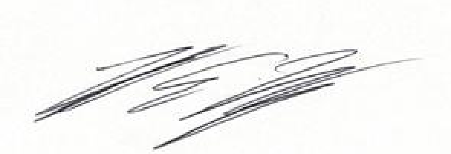


Bob King, President, Granite State Hydropower Association

REVISION ENERGY

NH House of Representatives
Science, Technology, and Energy Committee

Submission in Support of HB 106 and Against HB 225
February 19, 2021

On behalf of ReVision Energy, an employee-owned clean energy company and certified B Corporation, I would like to express support for HB 106 so NH municipalities are no longer subject to the arbitrary 1 MW net metering cap and can deliver savings to their taxpayers as well as the ratepaying public. We request the Committee amend the geographic provision to include at least towns which are adjacent to the host electricity generator.

I would also like to express strong opposition to HB 225, designed to effectively end net metering by existing clean distributed energy resources, which thousands of New Hampshire families, businesses, nonprofits, and municipalities have been counting on for years. It would also put a halt on further development of local clean energy systems and the thousands of jobs and millions of dollars in private-sector investment such development supports. HB 225 would set the energy rate for a typical 5 kW residential solar array or 50 kW nonprofit array or even 1,000 kW small business array around 2-3 cents/kWh while allowing the utilities to sell the power produced for 12-20 cents/kWh to neighboring homes and businesses – a massive subsidy to utilities with out-of-state investors. It would also disregard the market reality that power produced and consumed on the local distribution grid, which is coincident with peak demand and reduces system load, is considerably more valuable in terms of supply and demand than even the current 7-10 cents/kWh net metering rates.

As NH's economy continues to struggle from a pandemic and recession, supporting HB 106 and opposing HB 225 would allow our state to add, rather than cut, well-paying jobs and save all ratepayers money, according to the best available research. ReVision Energy currently employs nearly 300 electricians, apprentices, and other clean energy professionals working to help Granite Staters reduce energy costs and carbon emissions for the public good.

In support of these positions, I would like to submit the attached empirical study on the costs and benefits of distributed solar generators on the New England grid, completed in late 2020 by Synapse Energy Economics. I am also attaching a recent column I wrote in The Concord Monitor concerning current barriers to solar adoption in New Hampshire and policy options to increase economic investment while saving all ratepayers money.

Respectfully submitted,

Dan Weeks
Co-Owner, Director of Market Development
ReVision Energy
7 Commercial Drive
Brentwood, NH 03833

CONCORD MONITOR

Memo to policymakers: Let solar compete

By DAN WEEKS | February 2, 2021

I was recently called up before a New Hampshire town zoning board to seek a variance for a solar project my company installed for a local family farm. Apparently someone in town had driven by while we were constructing the 140-panel array and complained to town officials. Although we had been granted the required zoning permits many months ago, we were told to seek a variance on the grounds that solar panels in a field might now be considered a "building," with all the attending requirements.

Thousands of dollars in legal fees and construction delays later, we were grateful to receive a unanimous vote of approval from the zoning board. A few weeks later, after spending thousands more dollars in grid upgrades required by the utility, the project was complete – at a loss.

For an established company like mine with a strong footprint in neighboring states where solar is encouraged, losing money on New Hampshire projects that directly serve the public good is not the end of the world. As an employee-owned B Corporation, such projects neatly fit within our stated mission of "leading our community in solving the environmental problems caused by fossil fuels while alleviating economic and social injustice." Besides, my co-owners and I sleep better at night knowing we get to help local farms stay in business and cut costs for schools and nonprofits around the state. So don't feel sorry for ReVision Energy.

Nevertheless, it's a sad reflection on the state of solar in New Hampshire that few companies can afford to stay in business and many of the projects ReVision longs to bring to those in greatest need are simply uneconomic due to poor policy choices. For every farm or school we manage to power with solar, there are literally dozens of others wanting to harness the sun – if only state and local policymakers would let them. The same is true for many towns and businesses looking to go solar too.

The barriers are simple but they come at a significant cost, not only for solar customers but also the public at large.

At the local level, New Hampshire zoning regulations vary from town to town and frequently result in thousands of dollars worth of "soft" administrative expenses being layered on top of the "hard" engineering, procurement, and construction (EPC) cost. While some towns seek to encourage solar with property tax exemptions and thoughtfully crafted ordinances, many are ambiguous or even hostile to such projects, especially when a minority of residents object on aesthetic grounds. Some even treat ground-mounted solar arrays spaced 20 feet apart in grassy fields as an "impermeable" surface akin to a paved parking lot.

Then there are the utility companies. Before granting interconnection approval to solar projects of any scale, New Hampshire's for-profit utilities require grid impact studies and hardware upgrades far in excess of what is typically charged in neighboring states, where transparent pricing guidelines are in effect. Study costs alone run $10,000 to $25,000 at the state's largest utility, regardless of the outcome. If utility approval is granted, it is often conditioned on $100,000 to $200,000 worth of grid upgrades, which are owned and rate-based by the utility for future revenue. Payment is required up front with no opportunities for competitive pricing or third-party review.

Finally, the small handful of New Hampshire solar projects that surmount local permitting and utility interconnection hurdles each year must face the stubborn reality of state policies designed to cap their size and devalue their production. Under the state's Renewable

Portfolio Standard (RPS), established in 2006 when solar costs were high, solar generation is set at a measly 0.7% of total electricity supply through 2025. Bipartisan bills to raise the standard as solar has become the cheapest energy source (unsubsidized) on earth were met with gubernatorial vetoes in the last legislative session and stand little chance of passage in 2021. The same was true for repeated attempts to raise the artificial net metering cap of 1 megawatt (MW) per project, in spite of strong bipartisan support; another bill has been introduced this year to raise the cap for governmental entities only.

Making matters worse, when it comes to assigning a value to what little solar is produced in New Hampshire, the price per kWh set by the utilities is now well below retail rates and 50-75% lower than the value set by independent regulators in Maine, Massachusetts, and Vermont. For the local family farm that offsets other nearby farms with solar, the price paid by the utility for its electricity is roughly half what it will charge those other farms. Larger solar systems are valued even less and one of the proposed bills in Concord would slash it further.

Taken together, these and other barriers to solar growth in New Hampshire have made solar more expensive than in neighboring states and around the world. In contrast to New Hampshire's less than 1% solar penetration, Vermont now derives 14% of its energy from solar and Massachusetts recently topped 18%. Even Maine, which ranked last in the Northeast for many years, has quickly overtaken New Hampshire since a new administration took office in 2019, with billions of dollars worth of private investment and thousands of additional clean energy jobs expected in the coming years.

The direct effects of New Hampshire's backward solar policies are less competition for companies like ReVision and fewer jobs and investment dollars for the state as a whole. In fact, the number of solar companies doing business in New Hampshire has fallen by 40% since 2017 accompanied by a marked decline in solar industry jobs even before the pandemic is taken into account – jobs that pay twice the median wage and do not require a college degree. At a time when tens of thousands of Granite Staters are unemployed, New Hampshire should welcome such private-sector jobs and investment by raising the net metering cap and applying an evidence-based approach to pricing solar generation.

The benefits of doing so would redound to the public at large. According to a new report by Synapse Energy Economics, an independent energy research firm, distributed solar projects like the one ReVision installed for the family farm above generated over 8,600,000,000 kilowatt-hours (kWh) of clean electricity across New England over the last five years and saved all ratepayers $1.1 billion. New Hampshire, which shares a common transmission grid with the other New England states, received $83 million in savings, even though most of the region's 186,299 solar arrays are located out of state. In unit terms, the study found the real value of solar to ratepayers and society at large ranges from 21 cents per kWh in direct energy value to 37 cents per kWh when public health and environmental benefits are taken into account. That's more than three times higher than what utilities currently pay for solar in New Hampshire.

Far from a "cost-shift," as certain Concord politicians claim, the data show that solar is effectively subsidizing the grid while adding jobs and economic growth, albeit at a far slower pace than neighboring states. As New Hampshire seeks to build back better from the economic recession, policymakers should remove the artificial barriers to private-sector growth and finally let solar shine in New Hampshire.

Dan Weeks is a director at ReVision Energy, New Hampshire's largest clean energy company and an employee-owned B Corporation.

Solar Savings in New England

From 2014 to 2019, small-scale solar in New England produced wholesale energy market benefits of $1.1 billion

December 2020

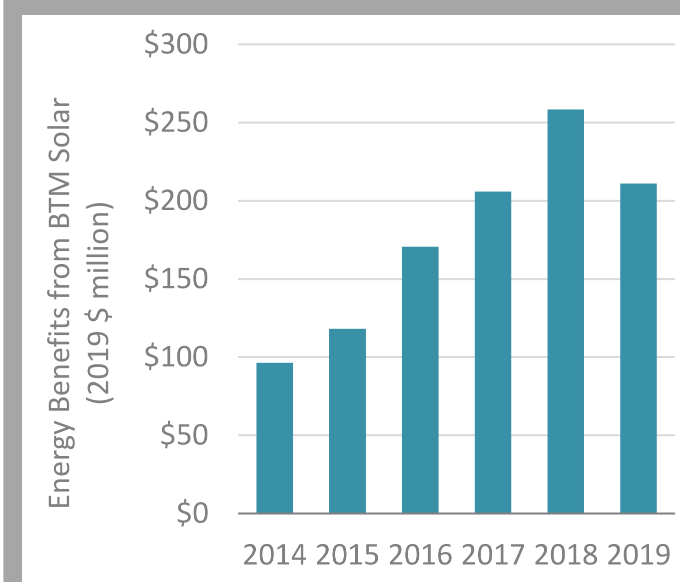
Between 2014 and 2019, behind-the-meter (BTM) solar produced more than 8,600 gigawatt-hours (GWh) of electricity in the six New England states. Electricity produced from BTM solar reduces the need to run other power plants, which reduces the amount of electricity that electric utilities need to buy and saves customers money. By avoiding the need to run the most expensive power plant, when BTM solar lowers the amount of electricity purchased, it also reduces the price that all utilities pay. Here, BTM solar is defined as small solar installations that do not participate in New England's energy markets (for more information see page 7).

Using hourly BTM solar data published in July 2020 by ISO New England, the nonprofit regional electric grid operator, Synapse estimated what demand and prices for electricity would have been without this resource.[1] We analyzed over 52,500 hourly datapoints from 2014 to 2019, and estimated that BTM solar reduced wholesale energy market costs in New England by $1.1 billion (see Figure 1). These include benefits that are shared by electricity customers throughout New England, not just the owners of the BTM solar facilities. Of this total, we estimate that benefits from price effects represent $743 million or 70 percent of the total. When the total benefits are divided by the quantity of electricity produced, we find the energy impact of BTM solar is 11.9 cents per kWh over this six-year period.

Hourly electricity benefits are just one benefit BTM solar can provide. Hourly analysis of this dataset using peer-reviewed tools published by the U.S. Environmental Protection Agency (U.S. EPA) shows that BTM solar avoided 4.6 million metric tons of climate-damaging carbon dioxide emissions in 2014 through 2019, and avoided millions of pounds of criteria pollutants proven to have negative impacts on human health. As a result, BTM solar contributed to $87 million in public health benefits in 2014 through 2019 (equal to 1.0 cents per kWh). Likewise, using a $112 per metric ton social cost of carbon, BTM solar provided $515 million dollars in climate benefits in 2014–2019 (equal to 6.0 cents per kWh).

BTM solar also provides other benefits, including reduced costs for generating capacity, transmission and distribution capacity, reliability, and retail margins. It also provides other economic benefits, such as job creation, local tax base support, and participant cost savings. All of these benefits should be considered when looking at a full societal value of BTM solar.

Figure 1. Energy benefits from BTM solar



Notes: 2018, a year with numerous heat waves and especially high summertime energy prices, has a particularly large amount of savings. Benefits described in this figure only include impacts related to the wholesale energy market. Other benefits (e.g., public health, climate, capacity, transmission and distribution, reliability, or retail margins) are not included.

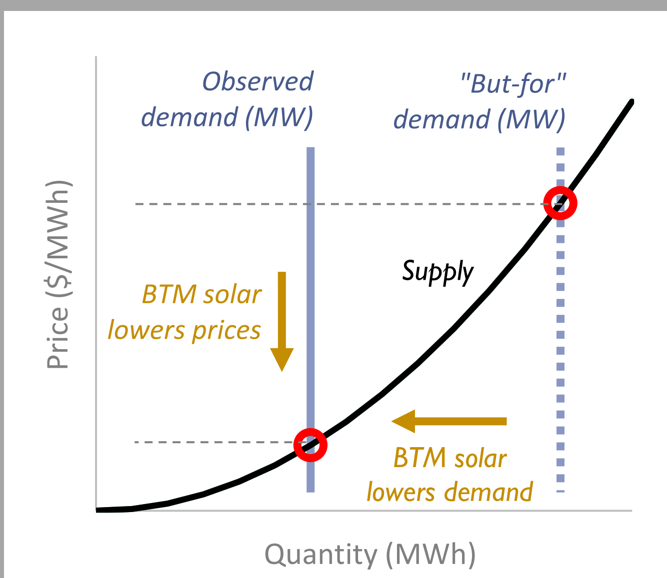
Synapse Energy Economics, Inc.

Authors: Patrick Knight, Steve Letendre, PhD, and Erin Camp, PhD

Methodology

When BTM solar produces electricity, electric utilities—and ultimately electric ratepayers—will purchase fewer kWh of electricity from other sources (e.g., fossil fuel-fired power plants). As BTM solar output increases, consumers pay less for electricity because the quantity of electricity purchased from other sources decreases. In addition, BTM solar has a second effect on electricity costs: because it reduces the demand for electricity to be purchased from other sources, it avoids the need to buy power from the most expensive power plant. This leads to a lower "market clearing price" that is paid to all electric generators on the grid (see Figure 2). As a result, more BTM solar not only decreases the quantity of electricity purchased, it also reduces the price paid for purchased electricity—which benefits all New England ratepayers .

Figure 2. Illustrative price and load impacts of BTM solar



In July 2020, for the first time, ISO New England published regionwide, hourly estimates of BTM solar generation for January 2014 through April 2020. This dataset is based on a sampling of hourly, actual solar output from individual facilities throughout New England, which are then upscaled to estimate aggregated solar production by state. After this data was posted on the ISO New England web site, Synapse deployed the "but-for" methodology (see callout) for each week from 2014 through 2019.[2]

Predictive Equations: Step-by-Step

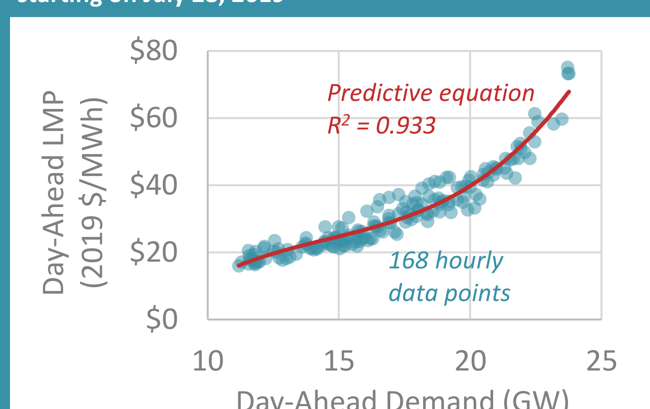
First, we assembled hourly, day-ahead price and demand data for 2014 through 2019.[3] We grouped hours into weeklong periods (Sunday through Saturday), and performed a regression for each individual week with demand as an independent variable and prices as a dependent variable. This regression provides a predictive equation of wholesale electricity price for any hourly demand in this week. For each hour, demand (measured in MW) and prices (measured in dollars per MWh) can be multiplied to calculate the total energy costs in that hour (measured in dollars).

Second, we assembled hourly BTM solar data. Each hourly datapoint was increased by 6 percent to reflect average transmission and distribution losses, then added to the demand in each hour. This provides an estimate of what demand would have been, if not for BTM solar.

Third, we used the predictive equations calculated in (1) to estimate what hourly prices would have been, if not for the BTM solar generation, all else being equal. As in (1), we can multiply the "but-for" demand by the resulting "but for" prices to estimate the total energy costs in each hour in the "but-for" hypothetical.

Fourth, we subtracted the total costs from the "but-for" costs to estimate the energy benefits resulting from BTM solar generation.

Figure 3. Illustrative predictive equation for week starting on July 28, 2019



Calculating energy benefits

For each week, we calculated the hourly total costs for each 24-hour period (24 hours x 313 weeks, producing costs for 7,512 hours) using week-specific predictive equations. Over the six-year period, the weekly predictive equations estimate total wholesale energy costs of $33.0 billion in 2019 dollars.

We then added the BTM solar output from ISO New England to each hour. Using each week-specific prediction equation, we calculated what energy costs would have been if not for BTM solar. Without BTM solar, we find that total wholesale market costs would have been $34.2 billion, suggesting that total benefits from solar are approximately 1.2 billion.

However, not all predictive equations are equally successful at estimating benefits. In some winter weeks, for example, energy market prices are more closely linked to fuel prices rather than demand for electricity. In these weeks, although BTM solar continues to reduce the demand for electricity produced from other sources, it is less able to reduce electricity costs.

To account for this, we examine two different time periods: summer weeks (any weeks in 2014 through 2019 that have at least one day in May, June, July, August, and September) and non-summer weeks (all other weeks). Summer weeks contain 43 percent of the total weeks analyzed, but 57 percent of the BTM solar produced. Predictive equations in summer weeks are generally very accurate. In 98 percent of summer weeks, estimated electricity prices are within 10 percent of the actual price. Meanwhile, non-summer weeks generally feature less successful predictive equations: only 83 percent of non-summer weeks estimate electricity prices within 10 percent of actuals.

For this analysis, we remove any weeks where the predictive equations are unable to accurately estimate prices within 10 percent, on average over the entire week. As a result, we estimate energy benefits of $1.1 billion, rather than $1.2 billion (a reduction of 10 percent). In reality, there is some non-zero quantity of energy benefits in these weeks because the BTM solar avoids the need for utilities to purchase energy from the wholesale markets. Thus, this is a conservative, lower-bound estimate as we only include those weeks with high predictive capabilities.

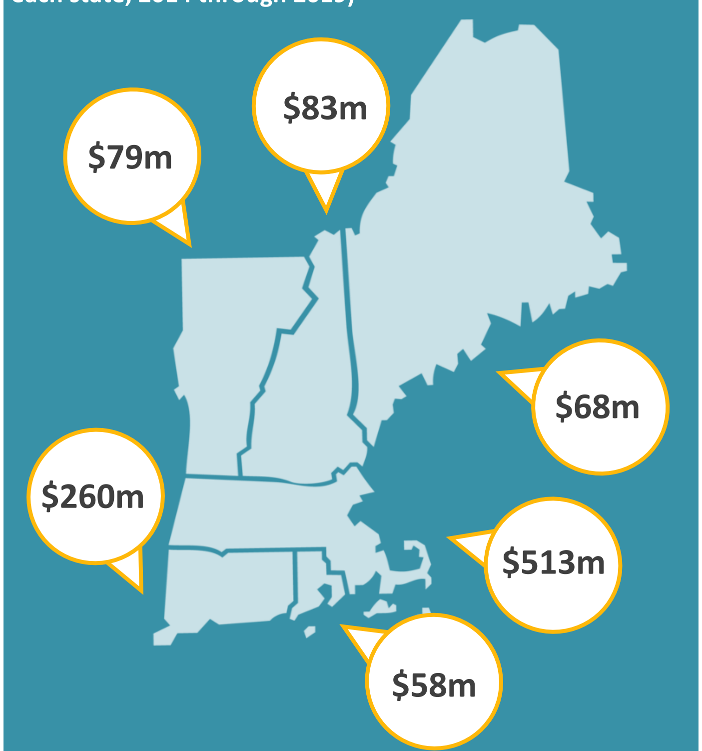
Load impacts and price impacts

The calculated energy benefits can be split into "load impacts" and "price impacts." Load impacts refer to the benefits associated with the reduction in the quantity of electricity purchased. "Price impacts" are due to the impact of reduced demand on the market-clearing price of electricity, as shown previously in Figure 2.

For each week, load impacts can be calculated by estimating energy benefits where demand is increased by the hourly BTM solar quantity but where prices are unchanged. The "price impact" can be estimated by subtracting the "load impact" from the total benefits. Over the six years analyzed, we find that load impacts provide about $317 million in benefits (30 percent of the total) while price impacts provide about $743 million in benefits (70 percent of the total). This only includes benefits for those weeks "screened into" our analysis.

To understand how each impact could be allocated to each state, we assume that load impacts are distributed across the six New England states based on each state's contribution to BTM solar production. In other words, states with more installed BTM solar accrue a greater share of the load impact.[4] Meanwhile, as shown in Figure 4's depiction of the total impacts for each state, we

Figure 4. Total energy savings from BTM solar accrued in each state, 2014 through 2019)



assume that the price impacts are distributed across the six New England states based on each state's contribution to observed day-ahead demand. In other words, states with larger electricity demand accrue a greater share of the price impact, and states with larger quantities of installed BTM solar accrue a greater share of the load impact.

Value per kWh

These energy benefits can be divided by the quantity of solar produced in each year to estimate the price impact value and the load impact value of BTM solar in cents-per-kWh terms. However, if each annual value is calculated using only the "screened-in" weeks, it will overestimate the cents-per-kWh benefits in weeks with poor predictive equations. In order to account for this, we multiply the cents-per-kWh value by the percentage of weeks that "screen in" for each year, thereby assuming the cents-per-kWh value in "screened out" weeks is 0 cents per kWh. We perform this operation separately for summer and non-summer weeks, which we then combine using an average weighted by the total number of all weeks in each seasonal period.

Figure 5 displays the resulting values for both load and price impacts in each year of the analysis. Because load impacts per kWh describe the benefits associated with reducing quantities, but not prices, they resemble

Figure 5. Energy benefits per kWh of BTM solar

average prices observed during the summer weeks. On average, over the six years analyzed, BTM solar provided a total value-per-kWh wholesale market benefit equal to 11.9 cents per kWh.

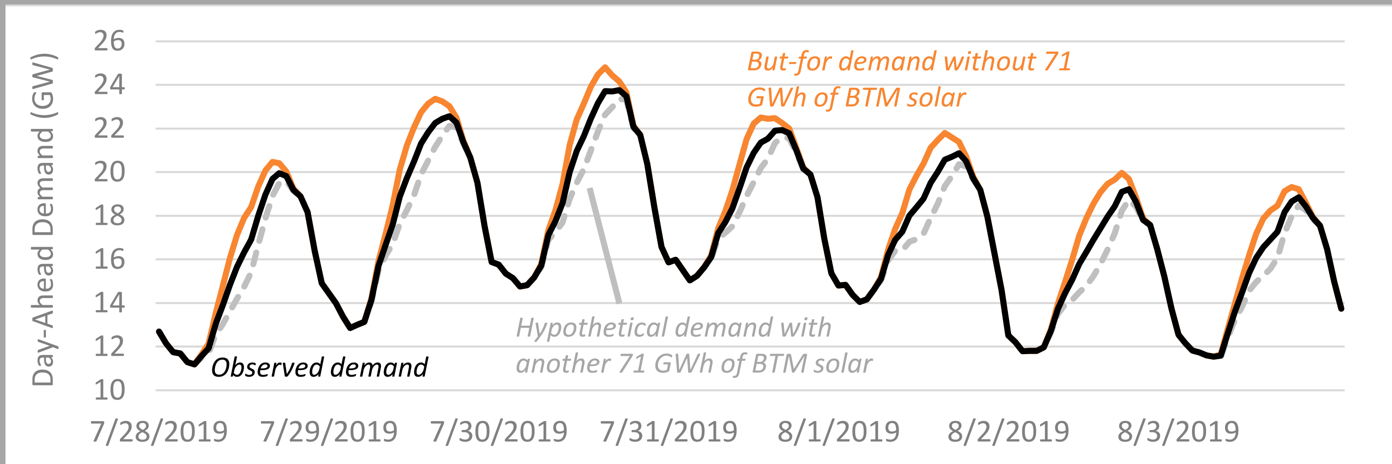
This value may vary week-to-week and year-to-year. For example, during hot years, total demand for electricity increases. This increase in demand often leads to increased prices, meaning that solar resources can avoid purchasing more energy at higher prices than in other years. 2018 in particular featured three separate heat waves, which contributed to a quantity of heating degree days that were 19 percent higher than the 2014-2019 average. This led to a year with summertime energy prices 11 percent higher than average.

Impact of increasing levels of BTM solar

Output from fixed solar facilities typically peaks around noon and decreases later in the day when demand for electricity remains high. This fact leads some to argue that as more BTM solar is installed, fewer energy benefits will accrue. Because energy prices are closely linked with demand in most summer weeks, as more solar comes online, it may increasingly reduce prices that are not necessarily the highest prices. Nonetheless, with the amount of BTM solar on the grid now, or expected in the next several years, prices at times of peak solar output are still likely to be high. Conversely, at times of high prices (e.g., later in the afternoon) systemwide BTM solar output may be reduced but not outright eliminated. As a result, additional BTM solar may provide fewer wholesale market cost benefits, but some benefits still remain.

To assess this issue, we examined one week in July 2019 with a total BTM solar output of 71 GWh. Figure 6 on the next page shows the observed hourly demand for this week in black, and the "but-for" demand in yellow. This figure also features a second hypothetical series in grey that posits what demand would have been with double the amount of BTM solar power. In our "but-for" analysis described above, the first 71 GWh of BTM solar provided $10.7 million in energy benefits. Doubling the amount of solar provides energy benefits of $19.1 million. In other words, doubling the quantity of solar would increase benefits by 80 percent.

Figure 6. Demand for illustrative week, with and without BTM solar



Note: Y-axis begins at 10 GW in order to highlight the difference between the three depicted scenarios.

This phenomenon often triggers discussions of conventional resources' capability to quickly ramp up or down to accommodate changes in solar output during the evening and morning hours, respectively. In this example week, the largest hourly change (a reduction of 2,082 MW) occurs between the hours of midnight and 1AM when solar is not operating in any circumstance. In hours when BTM solar is operating, additional BTM solar actually *reduces* the maximum hour-to-hour MW change, which occurs as demand is increasing between 7AM and 8AM (thereby likely making the morning ramp easier). Of all 112 hours in this week when BTM solar is operating, only 35 feature hourly changes that are greater after adding an additional 71 GWh of BTM solar . In these 35 hours, the maximum increase in hourly changes is 386 MW. This is equal to 2 percent of the day-ahead demand observed in that hour, or, about one-fifth the maximum hourly change observed (2,082 MW).

As discussed above, savings depend not only on how much BTM solar is installed, but also on other underlying system drivers. For example, temperatures were lower in 2019 than in 2018, leading to fewer periods of high summer prices. One way to examine these impacts is to model the 2019 quantity of solar on the weather and resulting energy prices that were observed in 2018. We find that total savings would have been $317 million, rather than $211 million, an increase of 50 percent.

Emissions and public health impacts

We used publicly available tools to evaluate the impact that BTM solar has on emissions and public health. First, we used the Avoided geneRation and Emissions Tool (AVERT) from the U.S. EPA. AVERT relies on actual, hourly, power plant-specific data published by U.S. EPA to statistically estimate the marginal emissions and generation avoided by renewable energy and energy efficiency.[5] According to AVERT, if the hourly output from BTM solar reported by ISO New England did not exist, 4.6 million metric tons of climate-damaging carbon dioxide would have been emitted from 2014 to 2019 (see Table 1). In addition, BTM solar avoided the release of hundreds of thousands of pounds of criteria pollutants proven to have negative impacts on human health. According to AVERT, in 2019, 94 percent of the generation avoided came from natural gas-fired power plants, while an additional 6 percent came from power plants fueled by oil, coal, or other resources.

Table 1. Estimated emissions avoided by BTM solar

Pollutant	Avoided emissions
Greenhouse gases (reported in million metric tons)	
Carbon dioxide (CO_2)	4.6
Criteria pollutants (reported in pounds)	
Sulfur dioxide (SO_2)	2,380,000
Nitrogen oxides (NO_X)	3,280,000
Particulate matter ($PM_{2.5}$)	340,000

Note: Avoided emissions for each pollutant are reported in the unit that is most commonly used for data reporting and other analysis. These emission benefits are calculated for all hours in 2014 through 2019, rather than only the weeks that met our screening criteria for energy benefits.

We then used these results in U.S. EPA's CO-Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool. COBRA uses a reduced form air quality model to estimate how criteria pollutants like sulfur dioxide (SO2), nitrogen oxides (NOX), and particulate matter (PM2.5) are transported through the atmosphere. COBRA then relies on assembled data from the literature to estimate how these pollutants impact different populations on a county-by-county level, and it translates any decreases of these pollutants into monetized public health benefits.[6] According to COBRA, the BTM solar estimated by ISO New England in 2014 through 2019 contributed to $87 million in public health benefits (see Table 2). Dividing this cost by the solar produced in this time period yields a health benefit of 1.0 cents per kWh. We also examined the benefits of reducing greenhouse gas emissions across a range of social costs of carbon. Depending on the cost of carbon modeled in this analysis, benefits from 2014 to 2019 are as high as $1.9 billion dollars. This translates into 22.6 cents per kWh of BTM solar.[7]

Table 2. Monetized benefits from improved public health and social cost of carbon

Pollutant	2019 $ M	2019 cents / kWh
Climate benefits from reduced greenhouse gas emissions		
At $112/MT	$515	6.0 ¢
At 200/MT	$918	10.7 ¢
At $425/MT	$1,948	22.6 ¢
Public health benefits from reduced criteria pollutants		
SO_2, NO_X, and $PM_{2.5}$	$87	1.0 ¢

Note: A price of $112 per metric ton corresponds to the $100 per short ton price approved by the VT PUC in Case No. 19-0397-PET. Other prices illustrate the carbon benefits of solar at higher prices. These public health benefits are calculated for all hours in 2014 through 2019, rather than only the weeks that met our screening criteria for energy benefits. See footnote 6 for additional information.

Other avoided costs

In addition to the energy benefits and public health impacts described above, BTM solar can provide other benefits. Increased quantities of BTM solar reduce the demand for grid-level capacity that must be purchased through ISO New England's Forward Capacity Market (FCM). Lowering the demand for capacity reduces capacity costs, thus reducing the overall electricity costs paid by ratepayers throughout New England. For example, we estimate that the value of capacity for solar installed in 2019 was $1.75 per kilowatt-month, or about 1.6 cents per kWh.[8]

As with the energy market, costs and prices in the FCM are calculated through supply and demand curves. This means that, as in the energy market, there is the potential for BTM solar to not only reduce the quantity of capacity purchased, but to also decrease the clearing price paid for capacity. BTM solar can also reduce other costs such as transmission and distribution capacity, reliability, and retail margins (i.e., the markup on costs observed between retail and wholesale prices that in some cases may represent utility profit). Finally, BTM solar provides other benefits to states or individual customers, including job creation, local tax base support, and participant cost savings. All of these benefits would reasonably be considered when looking at a full societal value of BTM solar.

How do energy benefits get passed to ratepayers?

Energy and capacity benefits are passed to ratepayers by load-serving entities (LSE) such as distribution utilities that purchase electricity at the wholesale level. The benefits described in this analysis are calculated for the day-ahead energy market. However, most, if not all, LSEs use out-of-market contracts to hedge their purchase of energy from the day-ahead market, which effectively acts a spot market.[9]

Each LSE may sign many different contracts with different suppliers for different quantities. Contract terms may overlap and contract terms can last weeks or years. Because the day-ahead market represents what the market is willing to pay for electricity on a spot basis, the expectation of future day-ahead market prices can be viewed as a proxy for the price of electricity paid in bilateral contracts. As such, while any one entity may not garner the exact savings from BTM solar estimated in this analysis, lower costs for electricity purchased in the day-ahead market should translate into lower contract costs, and eventually, lower costs paid by ratepayers.

Other caveats

The energy benefits described in this document only cover the solar quantity that ISO New England describes as "BTM solar." BTM solar is defined as the output from small (i.e., less than 5 MW), distributed systems that do not participate in the energy markets.[10] The dataset of hourly BTM solar production provided by ISO New England does not include any output from facilities that have a commitment in the Forward Capacity Market (FCM) or facilities that may have load co-located behind the meter but participate in the energy market. The benefits described in this document would likely be higher were output from these power plants also included. The quantity of solar that is BTM solar versus other some other type is different in each state. In Vermont, ISO New England defines virtually all of the installed solar capacity as BTM solar, while in Rhode Island and parts of Massachusetts, BTM solar, as defined by ISO New England, represents just one-third to one-half of the total solar installed capacity.[11] Hourly dispatch from these plants is estimated by "upscaling" the output from a subset of solar facilities throughout New England; actual production from BTM solar facilities may differ from the hourly estimates provided by ISO New England.

This analysis does not take into consideration how the electric grid might have otherwise been different if not for solar.

Summary of impacts

Table 3 shows a summary of the solar benefits assessed in this study. These categories of benefits should be carefully weighed against costs of solar to estimate the full benefit-cost ratio of solar policies.

Table 3. Summary of historical BTM solar benefits (2019 cents per kWh)

Benefit category	High	Medium	Low
Energy	11.9 ¢	11.9 ¢	11.9 ¢
Capacity	1.6 ¢	1.6 ¢	1.6 ¢
Criteria pollutants (SO_2, NO_X, $PM_{2.5}$)	1.0 ¢	1.0 ¢	1.0 ¢
CO_2 @ $425/MT	22.6 ¢	-	-
CO_2 @ $200/MT	-	10.7 ¢	-
CO_2 @ $112/MT	-	-	6.0 ¢
Energy, capacity, and pollution reduction benefits of BTM solar	**37.1 ¢**	**25.2 ¢**	**20.5 ¢**

Additional benefits not calculated:

- Capacity price impacts
- Transmission and distribution capacity
- Local economic benefits
- Local tax support
- Reliability benefits
- Participant savings
- Retail margin

Endnotes and Sources

1. See hourly BTM solar data published by ISO New England on July 24, 2020 at www.iso-ne.com/static-assets/documents/2020/07/btm_pv_data.xlsx. Further documentation is available at https://www.iso-ne.com/static-assets/documents/2020/07/btm_pv_data_documentation.pdf.

2. Synapse explored a variety of other regression types and found that third-order polynomials remain the regressions that best explain the relationship between electricity demand and prices .

3. Hourly data on prices and loads is available at https://www.iso-ne.com/isoexpress/web/reports/load-and-demand/-/tree/zone-info. This analysis focuses on day-ahead demand and day-ahead locational marginal prices (LMP).

4. Load impacts from net-metered solar facilities are most appropriately allocated to their owners, while load impacts from standalone solar facilities can be allocated to the entire state.

5. See https://www.epa.gov/statelocalenergy/avoided-emissions-and-generation-tool-avert for more information on AVERT.

6. See https://www.epa.gov/statelocalenergy/co-benefits-risk-assessment-cobra-health-impacts-screening-and-mapping-tool for more information on COBRA.

7. A $112 per metric ton price (in 2019 dollars) corresponds to the $100 per short ton price (in 2018 dollars) approved by the Vermont Public Utility Commission in Case No. 19-0397-PET (order available at https://epsb.vermont.gov/?q=downloadfile/417666/138298). A $200 per metric ton value is in line with the value described in Hänsel, M.C., Drupp, M.A., Johansson, D.J.A. et al. Climate economics support for the UN climate targets. Nat. Clim. Chang. 10, 781–789 (2020). https://doi.org/10.1038/s41558-020-0833-x. A $425 per metric ton value is in line with the value described in Ricke, K., Drouet, L., Caldeira, K. et al. Country-level social cost of carbon. Nat. Clim. Chang. 8, 895–900 (2018). https://doi.org/10.1038/s41558-018-0282-y.

8. Calculated by adjusting the average avoided capacity price for FCA 9 and 10 (listed in AESC 2018, Table 39, available at https://www.synapse-energy.com/sites/default/files/AESC-2018-17-080-Oct-ReRelease.pdf) to reflect peak line losses of 8 percent and a capacity credit of 19 percent (per slide 14 at https://www.iso-ne.com/static-assets/documents/2020/09/a6_a_iii_cea_mottmacdonald_presentation_cone_and_ortp.pptx) to derive $1.75 per kilowatt-month. This value was then multiplied by the peak BTM solar output in New England in 2019 (1.8 GW), then divided by the total BTM solar output reported by ISO New England (2.3 TWh). This estimation does not include the value of solar for future years (i.e., after December 2019), retail margin impacts, or capacity price suppression effects.

9. A separate real-time spot market exists to balance the differences between day-ahead demand (and supply commitments) with actual supply and demand requirements. Per ISO New England's September 2020 COO report (see https://www.iso-ne.com/static-assets/documents/2020/09/september-2020-coo-report.pdf, page 47), day-ahead demand represented 95 to 99 percent of actual, real-time demand between August 2019 and August 2020. The exact makeup of electricity power purchases (long-term contracts, day-ahead purchases, or real-time purchases) by New England LSEs is unavailable, as it represents a collection of private-party bilateral contracts and business practices. However, conversations between Synapse analysts and LSE representatives over the past two decades suggests that in general, roughly 60 percent of wholesale energy market purchases are hedged through bilateral agreements, with the remaining 40 percent purchased outright from the spot market (35 percent day-ahead, and 5 percent real-time). These rough percentages vary from LSE to LSE, and also vary over time.

10. Despite being called "BTM," this dataset does not necessarily exclude small, distributed systems that are physically installed in front of a meter.

11. See https://www.iso-ne.com/static-assets/documents/2020/07/btm_pv_data_documentation.pdf, page 8

About Synapse Energy Economics

Synapse Energy Economics, Inc. is a research and consulting firm specializing in energy, economic, and environmental topics. Since its inception in 1996, Synapse has grown to become a leader in providing rigorous analysis of the electric power sector for public interest and governmental clients.

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Support for this analysis was provided by the following organizations:

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Founded in 2001, REV members lead Vermont's renewable energy revolution — creating resilient, local economies powered by clean energy and building a 21st century workforce committed to improving the lives of their neighbors and communities. www.revermont.org

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CITY OF LEBANON
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February 9, 2021

Hon. Michael Vose
Chair, Science, Technology & Energy Committee
New Hampshire House
107 North Main St.
Concord, NH 03301

RE: **HB 106, establishing procedures for municipal host customer-generators of electrical energy.**

Dear Rep. Vose & Members of the NH House Science, Technology & Energy Committee,

I am the Assistant Mayor and am testifying on behalf of the City of Lebanon. While generally supportive of this bill I do have a couple of concerns and offer a suggested amendment to address the most critical of these. Specifically, that any form of net metering should not be available to generators with a rate capacity of 5 megawatts (5 MW) or more. That is simply because a generator 5 MW or larger is required to register with ISO New England as a "Generator" and is thus subject to federal FERC jurisdiction with regard to how its output to the grid is treated and not state jurisdiction. Net metering is a purely state jurisdictional policy.

The second suggested amendment is to also make clear that customer-generators of under 5 MW, that have the option to register with ISO New England, can only participate in net metering if they are not registered with ISO-NE as a Generator (even if only a "SOG" or Settlement Only Generator). This is to maintain the appropriate jurisdiction boundary as Generators under federal jurisdiction cannot be compensated for their output at more than the avoided cost, which is the ISO-NE market rates, LMP or real time price for SOGs.

I have attached a suggested amendment, excerpts from ISO-NE OP-14 that defines a "Generator", along with a NARUC brief explain jurisdictional issues around net metering. Also immediately following is my own summary of the jurisdictional boundaries.

Please do not hesitate to be touch if you have any questions or ideas to share.

Yours truly,

Clifton Below

Clifton Below
Assistant Mayor, Lebanon City Council
Clifton.Below@LebanonNH.gov

There is a fairly bright line between state and federal jurisdiction created explicitly by the Federal Power Act and confirmed by a series of US Supreme Court decisions. Simply put, retail meters and the data produced by them, as well as distribution utility operations and DERs generally including distributed generation and storage that is less than 5 MW in capacity, not a FERC jurisdictional interstate wholesale market participant, and connected to the distribution grid are all under exclusive state jurisdiction and not under FERC jurisdiction. The General Court and the Commission in some circumstances might want apply FERC standards, such as the uniform system of accounts, to state jurisdictional matters, but they are not required to do so, as the still standing precedent of *Connecticut Light & Power Co. v. FPC*, 324 U.S. 515 (1945) makes clear, even for a non-lawyer. For readers that may not be familiar with how clearly the jurisdictional boundary has been drawn, the following excerpts from the US Supreme Court and FERC legal analysis provides a useful summary (with emphasis added)[1]:

From US Supreme Court FERC v. EPSA, 577 U. S. ____ (2016)[2]:

. . . this Court held in *Public Util. Comm'n of R. I.* v. *Attleboro Steam & Elec. Co.*, 273 U. S. 83, 89–90 (1927), that the Commerce Clause bars the States from regulating certain interstate electricity transactions, including wholesale sales (*i.e.*, sales for resale) across state lines. That ruling created what became known as the "*Attleboro* gap"—a regulatory void which, the Court pointedly noted, only Congress could fill. [p. 3]

. . . Congress responded to that invitation by passing the FPA in 1935. The Act charged FERC's predecessor agency with undertaking "effective federal regulation of the expanding business of transmitting and selling electric power in interstate commerce." *New York* v. *FERC*, 535 U. S. 1, 6 (2002) (quoting *Gulf States Util. Co.* v. *FPC*, 411 U. S. 747, 758 (1973)). Under the statute, the Commission has authority to regulate "the transmission of electric energy in interstate commerce" and "the sale of electric energy at wholesale in interstate commerce." 16 U. S. C. §824(b)(1).

. . . the Act also limits FERC's regulatory reach, and thereby maintains **a zone of exclusive state jurisdiction.** As pertinent here, §824(b)(1)—the same provision that gives FERC authority over wholesale sales—states that "this subchapter," including its delegation to FERC, "shall not apply to any other sale of electric energy." Accordingly, **the Commission may not regulate either within-state wholesales sales** or, more pertinent here, retail sales of electricity (*i.e.*, sales directly to users). See *New York*, 535 U. S., at 17, 23. State utility commissions continue to oversee those transactions.

. . . as earlier described, [FPA] §824(b) limit[s] FERC's sale jurisdiction to that at wholesale," **reserving regulatory authority over retail sales (as well as intrastate wholesale sales) to the States.** *New York*, 535 U. S., at 17 (emphasis deleted); see 16 U. S. C. §824(b); *supra*, at 3. **FERC cannot take an action transgressing that limit** no matter its impact on wholesale rates. [p. 17] . . . The Act makes federal and state powers "complementary" and "comprehensive," [p.27]

Excerpts from a "Legal Analysis of Commission Jurisdiction over the Rates, Terms and Conditions of Unbundled Retail Transmission in Interstate Commerce" that FERC attached as

[1] For additional legal analysis please see the protest of NARUC (which the NHPUC is a member of) in the petition of New England Ratepayers Association, FERC Case No. EL20-42, pp. 34 to 45 in particular, available at: https://pubs.naruc.org/pub/4204BA38-155D-0A36-31CE-8A05CD0AC660.

[2] https://www.supremecourt.gov/opinions/15pdf/14-840-%20new_o75q.pdf

Appendix G to its Order No. 888 (https://www.ferc.gov/legal/maj-ord-reg/land-docs/order888.asp):

1. Relevant Federal Power Act Provisions Section 201(b)(1) of the FPA provides: The provisions of this Part shall apply to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce . . . . **The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction . . . . over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter.** 16 U.S.C. 824(b)(1) (emphasis added). Thus, the statute on its face limits Commission jurisdiction over sales of energy to sales at wholesale, but does not limit jurisdiction over transmission to transmission used only for wholesale sales. Sections 201(c) and (d) define the meaning of "the transmission of electric energy in interstate commerce" and "sale of electric energy at wholesale in interstate commerce." Section 201(c) provides: For the purpose of this Part, electric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof: but only insofar as such transmission takes place within the United States. . . .

In *Connecticut Light & Power Co. v. FPC*, 324 U.S. 515 (1945)(CL&P), the Court reviewed the Commission's finding that a Connecticut utility was jurisdictional because it owned transmission facilities that were used in interstate commerce. The Court generally embraced the Jersey Central standard for determining whether facilities are used to transmit electric energy in interstate commerce. The Court emphasized that whether certain facilities transmit electric energy in interstate commerce is more a technical than a legal question. The Court stated:

> Federal jurisdiction was to follow the flow of electric energy, an engineering and scientific, rather than a legalistic or governmental, test. [p. 6] . . .

CL&P, which was decided two years after Jersey Central, is the leading case interpreting the section 201(b) local distribution provision. In CL&P, the Commission sought to regulate the accounting practices of Connecticut Light & Power Company [p. 18] At issue was whether CL&P was a "public utility" under the FPA. The utility's system encompassed an area solely within a single state (Connecticut) 36/ and did not interconnect with any other company that operated out of state. "Its purchases and sales, its receipts and deliveries of power, [were] all within the state." However, CL&P did purchase energy from companies that had, in turn, purchased energy from Massachusetts. The company also sold energy to a municipality that exported a portion of that energy to Fishers Island, located off the coast of Connecticut but "territory of New York." The Commission based its jurisdiction on these few transactions. The Court of Appeals affirmed the Commission, holding that the Commission's jurisdiction extended to "electric distribution systems which normally would operate as interstate businesses." The Court of Appeals found that: whether or not the facilities by which petitioner distributes energy from Massachusetts should be classified as 'local' is not relevant to this case. The sole test of jurisdiction of the Commission over accounts is whether these facilities, 'local' or otherwise, are used for the transmission of electric energy from a point in one state to a point in another. The Supreme Court reversed. It held that the statutory language in section 201(b) of the FPA providing that the Commission "shall not have jurisdiction . . . over **facilities used in local**

distribution" is a limitation upon Commission jurisdiction that "the Commission must observe and the courts must enforce." In analyzing the statute, the Court stated: It has never been questioned that technologically generation, transmission, distribution and consumption are so fused and interdependent that the whole enterprise is within the reach of the commerce power of Congress, either on the basis that it is, or that it affects, interstate commerce, if at any point it crosses a state line. . . .

But whatever reason or combination of reasons led Congress to put the provision in the Act, we think it meant what it said by the words "but shall not have jurisdiction over facilities used in local distribution." Congress by these terms plainly was trying to reconcile the claims of federal and local authorities and to apportion federal and state jurisdiction over the industry.

The Court decided that **this limitation on jurisdiction was "a legal standard that must be given effect** in this case in addition [p. 20] to the technological transmission test." . . .

The Court stated that whether or not local distribution facilities carried out-of-state electric energy was irrelevant. Whatever the origin of the electric energy they carried, so long as the utility used the lines for local distribution, they were exempt from federal jurisdiction. In fact, the Court stated that local distribution facilities "may carry no energy except extra-state energy and still be exempt under the Act."

The Court concluded that the Commission's order: must stand or fall on whether this company owned facilities that were used in transmission of interstate power **and** which **were not facilities used in local distribution.**

Archived: Tuesday, April 20, 2021 3:55:39 PM
From: Jennifer Foor
Sent: Thursday, February 25, 2021 1:55:16 PM
To: Carrie Morris
Subject: RE: Missing minutes
Importance: Normal
Attachments:
DOC219.PDF DOC218.PDF DOC217.PDF DOC216.PDF DOC215.PDF

Hi Carrie,
Check out what I've got attached:

Minutes for 289, 308. 309, and 373.

I found minutes for 153 (attached); nothing for 225 or 294; and minutes for 396, but I didn't scan them because I realize you were looking for execs.

Those execs, however, have taken place since Rep. Plett took over the Clerk duties, so he must have them electronically.

Thanks!
Jenn foor

From: Carrie Morris <carrie.morris@leg.state.nh.us>
Sent: Thursday, February 25, 2021 12:03 PM
To: Jennifer Foor <Jennifer.Foor@leg.state.nh.us>
Subject: Missing minutes

Hi Jenn, I have been working on science this AM and seem to be missing some stuff.

Public Hearing minutes for HB289, 308, 309, 373

Exec dates and votes for HB153, 225, 294, 396

I may have just misplaced an email or something but to complete the files, I need this info. Do you have it?

Archived: Tuesday, April 20, 2021 3:55:39 PM
From: cynthia walter
Sent: Saturday, February 20, 2021 1:48:23 PM
To: ~House Science Technology and Energy
Subject: [CAUTION: SUSPECT SENDER] HB 225 testimony 2MW and price limits
Importance: Normal

2-19-21
Dear Members of the NH House Committee on Science, Technology and Energy
I am a scientist and have served on energy committees at my college and my church.

HB 225 creates harmful changes to options for renewable energy.

This harms Granite Staters in many ways, a few examples:

1. It raises the limit from 1 MW to only 2 MW. This cuts out many good, local energy projects because many are most efficient in the 2-5 MW range.
   a. This **limits new projects likely to start in NH**
   b. This **limits new, good jobs in NH**.

2. The bill does not provide a fair price for new, renewable energy, especially compared to other states.
   a. **This hurts investment in NH.**
   b. **This limits energy options in NH.**

3. The energy pricing above 100 kw and in other frameworks in the bill will not alter what Granite Staters pay for their energy. Other, much more powerful factors control the cost of our energy.
   a. **This bill keeps us dependent on out of state energy and big energy producers** with big costs, such as stranded assets.
   b. **This bill will NOT protect rate payers**.

I hope you reject HB 225.

Regards,

Cynthia Walter, Ph.D.
22 West Concord St.
Dover, NH 03820
cawalter22@gmail.com also walter.atherton@gmaill.com

Sent from Mail for Windows 10

Archived: Tuesday, April 20, 2021 3:55:39 PM
From: Clifton Below
Sent: Friday, February 19, 2021 9:19:52 AM
To: ~House Science Technology and Energy
Cc: Timothy Lang; Howard Pearl; Shulock, David; Kreis, Donald
Subject: HB 106 testimony
Importance: Normal
Attachments:
HB 106 City of Lebanon testimony 2-19.pdf HB 106 CoL suggested amendment.docx ISO-NE Generator defined in op14_rto_final.pdf NARUC_Protest_Combined w hightlights starting p34.pdf

---

Attached please find my written testimony on HB 106 with referenced attachments. My apologies for the late delivery.

Clifton Below ❖ Asst. Mayor, Lebanon City Council ❖ personal office: 1 COURT ST, STE 300, Lebanon, NH 03766-1358
(603) 448-5899 (O), 667-7785 (M) ❖ Clifton.Below@LebanonNH.Gov ❖ www.linkedin.com/in/clifton-below

Archived: Tuesday, April 20, 2021 3:55:39 PM
From: Dan Weeks
Sent: Friday, February 19, 2021 9:07:43 AM
To: ~House Science Technology and Energy
Subject: Testimony re: HB 106 and HB 225
Importance: Normal
Attachments:
HB 106 and HB 225 Submission - ReVision Energy - 20210219.pdf ;

Dear Committee members,

On behalf of ReVision Energy, an employee-owned clean energy company and certified B Corporation, I would like to express support for HB 106 so NH municipalities are no longer subject to the arbitrary 1 MW net metering cap and can deliver savings to their taxpayers as well as the ratepaying public. We request the Committee amend the geographic provision to include at least towns which are adjacent to the host electricity generator.

I would also like to express strong opposition to HB 225, designed to effectively end net metering by existing clean distributed energy resources, which thousands of New Hampshire families, businesses, nonprofits, and municipalities have been counting on for years. It would also put a halt on further development of local clean energy systems and the thousands of jobs and millions of dollars in private-sector investment such development supports. HB 225 would set the energy rate for a typical 5 kW residential solar array or 50 kW nonprofit array or even 1,000 kW small business array around 2-3 cents/kWh while allowing the utilities to sell the power produced for 12-20 cents/kWh to neighboring homes and businesses – a massive subsidy to utilities with out-of-state investors. It would also disregard the market reality that power produced and consumed on the local distribution grid, which is coincident with peak demand and reduces system load, is considerably more valuable in terms of supply and demand than even the current 7-10 cents/kWh net metering rates, as demonstrated in the attached report.

As NH’s economy continues to struggle from a pandemic and recession, supporting HB 106 and opposing HB 225 would allow our state to add, rather than cut, well-paying jobs and save all ratepayers money, according to the best available research. ReVision Energy currently employs nearly 300 electricians, apprentices, and other clean energy professionals working to help Granite Staters reduce energy costs and carbon emissions for the public good.

In support of these positions, I would like to submit the attached empirical study on the costs and benefits of distributed solar generators on the New England grid, completed in late 2020 by Synapse Energy Economics. I am also attaching a recent column I wrote in *The Concord Monitor* concerning current barriers to solar adoption in New Hampshire and policy options to increase economic investment while saving all ratepayers money.

Respectfully submitted,

Dan Weeks
7 Commercial Dr
Brentwood, NH 03064

Dan Weeks | Employee-Owner | Director of Market Development
ReVision Energy, a Certified B Corp

603.679.1777 office
603.264.2877 mobile

Locations in New Hampshire, Maine, and Massachusetts
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.

"Be the change you wish to see in the world."

Archived: Tuesday, April 20, 2021 3:55:39 PM
From: Catherine Bushueff
Sent: Friday, February 19, 2021 7:58:36 AM
To: ~House Science Technology and Energy
Subject: House Bills 106, 148, 167, and 225
Importance: Normal

Chairman Michael Vose
Science, Technology and Energy Committee
New Hampshire House of Representatives

Dear Chairman and Committee Members,

I write in **opposition** to HB225, relative to the calculation of net energy metering payments or credits

I write in **support** of:

- HB106, establishing procedures for municipal host customer-generators of electrical energy.
- HB148, allowing increased net energy metering limits for municipal hydroelectric facilities.
- HB167, relative to net energy metering limits for customer generators and the purchase of output of limited electrical energy producers.

I support passage of the above House Bills 106, 148, and 167 for the environmental and economic benefits each would provide New Hampshire residents and communities. Reducing air pollution, diversifying energy supply, and expanding opportunities, so we better participate in the green energy economy is more important than ever.

We all need to do our part in reducing carbon emissions, including those in New Hampshire. Failure to do so will leave the Granite State needlessly behind as neighboring states move ahead with smart energy initiatives to combat the climate crisis.

And for the above reasons, I **oppose HB225**. As I understand HB225, this bill proposes changes to net metering rates that will jeopardize green energy businesses and consumers by undercutting net-metered sources. HB225 is a backward-leaning proposal and ought **not** pass.

Sincerely.
Catherine Bushueff
22 Ridgewood Road
Sunapee, NH 03782
603-763-2266

Archived: Tuesday, April 20, 2021 3:55:39 PM
From: Bruce Berk
Sent: Thursday, February 18, 2021 4:28:57 PM
To: ~House Science Technology and Energy
Subject: NH House Remote Testify: 1:00 pm - HB225 in House Science, Technology and Energy
Importance: Normal

Dear Committee Members,

Although House bill 225 raises net metering limits to 2 MG, I oppose this bill since it lowers payments for output.

thank you,

Bruce Berk
Pittsfield

Archived: Tuesday, April 20, 2021 3:55:39 PM
From: Bruce Berk
Sent: Thursday, February 18, 2021 4:27:44 PM
To: ~House Science Technology and Energy
Subject: NH House Remote Testify: 2:30 pm - HB167 in House Science, Technology and Energy
Importance: Normal

Dear Committee Members,

I support this bill as well as 294, 407, 148 and 106 because these bills will create good paying jobs, will emphasize local control and promote energy efficiency.

Increasing net metering limits will support and encourage local municipal and private businesses. Although House bill 225 raises net metering limits to 2 MG, I oppose this bill since it lowers payments for output.

thank you,

Bruce Berk
Pittsfield

Archived: Tuesday, April 20, 2021 3:55:39 PM
From: Bruce Berk
Sent: Thursday, February 18, 2021 4:21:47 PM
To: ~House Science Technology and Energy
Subject: NH House Remote Testify: 1:30 pm - HB148 in House Science, Technology and Energy
Importance: Normal

Dear Committee Members,

I support this bill as well as 294, 407, 148 and 167 because these bills will create good paying jobs, will emphasize local control and promote energy efficiency. Increasing net metering limits will support and encourage local municipal and private businesses to invest in solar, clean energy. Although House bill 225 raises net metering limits to 2 MG, I oppose this bill since it lowers payments for output.

thank you,

Bruce Berk
Pittsfield

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Bruce Berk
Sent: Thursday, February 18, 2021 4:19:58 PM
To: ~House Science Technology and Energy
Subject: NH House Remote Testify: 11:00 am - HB407 in House Science, Technology and Energy
Importance: Normal

Dear Committee Members,

I support this bill as well as 294, 106, 148 and 167 because these bills will create good paying jobs, will emphasize local control and promote energy efficiency. Finally increasing net metering limits will support and encourage local municipal and private businesses. Although House bill 225 raises net metering limits to 2 MG, I oppose this bill since it lowers payments for output.

thank you,

Bruce Berk
Pittsfield

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Bruce Berk
Sent: Thursday, February 18, 2021 4:18:18 PM
To: ~House Science Technology and Energy
Subject: NH House Remote Testify: 10:00 am - HB294 in House Science, Technology and Energy
Importance: Normal

Dear Committee Members,

I support this bill as well as 106, 407, 148 and 167 because these bills will create good paying jobs, will emphasize local control and promote energy efficiency. Finally increasing net metering limits will support and encourage local municipal and private businesses. Although House bill 225 raises net metering limits to 2 MG, I oppose this bill since it lowers payments for output.

thank you,

Bruce Berk
Pittsfield

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Bruce Berk
Sent: Thursday, February 18, 2021 4:16:52 PM
To: ~House Science Technology and Energy
Subject: NH House Remote Testify: 9:00 am - HB106 in House Science, Technology and Energy
Importance: Normal

Dear Committee Members,

I support this bill as well as 294, 407, 148 and 167 because these bills will create good paying jobs, will emphasize local control and promote energy efficiency. Finally increasing net metering limits will support and encourage local municipal and private businesses. Although House bill 225 raises net metering limits to 2 MG, I oppose this bill since it lowers payments for output.

thank you,

Bruce Berk
Pittsfield

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Robert Hayden
Sent: Thursday, February 18, 2021 2:57:14 PM
To: ~House Science Technology and Energy
Subject: Written Testimony for HB225
Importance: Normal
Attachments:
SB225Testimony_18FEB21.docx

Hi Folks,

Please find my written Testimony for HB225 attached.

Be well and have a great day!

Bob Hayden
President and Chief Technical Officer
Standard Power of America

(cell) 603-325-1749
(fax) 855-855-2012
b.hayden@standardpower.com

www.standardpower.com

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Jasen Stock
Sent: Thursday, February 18, 2021 2:08:43 PM
To: ~House Science Technology and Energy
Subject: NH House Remote Testify: HB167, HB407, HB294 in House Science, Technology and Energy
Importance: Normal
Attachments:
hb 294-407-167 testimony 2-19-21.pdf

Good afternoon,

I am attaching the NH Timberland Owners Association's testimony supporting House Bills 294, 407, and 167.

Thank you,

Jasen

Jasen Stock
Executive Director
New Hampshire Timberland Owners Association
P: 603-224-9699
C: 603-674-8148
F: 603-225-5898
www.nhtoa.org

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Madeleine Mineau
Sent: Thursday, February 18, 2021 9:12:17 AM
To: ~House Science Technology and Energy
Subject: HB225 testimony in opposition by CENH
Importance: Normal
Attachments:
CENH HB225 Testimony.pdf Solar Savings in New England-Final.pdf

---

Dear Chairman Vose and members of the Committee,
Please find attached our written testimony in opposition of HB225.

Thank you for considering our input.
Madeleine

--
Madeleine Mineau
Executive Director
Clean Energy NH (formerly NHSEA)
Cell phone: 607-592-6184

CLEAN ENERGY NH
Your Voice in All Energy Matters

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Janice Ireland
Sent: Thursday, February 18, 2021 8:26:39 AM
To: ~House Science Technology and Energy
Cc: Jaci Grote; Kate Murray; Tom Sherman; Howard Kalet; Pfau, Tom
Subject: Letters Re: HB 225 & HB 549
Importance: Normal
Attachments: HB225.pdf ;HB549.pdf ;

Good morning,
Please find attached letters to the committee from the Town of Rye regarding HB 225 and HB 549.

Thank you,

Janice Ireland
Selectmen's Executive Assistant
10 Central Road
Rye, NH 03870
(603) 964-5523
(603) 964-1516 - Fax
jireland2@ryenh.us

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Heidi L. Kroll
Sent: Thursday, February 18, 2021 12:48:47 AM
To: ~House Science Technology and Energy
Subject: Testimony of GSHA regarding HB 225 re calculation of net energy metering payments or credits
Importance: Normal
Attachments:
FINAL GSHA testimony opposed to HB 225 re calculation of net energy.pdf

---

Good evening Chairman Vose and Honorable Members of the House Science, Technology and Energy Committee,

On behalf of the Granite State Hydropower Association, please find attached written testimony in opposition to HB 225. Please feel free to email me or call my cell phone number if you have any questions or would like additional information.

Sincerely,
Heidi

Heidi L. Kroll
direct 603.545.3710
tel 603.228.1181
tel 800.528.1181
cell 603.496.2345
fax 603.226.3334

http://www.gcglaw.com

Gallagher, Callahan & Gartrell, PC
A multidisciplinary law firm
214 N. Main Street
Concord, New Hampshire 03301

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Phillip Stephenson
Sent: Wednesday, February 17, 2021 1:03:55 PM
To: ~House Science Technology and Energy
Subject: Please oppose HB 225
Importance: Normal

Dear Members of the House Science, Technology and Energy Committee,

I am a private citizen from Hollis, New Hampshire, and I have spent my career working in the electric energy industry. I am writing in opposition to HB 225.

I am opposed to HB 225 for the following reasons:

- It is an inaccurate method of valuing distributed generation. At the low distributed generation penetration levels in New Hampshire, distributed generation is good for the electrical grid. It works primarily to offset demand that is charged at the full retail rate. Therefore, in addition to the wholesale energy value, there is a value to reducing the need for infrastructure to transport the energy. This is a recognized principle across the country and has been reflected by net metering rates that are higher at low penetration levels and only get reduced when the net benefit is reduced. Presently, distributed generation is still very valuable to the New Hampshire grid.
- If there were to be a change to the net-metering level that was previously negotiated through a multi-stakeholder process at the PUC, it should actually be increased. By almost any reasonable metric and compared to most other states, the compromise net metering rate that New Hampshire has today undervalues the benefits of distributed generation at current low penetration levels.
- This bill is a job killer. It favors remote power generation to local power generation and is an assault on the homegrown solar industry. Distributed generation also benefits local communities by moving the taxes for the facilities to local budgets rather than the remote areas communities that currently serve most New Hampshire communities.

HB 225 is bad for our electrical grid and raises its costs, it's bad for local New Hampshire property tax bases, it's bad for the solar industry and local economic development.

The real question is, who does this bill benefit? Who wrote this bill and why? I would like to understand what the bill is intended to achieve and for whom.

I ask that you vote down this extreme bill. This is a matter for the PUC to work through and do it's best to set energy rates for net metering that use the best information and expertise available. This type of technical evaluation is why we have a PUC and rely on professional expertise.

Thank you for your consideration.

Warm Regards,

Phillip Stephenson
262 Hayden Rd
Hollis, NH 03049

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Samuel Golding
Sent: Thursday, February 11, 2021 3:37:17 PM
To: ~House Science Technology and Energy
Subject: HB 315 testimony from Community Choice Partners, Inc.
Importance: Normal
Attachments:
CCPartners_NH SB286 Memo to Gov_17July2019.pdf Cato_Need for Retail Market Reform_2017.pdf CCPartners_DE 19-197 Data Platform Direct Testimony_17Aug2020.pdf CCPartners_HB315 Testimony_11Feb2021.pdf

---

Dear Chairman Vose and Honorable Committee Members:

Attached please find my testimony on HB 315 in PDF format, along with the Attachments to my testimony.

Please don't hesitate to be in touch if you have any questions.

Thank you for your attention to this important matter.

Samuel Golding
President
Community Choice Partners, Inc.
c: 415.404.5283

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Henry Herndon
Sent: Thursday, February 11, 2021 3:30:01 PM
To: ~House Science Technology and Energy
Cc: Andrea Hodson
Subject: Citizens' Petition | NH House ST&E Cmte. | Vote "NO" on House Bill 315
Importance: Normal
Attachments:
NH-House-STE_Citizen-Petition_No-on-HB315.pdf

To the Honorable Chairman Michael Vose and the Members of the NH House Science Technology & Energy Committee,

Please find attached a citizens' petition respectfully requesting you vote "No" on House Bill 315, relative to aggregation of electric customers.

Over the past thirteen days, this petition has collected signatures from 711 New Hampshire voters and community leaders representing 138 New Hampshire municipalities.

Thank you for your attention in this important matter, and thank you for your service.

Respectfully,
Henry P. Herndon

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Jasen Stock
Sent: Thursday, February 11, 2021 12:35:27 PM
To: ~House Science Technology and Energy
Subject: NHTOA written testimony to HB 213
Importance: Normal
Attachments:
hb 213 testimony 2-12-21.pdf

Chairman Vose and Honorable Members of the Committee,

Thank you for the opportunity to provide testimony on House Bill 213. I am forwarding the New Hampshire Timberland Owners Association's written testimony on House Bill 213. I look forward to participating in the public hearing for this bill tomorrow.

Jasen

Jasen Stock
Executive Director
New Hampshire Timberland Owners Association
P: 603-224-9699
C: 603-674-8148
F: 603-225-5898
www.nhtoa.org

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Madeleine Mineau
Sent: Sunday, February 7, 2021 10:28:22 AM
To: ~House Science Technology and Energy
Subject: HB 309 CENH testimony
Importance: Normal
Attachments:
CENH Testimony HB309 20210208.pdf 20181101-RPS-Review-2018-FINAL-REPORT-2018-11-01.pdf

---

Honorable members of the House ST&E committee,
Please find attached CENH's testimony in support of HB 309 scheduled for a hearing Monday 2/8 at 3pm. I am also including the PUC 2018 RPS review report which is referenced in our testimony.

I hope you are all having a nice weekend.
Madeleine

--
Madeleine Mineau
Executive Director
Clean Energy NH (formerly NHSEA)
Cell phone: 607-592-6184

CLEAN ENERGY NH
Your Voice in All Energy Matters

Archived: Tuesday, April 20, 2021 3:55:40 PM
From: Jasen Stock
Sent: Thursday, January 28, 2021 4:16:39 PM
To: ~House Science Technology and Energy
Subject: NH Timberland Owners Association - written testimony HB 382,376,614
Importance: Normal
Attachments:
hb 382-614-376 testimony 1-29-21.pdf

Thank you for the opportunity to provide written testimony on House Bills 382, 376, 614 (letter attached).

Please feel free to contact me if you have any questions.

Jasen

Jasen Stock
Executive Director
New Hampshire Timberland Owners Association
P: 603-224-9699
C: 603-674-8148
F: 603-225-5898
www.nhtoa.org

Archived: Tuesday, April 20, 2021 3:54:23 PM
From: Steve Abdu
Sent: Friday, February 19, 2021 10:37:36 AM
To: ~House Science Technology and Energy
Subject: NH House Remote Testify: 1:00 pm - HB225 in House Science, Technology and Energy
Importance: Normal

House Science Technology and Energy Committee Members,

HB225 would gut one of the major incentives to installing solar panels on homes in New Hampshire, Net Metering.

Please DO NOT reduce the price of our generated electricity to the wholesale level. Besides reducing the incentive to install, there are thousands of jobs that may be affected by reducing this incentive.

At a time when every watt is needed, please don't fix a situation that doesn't need fixing. The current system works, please don't screw it up. The electric generation industry and distributors already have a distinct advantage over the home owners contributing to the power grid. They don't need another.

Sincerely,

Louis Stephen Abdu
713 Blake Hill Rd.
New Hampton, NH

603 661-7797
steve.abdu@gmail.com

Archived: Tuesday, April 20, 2021 3:54:23 PM
From: Richard Knox
Sent: Friday, February 19, 2021 8:14:05 AM
To: ~House Science Technology and Energy
Cc: Richard Knox
Subject: NH House Remote Testify: 1:00 pm - HB225 in House Science, Technology and Energy
Importance: Normal

I'm not able to Zoom into your hearing today but wish to voice my strong opposition to HB225 regarding changes in the valuation of customer-generated electricity.

We built a new Energy Star-rated, super-insulated home in Sandwich in 2015 with a 6.7 Kw solar array, hoping it would supply most or all of our energy needs. However, we have found that our contractor under-sized our array; consequently, our electric bills in December, January and February are running $600 or higher per month. So we're investigating how we might increase the size of our PV system to moderate our bills — if not get to net-zero. This is important, as we are on a fixed income. We also worry about the resale value of our house if we can't make it more efficient.

HB225, if passed, would make it very difficult if not impossible to solve this problem. And I'm sure it would put the kibosh on many people's plans to relocate to New Hampshire, build new as we did, or make their homes more energy-efficient. These substantial investments don't make economic sense if homeowners can't reap the benefits of net metering or plan their PV systems to achieve a reasonable return-on-investment.

Surely, the General Court doesn't want to discourage this kind of investment in New Hampshire communities — just at the time when the pandemic has made these communities more attractive to people who want to flee the cities and, in many cases, work from home or set up businesses here.

Thanks for considering this point of view. I hope you will vote against HB225 and permit the PUC (with citizen input) to devise hold-harmless net-metering policies.

Sincerely,

Richard Knox
richard@richardaknox.com
603-284-6145

Archived: Tuesday, April 20, 2021 3:54:23 PM
From: Catherine Bushueff
Sent: Friday, February 19, 2021 7:58:36 AM
To: ~House Science Technology and Energy
Subject: House Bills 106, 148, 167, and 225
Importance: Normal

Chairman Michael Vose
Science, Technology and Energy Committee
New Hampshire House of Representatives

Dear Chairman and Committee Members,

I write in **opposition** to HB225, relative to the calculation of net energy metering payments or credits

I write in **support** of:

- HB106, establishing procedures for municipal host customer-generators of electrical energy.
- HB148, allowing increased net energy metering limits for municipal hydroelectric facilities.
- HB167, relative to net energy metering limits for customer generators and the purchase of output of limited electrical energy producers.

I support passage of the above House Bills 106, 148, and 167 for the environmental and economic benefits each would provide New Hampshire residents and communities. Reducing air pollution, diversifying energy supply, and expanding opportunities, so we better participate in the green energy economy is more important than ever.

We all need to do our part in reducing carbon emissions, including those in New Hampshire. Failure to do so will leave the Granite State needlessly behind as neighboring states move ahead with smart energy initiatives to combat the climate crisis.

And for the above reasons, I **oppose HB225**. As I understand HB225, this bill proposes changes to net metering rates that will jeopardize green energy businesses and consumers by undercutting net-metered sources. HB225 is a backward-leaning proposal and ought **not** pass.

Sincerely.
Catherine Bushueff
22 Ridgewood Road
Sunapee, NH 03782
603-763-2266

Archived: Tuesday, April 20, 2021 3:54:24 PM
From: Bruce Berk
Sent: Thursday, February 18, 2021 4:28:57 PM
To: ~House Science Technology and Energy
Subject: NH House Remote Testify: 1:00 pm - HB225 in House Science, Technology and Energy
Importance: Normal

Dear Committee Members,

Although House bill 225 raises net metering limits to 2 MG, I oppose this bill since it lowers payments for output.

thank you,

Bruce Berk
Pittsfield

Archived: Tuesday, April 20, 2021 3:54:24 PM
From: Robert Hayden
Sent: Thursday, February 18, 2021 2:57:14 PM
To: ~House Science Technology and Energy
Subject: Written Testimony for HB225
Importance: Normal
Attachments:
SB225Testimony_18FEB21.docx

Hi Folks,

Please find my written Testimony for HB225 attached.

Be well and have a great day!

Bob Hayden
President and Chief Technical Officer
Standard Power of America

(cell) 603-325-1749
(fax) 855-855-2012
b.hayden@standardpower.com

www.standardpower.com

Archived: Tuesday, April 20, 2021 3:54:24 PM
From: Madeleine Mineau
Sent: Thursday, February 18, 2021 9:12:17 AM
To: ~House Science Technology and Energy
Subject: HB225 testimony in opposition by CENH
Importance: Normal
Attachments:
CENH HB225 Testimony.pdf Solar Savings in New England-Final.pdf

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Dear Chairman Vose and members of the Committee,
Please find attached our written testimony in opposition of HB225.

Thank you for considering our input.
Madeleine

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Madeleine Mineau
Executive Director
Clean Energy NH (formerly NHSEA)
Cell phone: 607-592-6184

CLEAN ENERGY NH
Your Voice in All Energy Matters

Archived: Tuesday, April 20, 2021 3:54:24 PM
From: Janice Ireland
Sent: Thursday, February 18, 2021 8:26:39 AM
To: ~House Science Technology and Energy
Cc: Jaci Grote; Kate Murray; Tom Sherman; Howard Kalet; Pfau, Tom
Subject: Letters Re: HB 225 & HB 549
Importance: Normal
Attachments: HB225.pdf ;HB549.pdf ;

Good morning,
Please find attached letters to the committee from the Town of Rye regarding HB 225 and HB 549.

Thank you,

Janice Ireland
Selectmen's Executive Assistant
10 Central Road
Rye, NH 03870
(603) 964-5523
(603) 964-1516 - Fax
jireland2@ryenh.us

Archived: Tuesday, April 20, 2021 3:54:24 PM
From: Karen Contos
Sent: Wednesday, February 17, 2021 10:47:16 AM
To: ~House Science Technology and Energy
Subject: Written testimony on HB225
Importance: Normal

Please forward this to all committee members. I do not use Outlook and so I can't use the link on the NH House website. Thank you.

I oppose HB225 as the government needs to encourage residents to add solar, not discourage them. Distributed Energy is a very valuable resource. And as homeowners pay for the infrastructure themselves, the least the government can do is to require electric utilities to do net metering. When a homeowner generates more electricity than they need, the power goes to the nearest neighbor that needs power. So, the solar generator should get net metering for their excess power.

The increased installation of solar panels and wind turbines would add thousands of high paying jobs to New Hampshire, especially trade oriented jobs.
This bill is going in the wrong direction. Instead of discouraging solar, New Hampshire needs to encourage it.

As you know the climate in New Hampshire is changing and the warming temperatures are hurting the skiing industry, our forests and our coastline.

For our children and grandchildren, we need to immediately add an extensive amount of solar and wind energy to our portfolio and limit the use of fossil fuels. We need to quickly react to the climate crisis.

Thank you to the Committee Chair and members for your consideration.

--
Karen M. Contos
Merrimack, NH

TOWN OF RYE • OFFICE OF SELECTMEN
10 Central Road
Rye, NH 03870-2522
(603) 964-5523 • Fax (603) 964-1516

February 16, 2021

NH House Science, Technology & Energy Committee
107 N Main Street
Concord NH 03301

Re: House Bill 225

To the Honorable Members of the NH House Science, Technology & Energy Committee,

We respectfully request that you vote "No" on House Bill 225. This bill would reset all net metering credit to wholesale (currently averaging 2-3¢/kWh).

Currently the net metering credits are set at the default energy service rate (currently about 8¢/kWh) for projects 100 kW and larger. For smaller projects, the credits include the cost of energy plus the transmission plus 25% of the distribution (about 12-13¢/kWh). HB 225 proposes a significant reduction and it hurts the smaller solar arrays the most.

When a solar array produces more energy than the owner can use, the electrons flow out to the grid. They flow to the nearest demand. So if one house is generating extra energy on a hot summer day and the house next door is consuming energy (running air conditioning), the electrons flow from one house to the next. The utility is proposing that they be able to purchase the excess energy for 2¢ and then sell it to the neighbor for the retail rate - about 17¢ per kWh! And they are fully charging for transmission and distribution which in this case consists of electrons traveling from one house to the next, rather than from some large, more distant power plant.

HB225 would have a serious negative impact on the value and payback of any net metering projects, large or small, that already exist or are under consideration. Electricity from solar reduces the energy that utilities need to buy and that saves all ratepayers money. New Hampshire should be encouraging more investment in solar as a way of reducing energy demand, energy prices and public health costs.

Please, vote "No" on HB 225. Thank you for taking our position on this matter into consideration.

Sincerely,
Rye Select Board

Philip D. Winslow, Chairman

William Epperson, Selectman

Mae C. Bradshaw, Selectwoman

Howard Kalet, Co-Chairman
Rye Energy Committee

Representative Jaci Grote, Rockingham 24

Sources:
https://www.nhbr.com/whats-the-net-effect-of-net-metering-in-nh/

Solar Savings in New Hampshire

December 2020

Electricity from solar reduces the need to run other power plants, which cuts the amount of electricity utilities need to buy and saves customers money. By avoiding the need to run the most expensive power plants (which are often powered by fossil fuels), when solar lowers the amount of electricity purchased, it also reduces the wholesale price of electricity.

Analyzing hourly data from ISO New England, we estimated what demand and prices for electricity would have been if not for local solar. These include benefits shared by all New Englanders, not just those with solar. **New Hampshire ratepayers saved more than $83 million due to local solar.**

On average, over the six years analyzed, local solar provided 11.9 cents per kWh of energy market benefits. This calculation only includes weeks where there is a strong relationship between loads and prices; other likely energy savings are not estimated here.

New England Solar Energy Savings

Year	NH	New England
2014	$7 million	$96 million
2015	$9 million	$118 million
2016	$13 million	$171 million
2017	$16 million	$206 million
2018	$20 million	$258 million
2019	$17 million	$211 million
Total	$83 million	$1,060 million

Numerous heat waves and especially high summertime energy prices in 2018 contributed to higher savings that year. Benefits in this figure only include impacts related to the wholesale energy market. Other benefits (e.g., public health, climate, capacity, transmission and distribution, reliability, or retail margins) are not included.

From 2014 to 2019...

- Solar created $1.1 billion in energy savings in New England, including $83 million in NH
- New England solar cut 4.6 million metric tons of CO_2 pollution, equal to taking one million cars off the road
- Solar created $87 million in public health benefits in New England and $1 million in NH

In New Hampshire in 2019...

- Local solar produced 52 million kWh of electricity, equal to 0.5 percent of the state's needs
- Local solar powered the equivalent of 7,000 homes
- Local solar created $3 million in CO_2 benefits, and removed the equivalent of 6,000 cars from the road

Synapse

Authors: Patrick Knight, Steve Letendre, PhD, and Erin Camp, PhD

TOWN OF RYE • OFFICE OF SELECTMEN
10 Central Road
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Synapse

Authors: Patrick Knight, Steve Letendre, PhD, and Erin Camp, PhD

ISO New England Operating Procedure No. 14 - Technical Requirements for Generators, Demand Response Resources, Asset Related Demands and Alternative Technology Regulation Resources

Effective Date: November 5, 2020

Table of Contents

*This document is controlled when viewed on the ISO New England Internet web site. When downloaded and printed, this document becomes **UNCONTROLLED**, and users should check the Internet web site to verify that they have the latest version. In addition, a Controlled Copy is available in the Master Control Room procedure binders at the ISO.*

Good Utility Practice including making resources available for service as soon as possible after failures of equipment.

II. TECHNICAL REQUIREMENTS FOR GENERATORS

This section describes the basic technical requirements that a Generator shall meet to be considered for offer, dispatch and settlement. Generators shall also meet the eligibility requirements of Section III of the ISO New England Inc. Transmission, Markets and Services Tariff (ISO Tariff) and ISO New England Manuals (ISO Manuals) to offer into the New England Markets.

Criteria used to define registration options outlined in Section II.A.2 shall be used for all generating facilities. All registered SOGs shall comply with the registration requirements of Section II.A.2 of this OP on or before January 1, 2021.

A. Generator Defined

1. A Generator shall be defined consistently for all ISO applications for the purposes of offer, dispatch and settlement. Defined Generators are represented in the ISO Energy Management System (EMS) and shall communicate with ISO through its approved DE.

   a. To define a new Generator, a minimum of one hundred and twenty (120) calendar days' advance notice to ISO is required. To change data for an existing Generator definition, a minimum of seven (7) calendar days' advance notice to ISO is required. The advance notice period commences upon ISO receipt of the data detailed in Section II.A.6 of this OP.

2. Except as provided for in Sections II.A.3 and II.A.4 below, the registration options for a generating facility are as follows:

   a. A generating facility (of any size) interconnected at 115 kV or above shall register as a Generator.

   b. A generating facility of five (5) MW or greater interconnected below 115 kV shall register as a Generator.

   c. A generating facility that is at least one (1) MW and less than five (5) MW interconnected below 115 kV:

      - May register as a Generator
      - May register as a SOG or
      - May elect to **not** register, or to register as an ATRR only, if **not** participating in any New England Markets other than as a load reducer or regulation provider

   d. A generating facility less than one (1) MW interconnected below 115 kV:

- May register as a SOG or
- May elect to **not** register, or to register as an ATRR only, if **not** participating in any New England Markets other than as a load reducer or regulation provider

3. A generating facility that meets the Distributed Generation Definition:
   - May register pursuant to Section II.A.2 above
   - May register as a component of a DRR, On-Peak Demand Resource, or Seasonal Peak Demand Resource or
   - May elect to **not** register, or to register as an ATRR only, if **not** participating in any New England Markets other than as a load reducer or regulation provider
4. A generating facility that opts to register as part of an Electric Storage Facility shall register as a Generator.
5. **Neither** a Generator **nor** an SOG may be registered at the same end-use customer facility as a Demand Response Asset unless the Generator or SOG is separately metered and reported and its output does **not** reduce the load reported at the Retail Delivery Point of the Demand Response Asset.
6. For the purpose of this OP, the aggregated maximum net output at or above 0 degrees F and interconnection voltage of a generating facility measured at the point at which the generating facility interconnects to the existing system are used to determine registration options.
7. For dispersed power generating facilities or distributed energy resources (excluding load reducers) that are interconnecting to the existing system through a common point of connection (e.g., a common collector or an express feeder), the following applies:
   a. For purposes of this OP, a common collector is a system, usually operating at distribution or sub-transmission voltage levels, designed primarily for interconnecting capacity to a common point of connection on an existing transmission or distribution element. Where the existing point of connection is a substation, the interconnection facilities are commonly referred to as an express feeder. An express feeder by definition serves **no** load other than that associated with the interconnected dispersed power generating facilities or distributed energy resource.
   b. Where multiple dispersed power generating facilities or distributed energy resources are connecting to the existing system through a common point of connection at the same time, all generating facilities/resources (excluding load reducers) interconnected at the common collector or express feeder system will be aggregated for the

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

	)	
New England Ratepayers Association	)	No. EL20-42
	)	

PROTEST OF THE NATIONAL ASSOCIATION
OF REGULATORY UTILITY COMMISSIONERS

INTRODUCTION

Net metering is a retail service provided by local distribution utilities under which the retail electric service they provide is measured by, and is billed based on, the net delivery of electricity to the retail customer during a retail service billing period, and the utility manages any outflow from retail customers' local generation, typically located behind the meter. Net metering has been an established feature of retail electric rates and state energy policy across the nation for decades.[1] Nearly every state has enacted a net metering program to promote renewable resources and distributed generation within its boundaries. Federal law recognizes that the decision to allow or require utilities to offer net metering service is one for the states, and lies outside the Commission's jurisdiction. Indeed, the Energy Policy Act of 2005 ("EPAct 2005") affirmatively encouraged "[e]ach state regulatory authority" to include net metering service among its regulatory policies and as part of the local utility services that it regulates.[2] The Commission, too, has for nearly 20 years acknowledged states' authority and held that net metering does not involve wholesale sales subject to its jurisdiction. Relying on that settled law, states and utilities have developed and implemented net metering programs, and millions of Americans have made long-term investments in solar panels and other distributed generation for their homes and businesses.

Based on court decisions dating from 2010 and 2012, Petitioner asks the Commission to disregard established law and that reliance, to effectively declare the net metering programs, rates, and regulations in nearly every state to be unlawful, and to impose uniform and rigid federal regulation in their place. Petitioner's main complaint appears to be that the state-jurisdictional

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[1] Those programs are not all alike. While sharing the core features identified in federal law, their diversity reflects the diversity of the states and their local needs and priorities. This diversity provides a unique laboratory for exploring new program designs and features—exactly the kind of local variation that federalism is intended to promote.

[2] 16 U.S.C. § 2621(a), (d)(11).

retail rates charged to the retail customers it claims to represent are too high, allegedly because of net metering. That complaint, however, belongs before state regulators and state legislatures. This Commission has no regulatory interest in addressing grievances regarding retail rate design, and indeed, no jurisdiction to do so. Moreover, Petitioner identifies no specific net metering program that it is challenging. Instead, it sweeps broadly and asks this Commission to issue an abstract declaration "find[ing] unlawful, and therefore reject[ing], state net metering laws which assert jurisdiction over … wholesale sales,"[3] without ever identifying which state net metering laws it has in mind.

An abstract attack on net metering laws, divorced from any concrete controversy, may make for a stimulating law review article. But it is not grounds for a declaratory order. Far from resolving uncertainty, the relief requested by the Petitioner will generate widespread uncertainty and litigation. States will be left to determine whether the programs they have enacted, encouraged by Congress and Commission precedent, fall within the terms of the theoretical declaration demanded by Petitioner, and millions of homeowners and small businesses will attempt to mitigate the impact of the ruling on their individual investments. Accordingly, the Commission should not entertain this Petition.

To the extent the Commission nevertheless does entertain the Petition, there are at least three reasons it should reaffirm its longstanding precedent and reject the Petition's legal theory. **First**, in *MidAmerican* and again in *Sun Edison*, the Commission correctly rejected the very same theory Petitioner advances here. As the Commission then explained, the outflow of energy from a retail customer to its local distribution utility is not a wholesale sale. Netting those outflows against inflows when measuring the retail service provided during a billing cycle does not set a

[3] Petition at 45.

wholesale rate. Congress, acting with the backdrop of the *MidAmerican* ruling, confirmed states' jurisdiction in EPAct 2005. Unlike portions of the Public Utility Regulatory Policies Act ("PURPA") that authorize the Commission to take federal action, EPAct 2005 recognizes state jurisdiction over net metering programs and encourages states to exercise that jurisdiction by adopting those programs.

Second, even if the Commission decided to ignore Congress and abandon its own precedent to assert jurisdiction over outflows of energy from a retail customer to its local utility, it still could not issue the requested declaration. The only possible impact of asserting federal jurisdiction would be that the owners of net-metered generation would become entitled to wholesale compensation for flows of energy that currently are not regarded as sales at all. Asserting that jurisdiction would not, and could not, prevent states from continuing to measure state-jurisdictional retail service based on the net inflow to the retail customer. Of course, Petitioner does not want to give net-metered homes and businesses a <u>new</u> wholesale revenue stream—it wants the Commission to <u>prohibit</u> states from using a netting convention when measuring retail service. In effect, Petitioner wants the Commission to dictate that states must recognize a greater quantity of retail sales than state-regulated retail tariffs allow. But even if the Commission could regulate outflows from net metering customers as wholesale sales, it has no power whatsoever to dictate the terms of retail service.

The D.C. Circuit's decisions in the 2010 and 2012 station power cases—cited by Petitioner as the sole reason why the Commission should in 2020 revisit *MidAmerican* and *Sun Edison*—only confirm the impropriety of Petitioner's requested declaration. In those cases, the D.C. Circuit confirmed that the Commission had no jurisdiction to displace the state's netting rules for measuring whether retail sales had occurred. States are entitled to define the terms of retail service, and to measure retail service as they see fit. The Commission may not interfere. It may not "specif[y] terms of sale at retail"—this "is a job for the States alone."[4]

Third, the Commission cannot issue the requested declaration because a homeowner or business does not engage in interstate commerce when energy flows out from the home or business to the local utility's distribution system, and the Commission has no jurisdiction to regulate the local outflow from these net metered facilities. The Petition brushes that obstacle aside on the theory that the energy in the local utility's distribution network previously traveled in interstate commerce, but that is irrelevant. To assert jurisdiction over the outflow of energy from a retail customer to a utility, the Commission must find—and the Petitioner must prove—that the outflow from the net metered facility is in interstate commerce. The Petitioner does not and cannot so prove. Neither precedent nor fact supports such a notion. To be sure, when a utility sells commingled energy, it is selling, at retail, electricity that has flowed in interstate commerce. But a net metered customer is not flowing any commingled energy onto the grid. Nor does the net metered customer intend or expect that its outflow will subsequently leave its neighborhood distribution facilities, let alone cross state lines. Accordingly, the homeowners and businesses using retail net metering service are not engaged in interstate commerce, and their outflows are outside of the Commission's jurisdiction.

Finally, the Commission cannot overlook the fact that state and federal legislatures, state regulatory commissions, utilities, and millions of retail customers have acted in reliance on the law and this Commission's established precedent. When the Commission reverses a prior legal interpretation on which the public has relied, it must take account of that reliance and explain why, nevertheless, a change in position is warranted. Here, nothing has happened requiring a change in

[4] *FERC v. Elec. Power Supply Ass'n*, 136 S. Ct. 760, 775 (2016).

Commission policy, except that more states, and myriad more Americans, have invested in small-scale distributed generation, in reliance on retail net metering programs. Against those reliance interests, the Petitioner balances only abstract claims that states' retail rates are too high and misallocate costs among retail customers—matters over which this Commission has no regulatory authority. Disrupting the net metering programs in place in 48 states and potentially upending the reliance of millions of consumers is wholly unjustified.

FACTUAL BACKGROUND

Net metering is a means of measuring the retail electric service used by a utility customer. Net metering has been implemented in many variations, but the common feature is that retail service to an electric consumer is measured so that "electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric energy provided by the electric utility to the electric consumer during the applicable billing period."[5] The primary purpose of net metering is to enable retail customers to self-supply a portion of their electricity needs,[6] typically in a manner consistent with state clean-energy, environmental, and economic development objectives, while maintaining the reliability and efficiency of the distribution system.

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[5] 16 U.S.C. § 2621(d)(11). *See also* Exhibit A (Affidavit of Carl Pechman, Ph.D. in Support of the Protest of the National Association of Regulatory Utility Commissioners) at 3-4.

[6] *See Sun Edison LLC*, 129 FERC ¶ 61,146 at P 17 (2009), *modified on reh'g by* 131 FERC ¶ 61,213 (2010). Efficiency is achieved by allowing interconnection with the standard bi-directional meter instead of requiring the homeowner/owner of distributed generation to install multiple meters and establish multiple billing protocols with its local utility.

The first net metering programs date back to the early 1980s.[7] After the EPAct 2005 formally encouraged states to consider the adoption of net metering policies,[8] adoption by states and participation by customers accelerated. By 2015, 43 states and the District of Columbia had adopted net metering policies,[9] and over 500,000 customers had enrolled.[10] By year-end 2018, over two million customers were participating in net metering programs nationwide.[11] Today, net metering programs are available in 48 states and the District of Columbia. Net metering customers represent approximately 1.5% of electric utility customers nationwide.[12]

While Petitioner attacks a construct it calls "full net metering," there is no one-size-fits-all approach to net metering and the Petition does not identify any particular state's program as problematic. In reality, net metering programs are diverse and carefully designed to advance each state's individual policy goals and address local needs. States use net metering programs to advance policy goals including to allow customers to self-supply a portion of their own electricity

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[7] Minnesota was the first state to enact a net metering program, in 1983, although Iowa, Idaho, Arizona and Massachusetts were also early adopters. Solar Electric Power Ass'n, *Ratemaking, Solar Value and Solar Net Energy Metering – A Primer* at 1 (2013), https://perma.cc/6LMH-5FQ9. *See also* Richard L. Revesz & Burcin Unel, *Managing the Future of the Electricity Grid: Distributed Generation and Net Metering*, 41 Harv. Envtl. L. Rev. 43, 59 (2017).

[8] 16 U.S.C. § 2621(d). In 2003, there were fewer than 7,000 net metering customers nationwide. The number increased to approximately 100,000 by 2010. J. Heeter et al., *Status of Net Metering: Assessing the Potential to Reach Program Caps*, Nat'l Renewable Energy Lab. at 1 (2014), https://perma.cc/2KPV-KC2M.

[9] Benjamin Hanna, *FERC Net Metering Decisions Keep States in the Dark*, 42 B. C. Envtl. Aff. L. Rev. 133, 142 (2015).

[10] J. Heeter et al., *Status of Net Metering, supra* n. 8, at 1.

[11] U.S. Energy Information Administration, *Electric Power Annual 2018*, Table 4.10 Net Metering Customers and Capacity by Technology Type (Oct. 2019), https://www.eia.gov/electricity/annual/pdf/epa.pdf.

[12] At year-end 2018, there were 153,339,118 electric utility customers nationwide, 133,893,321 of whom were residential customers. U.S. Energy Information Administration, *2018 Total Electric Industry – Customers*, https://www.eia.gov/electricity/sales_revenue_price/pdf/table1.pdf. Thus, net metering customers represented approximately 1.5% of residential electric utility customers nationwide.

needs, to promote diversification of in-state generation resources, to enhance the resilience of the distribution grid by encouraging distributed energy resources, and to mitigate the environmental impacts of electricity generation.[13] More recently, states have used net metering programs to help advance distribution system technology ancillary to distributed generation, such as smart inverters and distributed storage.[14] Net metering programs also vary in how they measure the net quantity of retail electric service provided, how they calculate the retail charges participating customers pay, and in some cases the means of interconnecting retail customers' on-site distributed generation to the local distribution network.

The diversity in key features of net metering programs across the country underscores the impossibility of treating net metering service as a uniform, abstract concept, as the Petition tries to do. For example, many net metering programs offset excess energy production against only volumes, or only volumetric charges; non-volumetric charges such as customer charges must continue to be paid.[15] Some states enable customers to retain renewable energy credits ("RECs")

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[13] *See, e.g.*, Mont. Code Ann. § 69-8-601 (Montana) (making a legislative finding that net metering is in the public interest because it encourages private investment in renewable resources, stimulates economic growth, and enhances diversification of energy resources); R.I. Gen. Laws § 39-26.4-1 (Rhode Island) (stating the purpose of the net metering statute is to promote installation of customer-sited renewable generation, support customer development of renewable generation, reduce environmental impacts and carbon emissions, diversify energy generation sources, improve distribution system resilience and reliability, and reduce distribution system costs); Wash. Rev. Code § 80.60.005 (Washington) (stating that the purpose of net metering law is to encourage private investment in renewable energy resources and continue the diversification of energy resources used in the state).

[14] *See, e.g., In re Instituting a Proceeding to Investigate Distributed Energy Resources Policies*, Hawaii PUC, Docket No. 2014-0192, Decision and Order No. 33258 (Oct. 12, 2015) (adopting (i) a "smart export" program, which is available to customers who have both a distributed energy resources and a battery storage system, compensates these customers for energy exported to the grid only in the evening and overnight, and offers a streamlined interconnection process; and (ii) a "customer grid supply" program that provides credit for exports at any time of day, but requires the customer to install an advanced inverter that allows the utility to control output to the grid).

[15] Arizona (Ariz. Admin. Code § R14-2-2301); Missouri (Mo. Rev. Stat. § 386.890; 20 CSR 424.20.065); Washington (Wash. Rev. Code § 80.60.005).

associated with their generation, while others prescribe that RECs belong to the utility as soon as they are created.[16] Many net metering programs cap the size of the individual behind-the-meter resources that are eligible for net metering, but the size limitations differ among programs.[17] Many states also cap the total level of participation in net metering by limiting the number of customers or the total capacity of distributed generation eligible for net metering, while others impose no cap or leave the matter to utility discretion.[18] These varying policies reflect the diverse goals of individual states as well as the need to thoughtfully tailor distributed generation policy based on an understanding of the implications for the distribution systems of each local utility.

State net metering programs also differ in measuring the quantity of retail service taken by retail customers, and in determining customers' retail service bills. Many, if not all, programs enable customers to use outflows onto the local distribution network to offset their consumption over the course of a billing period on a one-for-one, kilowatt-hour for kilowatt-hour basis.[19] If a

[16] Delaware (CDR 26-3000-3001, Sec. 15.1 (providing that net-metered customers retain RECs)); Illinois (220 ILCS 5/16-107.5 (same)); Pennsylvania (52 Pa. Code 75.13). *Compare* 20 CSR 424.20.065 (Missouri) (providing that customers who receive a solar rebate for their net-metered system are deemed to have transferred all RECs to the utility for a ten-year period, but providing that customers who do not receive a solar rebate retain RECs).

[17] In California, net metered resources may be greater than 1 MW, so long as they are sized to the onsite load and there is no significant impact on the distribution grid. Cal. Pub. Util. Code § 2827.1(b)(5). In Delaware, the size limitations for net metered resources differ by customer class. CDR 26-3000-3001, Sec. 15.1.2.1. In Kansas, facilities installed at a residential customer's premises after 2014 may be no larger than 15 kW; facilities installed before 2014 may be up to 25kW. Kan. Stat. Ann. § 66-1267. In Colorado, net metered resources must be sized to serve no more than 120% of the customer's average annual consumption. 4 Colo. Code Regs. 723-3, § 3652(ff).

[18] Maryland law caps net metering at 1500 MW state-wide. Md. Code Ann. Pub. Utils. 7-306(d). Alaska caps enrollment at 1.5% of the offering utility's total load. Alaska Admin. Code tit. 3, § 50.910(b). Delaware utilities can choose to stop enrolling customers in net metering when the total generating capacity of net metering customers reaches 5% of monthly peak demand. CDR 26-3000-3001, Sec. 15.3.7.

[19] Arizona (Ariz. Admin. Code § R14-2-2306(C)); Arkansas (126 03 CAR 023, Rule 2.04(B)); Colorado (4 Colo. Code Regs. 723-3, § 3664(a)-(b)); Delaware (CDR 26-3000-3001, Sec. 15.3); Florida (Fla. Admin. Code Ann. § 25-6.065(8)(d)); Illinois (220 ILCS 5/16-107.5(d), (d-5), (e), (e-5)); Indiana (170 Ind. Admin. Code § 4-4.2-7); Maine (CMR 65-407-313); Maryland (COMAR 20.50.10.04); Missouri (Mo. Rev. Stat. Ann. § 386.890; 20 CSR 424.20.065); New Jersey (N.J. Stat. § 48:3-112; N.J. Admin. Code § 14:8-4.3); Rhode Island (R.I. Gen. Laws § 39-26.4-1 et seq. (providing, for energy up to 100% of the customer's

customer consumes more than it produces over the netting period, it pays the retail rate only for the net amount it consumes.[20] But, beyond that, some programs provide that if the customer produces more than it consumes in the netting period, it can receive a credit to its utility account that can be used to offset net consumption in a future period. Many assign a value to each credit, which again, varies from state to state both in size and what it represents.[21] For example, in Nevada, credits are equal to a percentage of the retail rate, with the percentage decreasing incrementally as more customers enroll in net metering.[22] In Mississippi, credits are equal to the avoided cost of wholesale power, plus a 2.5-cent adder for "non-quantifiable expected benefits."[23] In Vermont, the base credit is valued at a weighted average per-kilowatt-hour rate, and adjusted up or down by several cents per kilowatt-hour based on factors evaluated by the state commission

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usage, credit equal to the per-kWh charges for standard offer service, distribution, transmission, and transition charges)).

[20] Most states require net metered customers to pay customer charges and similar items not charged on a per-kWh basis, regardless of whether they are net consumers or net producers.

[21] Alaska (Alaska Admin. Code tit. 3, § 50.930 (per-kWh credit equal to the utility's non-firm power rate)); Delaware (CDR 26-300-3001, Sec. 15.3 (per-kWh credit equal to volumetric components of the delivery and supply services components of retail rates)); Kansas (Kan. Stat. Ann. § 66-1266(b) (for net metering customers who installed facilities after 2014, credits equal the utility's monthly system average cost of energy)); Maryland (COMAR 20.50.10.05 (credits equal the generation or commodity portion of the rate applicable to the customer)); Massachusetts (220 Mass. Code Regs. § 18.04 (credits vary by type of facility and total statewide enrollment; per-kWh credits for solar facilities while statewide enrollment remains below 1600 MW are equal to the sum of default service, distribution, transmission, and transition charges; per-kWh credits after total statewide enrollment reaches 1600 MW are equal to 60% of that sum)); Minnesota (Minn. Stat. 216B.164 (dollar value for per-kWh credit set by the Commission); Missouri (20 CSR 424.20.065) (credits must be at least equal to the utility's avoided cost)); Nebraska (RRS Neb. 7-2003(4) (credits are equal to the utility's avoided cost of electricity supply); Ohio (Ohio Admin. Code § 4901:1-10-28) (perk-kWh credits are equal to the energy component of the utility's standard service offer)); Oklahoma (O.A.C. § 165.40-9-3) (credits are equal to the utility's avoided cost); Rhode Island (R.I. Gen. Laws § 39-26-4.2 (credits are equal to the distribution company's standard offer service per-kWh charge applicable to the customer; credits are available only up to 125% of the customer's consumption).

[22] Nev. Rev. Stat. Ann. § 704.7732(3) (between 2017 and the date total net metering capacity in the state equals 80 MW, credits are equal to 95% of the retail rate; the credit is equal to 88% of the retail rate for the next 80 MW of customers; 81% for the next 80 MW of customers; and 75% thereafter).

[23] CSMR 39-000-004, Subpart II, Chapter 3, Secs. 106-107.

in approving each net metering facility.[24] Some programs provide credits of different values to different classes of customers.[25] Some programs permit a customer to carry credits into the future indefinitely,[26] others have credits that expire after a time if not used.[27] Many programs require the utility to "cash out" a customer's credit balance annually, on customer election, or when the customer leaves the system.[28] The value of these cashed-out credits often differs from the value

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[24] CVR 30-000-5100 Ch. 5.126(2) (providing that positive siting or REC adjustment factors, approved when the net-metered facility is approved, will be applied to each kWh produced for 10 years after the system is commissioned, and that negative siting or REC adjustors will be applied to each kWh for the life of the system).

[25] Illinois (220 ILCS 5/16-107.5(d)-(e-5) (calculating credits differently depending on whether the customer takes hourly-priced service or not, and whether the customer is a member of a class that has been declared by the Commission to be competitive or not)); Rocky Mountain Power (Idaho), Electric Svc. Sch. No. 135, Net Metering Service (providing credits to residential customers at the retail rate, but crediting non-residential customers at 85% of monthly weighted average price for non-firm energy).

[26] Alaska (Alaska Admin. Code tit. 3, § 50.930(b)); Indiana (170 Ind. Admin. Code § 4-4.2-7(3)); Kentucky (Ky. Rev. Stat. § 278.466); Nevada (Nev. Rev. Stat. Ann. § 704.775(2)(c)(3)); Ohio (Ohio Admin. Code Ann. § 4901:1-10-28(B)(9)(c)).

[27] Illinois (220 ILCS 5/16-107.5(d)(3) (credits expire once per year)); Kansas (Kan. Stat. Ann. 66-1266(a)(4) (credits earned by net metering customers who established service before 2014 expire once per year)); Maine (CMR 65-407-313 (credits expire 12 months after they are earned)); Missouri (Mo. Code Regs. tit. 20, § 4240-20.065(7)(D) (credits expire 12 months after they are earned)); Oregon (Or. Admin. R. 860-039-0005 (once per year, all remaining credits are deemed granted to the utility for distribution to customers in low-income assistance programs)); Pennsylvania (52 Pa. Code § 75.13 (once per year, remaining credits expire)); Utah (Utah Code § 54-15-101 (credits expire after 12 months, and the value is granted to low-income assistance programs)); Vermont (CVR 30-000-5100, Ch. 5.129(B) (credits revert to the utility after 12 months)); Washington (Wash. Rev. Code § 80.60.030(5) (once per year, any remaining credits revert to the utility)).

[28] Arizona (Ariz. Admin. Code § R14-2-2306(F) (once each year, utility must issue a check or billing credit equal to carried-forward kWh credits multiplied by the utility's avoided cost rate)); Arkansas (126 03 CARR 023, Rule 2.04(3) (customer may elect to have utility purchase kWh credits older than 24 months at the utility's avoided cost rate, if the total is greater than $100)); California (Cal. Pub. Util. Code § 2827(h)(3) (customers may choose to have any balance of credits compensated once per year at a rate equal to the 12-month average rate for energy, or let the credits revert to the utility)); Delaware (CDR 26-3000-3001, Sec. 15.3.2 (once per year, customer may request payment of balance of credits at the weighted average of summer and winter supply service charges, excluding non-volumetric charges)); Florida (Fla. Admin. Code § 25-6.065(8)(f) (at the end of each calendar year, utility must pay for balance of credits at average annual rate based on its as-available energy tariff)); Maryland (COMAR 20.50.10.05(E) (credits must be paid out once per year, at a rate equal to the commodity portion of the applicable rate)); Michigan (Mich. Admin. Code R. 460.650, 450.652 (credits must be refunded to customers if they leave the system or terminate service)); Minnesota (Minn. R. 7835.4017(3) (any net input remaining at the end of the calendar year must be compensated at the utility's avoided cost rate)); Mississippi (CMSR 39-000-004 Ch. 3, Sec. 108 (credits

of banked credits. For example, California law provides that credits accrue and are used on a one-for-one kilowatt-hour basis, but credits are cashed-out annually at the 12-month average of the rate for energy.[29] Colorado law enables customers to elect an annual cash-out at the utility's average hourly incremental cost of supply over the most recent calendar year, or choose to roll their credits forward indefinitely, but provides that a customer with rolling credits will receive no cash-out if they terminate service.[30] In Minnesota, New York and Wyoming, credits are cashed-out at the utility's avoided cost rate.[31] The Petition, painting with a broad brush, ignores all of this variation.

Net metering programs have also evolved over time. Initially, programs often focused on early adoption of distributed generation, frequently small rooftop solar, and so established standardized, low-cost interconnection requirements, standard practices for calculating the net usage of electricity by the customer, and standard application of the retail rate to net usage. As distributed generation has become more common, opportunities to use distributed resources for distribution purposes have grown, and as state regulators have gained greater familiarity with the associated costs and benefits, states continue to refine their net metering programs. Indeed, just recently, Iowa and Arkansas revised their programs to better advance state policy.[32] The pace and

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remaining when the customer closes their account are paid to the customer)); Nebraska (Neb. Rev. Stat. § 70-2003(4) (credits are paid out once per year)); New Jersey (N.J. Admin. Code § 14:8-4.3 (once per year, the supplier must compensate customer for remaining credits at the avoided cost of wholesale power)); Wyoming (Wyo. Stat. Ann. § 37-16-101 (at year-end, all unused credits are sold to the utility at the utility's avoided cost)).

[29] Cal. Pub. Util. Code § 2827(h)(3). In Delaware, the cash-out value of a credit is equal to the weighted average of summer and winter supply services charges, excluding non-volumetric charges. CDR 26-3000-3001, Sec. 15.3.2. In Florida, the cash-out value of a credit is equal to the average annual rate under the utility's as-available energy tariff. Fla. Admin. Code § 25-6.065(8)(f).

[30] 4 Colo. Code Regs. 723-3, § 3664(b).

[31] Minnesota (Minn. R. 7835.4017(3)); New York (NY CLS Pub. Ser. 66-j, 66-l); Wyoming (Wyo. Stat. § 37-16-101).

[32] *See* Iowa Code § 476.49 (effective July 1, 2020) (establishing new "inflow-outflow billing" and "net billing" practices); *In re Net Metering and the Implementation of Act 827 of 2015*, Ark. Pub. Serv. Comm'n

type of experimentation across the states, again, reflects the differing policy preferences and implementation challenges faced by individual states. But, in doing so, states consistently take into account the fact that net metering customers have made significant investments with the expectation that regulatory treatment would remain the same.[33]

ARGUMENT

I. THE PETITION FOR DECLARATORY ORDER SHOULD BE DISMISSED.

The Petition does not satisfy the Commission's standard for issuance of a declaratory order. The Commission issues declaratory orders when doing so can eliminate uncertainty and clarify parties' rights and obligations in order to terminate a controversy.[34] The Commission has no obligation to entertain a petition for declaratory order, and it routinely dismisses petitions that present merely academic questions,[35] are speculative or premature,[36] or fail to provide a sufficient

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Docket No. 16-027-R, Order No. 28 (June 1, 2020) (establishing a net metering rate structure effective until at least December 31, 2020; after that date, utilities may individually request alternative structures).

[33] *See, e.g.*, Kan. Stat. Ann. § 66-1263 (differentiating between net-metered facilities installed prior to 2014 and those installed in 2014 and after, with respect to size limitations and value of credits).

[34] *See* 5 U.S.C. § 554(e) ("The agency, with like effect as in the case of other orders, and in its sound discretion, may issue a declaratory order to terminate a controversy or remove uncertainty."); 18 C.F.R. § 385.207(a)(2) (providing for a party to petition for "[a] declaratory order or rule to terminate a controversy or remove uncertainty").

[35] *Phillips Petroleum Co.*, 58 FERC ¶ 61,290 at 61,932 (1992) (rejecting a request for declaratory order that presented "a question which is purely academic").

[36] *See Advanced Energy Econ.*, 167 FERC ¶ 61,032 at P 18 (2019), *citing S. Md. Elec. Coop.*, 162 FERC ¶ 61,048 at P 13 (2018); *City of Boulder*, 144 FERC ¶ 61,069 at P 32 (2013) (denying petition where ruling on stranded cost obligation "would be premature and speculative" in the absence of agreement with executed power requirements contract); *Lynch v. ISO New England, Inc.*, 107 FERC ¶ 61,24 at P 14 (2004) (dismissing Rhode Island Attorney General's petition for declaratory order as premature, noting that to grant the petition would inappropriately circumvent established procedures in New England); *Turlock Irrigation Dist. v. Pac. Gas & Elec. Co.*, 64 FERC ¶ 61,183 at 62,544, *reh'g denied*, 65 FERC ¶ 61,016 at 61,227 (1993) (declining to issue a declaratory order regarding a proposed rate design in the absence of a rate filing)).

basis for a generic interpretation of the law.[37] In determining whether to grant a petition, the Commission may consider the likely value of its order, and the potential consequences: when a declaratory order will "generate controversy, not remove it," or would engender additional litigation, the Commission can and does reject it.[38]

Under these standards, the Petition should be dismissed. Petitioner has not demonstrated any uncertainty to be eliminated, nor any controversy to be terminated. To the contrary, for nearly two decades, this matter has been settled: the Commission has recognized state authority to develop and implement net metering programs. EPAct 2005 confirmed and underscored that state authority when Congress included net metering service among the programs it encouraged states to enact.[39] State legislatures, regulatory commissions, utilities, and retail customers have acted in reliance on that law and precedent over many years. Even the case law that Petitioner claims requires the Commission to revisit its precedents is ten years old.[40] Far from settling a controversy, Petitioner seeks to create a new uncertainty by undermining settled law.

Moreover, the harms asserted by Petitioner—ostensibly a group of retail ratepayers—have little to do with the Federal Power Act. Petitioner claims that net metering makes "it more difficult

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[37] *See Morgan Stanley Capital Grp., Inc.*, 119 FERC ¶ 61,298, at P 17 (2007) (rejecting a request for declaratory order on the basis that "the Petitioners have not provided sufficient basis for our issuing a declaratory order providing a generic interpretation … . First, Petitioners' application provides no basis upon which to interpret the … contracts. Second, because of the individual circumstances surrounding the negotiation and execution of individual legacy Seller's Choice contracts, we find that these contracts are not susceptible to generic resolution through a declaratory order proceeding.").

[38] *Phillips Petroleum Co.*, 58 FERC ¶ 61,290, at 61,932 ("[A]ll declaratory orders are applications of the law to a particular set of facts as described by the petitioner and, thus, are of limited use when applied to different factual circumstances. In the event, and to the extent, that factual circumstances differ, now or in the future, from those upon which an opinion is premised, the value of the order would be diminished. [Here,] a declaratory order would likely generate controversy, not remove it.").

[39] *See* 16 U.S.C. § 2621(d)(11).

[40] *S. Cal. Edison Co. v. FERC*, 603 F.3d 996 (D.C. Cir. 2010); *Calpine Corp. v. FERC*, 702 F.3d 41 (D.C. Cir. 2012).

to achieve carbon reduction goals," "increases the cost of distribution due to the need to re-design distribution systems to accommodate two-[way]flows of power," and shifts costs between classes of retail customers.[41] But the Federal Power Act "leaves to the States alone, the regulation of … any retail sale[ ]of electricity."[42] Given that the Petition concerns retail rate design, these policy arguments must be directed to state legislatures or state regulators. Petitioner's alleged injuries cannot support a dramatic redrawing of jurisdictional lines established by Congress and on which millions of Americans have relied.

Petitioner also touches on an argument that "full net metering" places at a "competitive disadvantage" the resources "required for reliability."[43] To the bulk power system, the vast majority of net metering simply reduces the distribution system load it supplies.[44] Energy produced by net metered facilities simply does not flow onto the transmission system.[45] And while Petitioner may think that net metering leads to "over-investment" in distributed resources,[46] the cost of that investment is borne almost exclusively by the net metering customers themselves. Moreover, the policy preference for certain resources falls squarely within state authority over generation facilities. States have many means of encouraging distributed resources, so even if the Petition were granted, Petitioner's grievance would likely go unredressed. For example, nothing would prevent states from promoting small distributed generation through rebates, or from including the cost of such rebates in retail rates. In short, Petitioner seeks Commission action to

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[41] Petition at 39, 42-43.

[42] *Elec. Power Supply Ass'n*, 136 S. Ct. at 766.

[43] Petition at 42.

[44] *See* Exhibit B (Affidavit of Sam Wheeler in Support of the Protest of the National Association of Regulatory Utility Commissioners).

[45] *Id.*

[46] Petition at 42.

bypass Congress and upend decades of settled law rather than seeking recourse in the legislative halls and state commission proceedings where that debate should properly occur.

Far from clarifying parties' rights, granting this Petition would only create uncertainty and ignite controversy. Petitioner has asked for a generic declaration about a concept—"full net metering"—wholly disconnected from any particular state program. Because the Petition fails to acknowledge the diversity among the net metering programs across the country, it leaves the Commission and parties to speculate as to precisely which features of net metering Petitioner finds problematic, as well as which net metering programs have such features. Without that detail, the Commission lacks a record to justify any action on Petitioner's request. Moreover, any generic action taken in the absence of such detail would no doubt set off a litigation blitz in almost every state, with commissions and courts left to figure out how Petitioner's academic legal theory applies to and affects actual statutes, regulations, orders, and tariffs, which, as noted above, vary significantly from state to state.

While the Commission does not require petitioners to satisfy the requirements of Article III standing, doctrines like standing and ripeness—which limit adjudications to a concrete controversy causing concrete injury and prevent courts from "entangling themselves in abstract disagreements"[47]—serve the important jurisprudential purpose of ensuring that the decision maker "can see what legal issues it is deciding, what effect its decision will have on the adversaries, and some useful purpose to be achieved in deciding them."[48] These basic elements of sound decision making and judicial economy are equally important in the context of an adjudicatory body like the

[47] *Abbott Labs. v. Gardner*, 387 U.S. 136, 148 (1967), *overruled on other grounds by Califano v. Sanders*, 430 U.S. 99 (1977).

[48] *Pub. Serv. Comm'n of Utah v. Wycoff Co*., 344 U.S. 237, 244 (1952).

Commission.[49] Without these limits, courts and agencies alike could be "called upon to decide abstract questions of wide public significance even though … intervention may be unnecessary."[50] The Commission too should avoid disagreements that are "nebulous or contingent" and will result in "futile or premature interventions," especially where, as here, the effects of the requested ruling will "reach far beyond the particular case."[51] The Commission consistently has been guided by these considerations when deciding whether to take up or dismiss a petition for declaratory order. Indeed, in 2016, the Commission dismissed another petition for declaratory order raising similar arguments, focused on a specific state program, as "premature" and "speculative."[52] This Petition—which does not point to any individual state program from which the alleged injuries arise—is far more speculative and abstract.

Petitioner's failure to identify any concrete controversy is not only fatal to the Petition under the Commission's precedent, but also under the Administrative Procedure Act ("APA"). If the Commission grants Petitioner's request, the Commission will have violated the APA by effectively issuing a "rule" without observing the APA's prerequisites for rulemaking.

The APA defines a "rule" as "an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy."[53] Rulemakings are "for the purpose of promulgating policy-type rules or standards" and involve a "basically

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[49] *See Climax Molybdenum Co. v. Sec'y of Labor, Mine Safety & Health Admin.*, 703 F.2d 447, 451 (10th Cir. 1983) (in determining whether an issue before an agency is moot, the agency "receives guidance from the policies that underlie the 'case or controversy' requirement of [A]rticle III" and "is informed by an examination of the proper institutional role of an adjudicatory body and a concern for judicial economy").

[50] *Warth v. Seldin*, 422 U.S. 490, 500 (1975).

[51] *Wycoff Co.*, 344 U.S. at 243-44.

[52] *S. Md. Elec. Coop., Inc.*, 157 FERC ¶ 61,118 at P 26 (2016), *clarified on denial of recons.*, 162 FERC ¶ 61,048 (2018).

[53] 5 U.S.C. § 551(4).

legislative-type judgment, for prospective application only."[54] When an agency promulgates such a rule, it must follow a defined set of procedures.[55] In contrast, adjudications are "designed to adjudicate disputed facts in particular cases."[56] The agency cannot "escape" the requirements applicable to rulemaking "by labeling its rule an 'adjudication.'"[57] Instead, a court will decide the nature of the agency proceeding and "shall … hold unlawful and set aside" agency action that fails to observe the "procedure required by law."[58]

Here, though denominated a petition for declaratory order, Petitioner requests that the Commission effectively issue a new rule. First, Petitioner would have the Commission reject state net metering laws and programs without focusing concretely on the characteristics of any particular state program, and without any showing of actual injury from the supposedly-wholesale sales, making the Commission's order a rule of general applicability rather than an adjudication of any particular case.[59] Second, Petitioner asks the Commission to entangle itself in policy arguments—another hallmark of rulemaking.[60] Finally, the Petitioner appears to seek an action with only prospective effect—that is, to have the Commission hold that PURPA or Federal Power Act pricing must govern <u>future</u> alleged "wholesale sales."[61] This, too, is a defining feature of a rule.

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[54] *United States v. Fla. E. Coast Ry. Co.*, 410 U.S. 224, 245-46 (1973). Put another way, an agency action is a "rule" if it is "generally applicable" and has "only 'future effect.'" *Safari Club Int'l v. Zinke*, 878 F.3d 316, 332-33 (D.C. Cir. 2017).

[55] *See* 5 U.S.C. § 553.

[56] *Fla. E. Coast Ry. Co.*, 410 U.S. at 245.

[57] *Safari Club Int'l*, 878 F.3d at 332.

[58] 5 U.S.C. § 706(2)(D).

[59] *See Safari Club Int'l*, 878 F.3d at 333 (an agency action was a final rulemaking, in part, because it would affect a wide range of individuals but did not "adjudicate any dispute between specific parties").

[60] *See, e.g.*, Petition at 44 (alleging that metering programs have "multiple adverse public policy implications"); *see also id.* at 37-44 (raising policy arguments).

[61] *Id.* at 44-45.

In the past, the Commission has rightly rejected petitions that, like this one, seek to pass off a rule of general applicability as a declaratory order. In *Texas Eastern Transmission Corp.*, for instance, the Commission denied a petition requesting "what would be in effect a binding norm or rule" because an "adjudicatory proceeding is not the proper forum for such rulemaking activity."[62] Likewise, in *ITC Grid Development, LLC*,[63] the Commission held that a declaratory order was "not the appropriate means" to address "important policy issues" or create "a generally applicable determination" with "binding" effect.[64] The APA requires the Commission to follow the same course here.[65]

To the extent Petitioner is actually aggrieved by some feature of a state net metering program, and can demonstrate harm to its membership, and to the extent that the alleged injury is actually connected to the purposes of the Federal Power Act, Petitioner can bring a complaint seeking redress. The Commission would then have the opportunity to evaluate Petitioner's jurisdictional theories in light of a specific state program and concrete facts. But the Commission should not entertain a petition seeking declarations about an abstract concept, divorced from any real world dispute, whose only effect would be to induce uncertainty and generate controversy. The Petition should be dismissed.

[62] 62 FERC ¶ 61,196 at 62,390 (1993).

[63] 154 FERC ¶ 61,206 (2016).

[64] *Id.* at PP 42, 45-46.

[65] Petitioner cannot avoid this outcome by arguing that the declaratory order it seeks will have no binding effect and will not carry the force of law, but is instead akin to a guidance document. Such a position would only underscore the absence of any actual controversy to be resolved or injury to be remedied.

II. NET METERING SERVICE DOES NOT INVOLVE THE "SALE" OF ELECTRICITY.

If the Commission nevertheless considers the Petition, the Commission should reject it on the merits and affirm its precedent. The keystone of the Petition is the premise that, when energy flows from retail customers to their local utilities, those flows are "sales" by the retail customers to the utilities. According to the Petition, these "sales"—occurring "whenever a customer generates more energy than it consumes"[66]—are wholesale sales subject to the Commission's exclusive jurisdiction, but take place at a rate the Commission has not approved. It is not clear whether the Petitioner thinks that an outflow for an instant is a sale, or whether Petitioner is asserting that only net outflows over its preferred netting period are sales. But, regardless, Petitioner seeks a declaration that all state net metering laws are preempted. This argument is flawed for at least two reasons.

First, it rests on a basic misunderstanding of net metering service. As the Commission recognized in *MidAmerican*,[67] and as Congress recognized in EPAct 2005, net metering programs are part of the retail service provided by the local utility and netting is a manner of measuring and billing used to determine the amount owed for that retail service. A retail customer does not engage in a "sale" every instant that power flows from an on-site generator onto the grid.[68] Nor does a utility pay a "rate" when it allows a customer's meter to run bi-directionally, or when it calculates the amount owed by the customer for the retail service the utility has provided based upon the net energy consumed during a monthly billing period. Indeed, Petitioner's attempt to recast as a

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[66] Petition at 19, 21.

[67] *MidAmerican Energy Co.*, 94 FERC ¶ 61,340 (2001).

[68] In acknowledging that netting is permissible, and urging the Commission to apply its own netting intervals, Petitioner concedes that a measurement period is essential in determining the amount of a service provided to customers.

wholesale sale what is actually an element of retail service and a retail billing convention would lead the Commission to intrude into the heart of the authority reserved by the Federal Power Act for states.

Second, even if Petitioner's premise were accepted such that a wholesale sale did occur each instant that power flowed from a behind-the-meter generator onto the local distribution network, Petitioner still would not be entitled to the requested declaration that state net metering programs are unlawful. Instead, accepting Petitioner's faulty premise would require the Commission to assert its jurisdiction and set a rate to be paid to retail customers for those "sales"—"sales" that, under *Mid-American*, are not occurring at all. As a result, owners of generators participating in net metering programs would, under Petitioner's theory, receive a federal revenue stream that they currently do not receive. But the state would remain free to apply whatever netting convention and pricing methodology it selects for the retail service provided. The Commission has no authority to mandate that state retail tariffs recognize a greater quantity of retail sales than the state determines is proper. That authority is reserved exclusively to the states.

Ironically, the cases on which Petitioner relies most heavily—*Calpine*[69] and *Southern California Edison*[70]—establish that very point. The upshot of those cases is that the Commission cannot use its own jurisdiction to override states' regulation of the retail market—including states' use of netting to establish retail charges. As *Calpine* explains, netting "simply determines under what conditions generators will be assessed … retail charges."[71] And while the regulation of

[69] *Calpine*, 702 F.3d 41.

[70] *S. Cal. Edison Co.*, 603 F.3d 996.

[71] *Calpine*, 702 F.3d at 50.

transmission charges and wholesale rates "is undoubtedly within FERC's jurisdiction, retail charges are not."[72]

A. The Commission Has Long Correctly Held That Net Metering Does Not Involve "Sales" of Electricity.

For almost two decades, the Commission has correctly held that outflows from net metered generators do not constitute Commission-jurisdictional sales. In the *MidAmerican* case, decided in 2001, the Commission rejected the precise argument made by Petitioner here: MidAmerican "argue[d] that every flow of power constitutes a sale, and, in particular, that every flow of power from a homeowner or farmer to MidAmerican must be priced consistent with the requirements of either PURPA or the [Federal Power Act]."[73] The Commission found "no such requirement" in either PURPA or the Federal Power Act.[74] As the Commission correctly recognized, MidAmerican, "[i]n essence," had asked the Commission "to declare that when, for example, individual homeowners or farmers install small generation facilities to reduce purchases from a utility, a state is preempted from allowing the individual homeowner's or farmer's purchase or sale of power from being measured on a net basis, *i.e.*, that PURPA and the [Federal Power Act] require that two meters be installed in these situations, one to measure the flow of power from the utility to the homeowner or farmer, and another to measure the flow of power from the homeowner or farmer to the utility."[75] But, as the Commission explained, netting was simply the practice by which the utility accounted for the customer's retail usage.[76] At times, power flowed

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[72] *Id*.

[73] *MidAmerican*, 94 FERC ¶ 61,340 at 62,263.

[74] *Id*.

[75] *Id*.

[76] *Id*.

from the utility to the customer; at other times, power flowed the opposite direction, offsetting the customer's total retail usage.[77] Accordingly, the Commission held that "no sale occurs when an individual homeowner or farmer (or similar entity…) installs generation and accounts for its dealings with the utility through the practice of netting."[78]

The Commission reaffirmed that holding eight years later in *Sun Edison LLC*.[79] The Commission again explained that "net metering is a method of measuring sales of electric energy."[80] And "[w]here there is no net sale over the billing period, the Commission has not viewed its jurisdiction as being implicated; that is, the Commission does not assert jurisdiction when the end-use customer that is also the owner of the generator receives a credit against its retail purchases from the selling utility."[81] That is because "where there is no net sale over the applicable billing period to the local load-serving utility, there is no sale."[82]

The Commission has it right. Net metering is a means by which states define and measure their retail service. The local utility uses net metering to determine the quantity of the retail service provided to local customers during a billing period, and thus the retail rates to be paid to the local utility. The question of "how to measure"[83] retail transactions falls squarely within the state's jurisdiction over retail service and does not implicate the Commission's jurisdiction.

The Petition nevertheless attempts to recharacterize the states' lawful retail service and billing conventions as a series of separate sales, claiming that every time power flows from a net-

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[77] *Id*.

[78] *Id.*

[79] 129 FERC ¶ 61,146 (2009), *modified on reh'g by*, 131 FERC ¶ 61,213 (2010).

[80] *Id.* at P 18.

[81] *Id*.

[82] *Id.* at P 19.

[83] *MidAmerican*, 94 FERC ¶ 61,340, at 62,262.

metered generator onto the local distribution network, a "sale" to the utility has occurred.[84] Petitioner erroneously conflates a flow of power with a sale of power. When state governments chose to encourage customer-sited generation, they faced the question of how to address outflows from the generators onto the distribution system. Managing those outflows is part of the retail service that the local utility provides, and states deemed it fair, as a matter of retail ratemaking, to recognize those outflows as restoring to the local utility energy that had previously flowed to the customer.

Significantly, Petitioner does not identify any of the indicia one would expect to see if energy outflows were, as its theory asserts, sales of energy. For example, Petitioner makes no claim that such "sales" are taxed; that title to the energy formally is transferred; or that the utility records a cost associated with "acquiring" power that flows to it. And even if Petitioner were able to disinter some state statute or tariff that contained such features, that would hardly justify the broad and abstract declaratory relief it seeks—relief detached from a challenge to any particular program, let alone a program that actually affects Petitioner.[85]

B. Congress Has Confirmed That Net Metering Programs Do Not Trigger Commission Jurisdiction.

In EPAct 2005, Congress confirmed the Commission's view that state net metering programs do not implicate the Commission's jurisdiction. Congress added to Section 111(d) of

[84] Petition at 18-24.

[85] Petitioner also hints at the possibility that outflows may qualify as wholesale sales because they involve "exchanges" of energy, Petition at 21-23, but then undercuts its own position by conceding that "in the case of FNM … there is nothing that can properly be characterized as an exchange because the utility's retail sale is not just energy, but is a firm, bundled service." *Id.* at 24. Petitioner gets this one point exactly right: net metering is part of the retail service that local utilities provide, and a means of measuring the retail rates owed by customers in a billing cycle.

PURPA a provision directing states to consider whether to adopt net metering programs.[86] Both the definition of "net metering" and the placement of the provision in Title I of PURPA demonstrate Congress's understanding that net metering programs do not trigger federal jurisdiction over wholesale sales.

The definition of net metering makes clear that Congress regards net metering as a retail service, not a wholesale sale. Accordingly, Congress defined the term to mean "service to an electric consumer under which electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric energy provided by the electric utility to the electric consumer during the applicable billing period."[87]

Congress then placed its discussion of net metering in the portion of the statute that encourages states to enact certain programs in the exercise of their retail jurisdiction. Congress did not impose—or authorize the Commission to impose—net metering as part of the federal authority over wholesale sales. Thus, the statute asks or requires nothing of this Commission when it comes to net metering, but instead requires "[e]ach State regulatory authority" to "consider each standard established by subsection (d)" and determine "whether or not it is appropriate to implement such standard."[88] The list of standards set forth in subsection (d) includes, in addition to net metering programs, many other retail ratemaking matters that obviously lay solely within the state's jurisdiction to enact. These include, for example, retail rate design intended to reflect the cost of service; time-of-day rate design; integrated resource

[86] *See* 16 U.S.C § 2621(d)(11).

[87] *Id.* (emphasis added).

[88] *Id.* § 2621(a) (emphasis added).

planning; investments in conservation and energy efficiency; the development of retail rate design and incentives to encourage energy efficiency, including home energy audits; minimization of dependence on a single fuel source; increased efficiency for fossil fuel generation; and investments in smart grid technologies.[89]

In a gross misreading of the statute, the Petition argues that Section 111(d) does not apply to any type of net metering program other than one that provides an offset for energy valued at the PURPA avoided-cost rate—and that federal law preempts all other types of net metering programs.[90] Title II of PURPA governs "[c]ertain Federal Energy Regulatory Commission and Department of Energy [a]uthorities," and sets forth the requirement concerning avoided-cost rates, which applies to wholesale sales by small power production facilities.[91] Congress made no mention of net metering in Title II—because Congress understood that net metering does not involve a wholesale sale. Instead, Congress included net metering in Title I of PURPA, which discusses "<u>[r]etail</u> [r]egulatory [p]olicies [f]or [e]lectric [u]tilities," and directs states to consider standards for <u>retail</u> regulation without preempting state authority.[92]

As the Supreme Court explained in *FERC v. Mississippi*, "Titles I and III of PURPA require only <u>consideration</u> of federal standards."[93] Although "Congress could have pre-empted the field" if it wished, and imposed the Title I standards as mandates, "Congress adopted a less intrusive scheme and allowed the States to continue regulating in the area."[94] Thus, by its express terms,

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[89] *Id.* § 2621(d).

[90] Petition at 35-36.

[91] *See* Public Utility Regulatory Policies Act of 1978, Pub. L. No. 95-617, title II, 92 Stat. 3117, 3134.

[92] *See* 95-617, tit. I, 92 Stat. at 3120; *see also* 16 U.S.C. § 2621.

[93] *FERC v. Mississippi*, 456 U.S. 742, 764 (1982).

[94] *Id*. at 765.

the statute does not limit states' authority to adopt a different standard than the one described by Congress.[95] Petitioner would have the Commission contravene Congressional intent and intrude into an area expressly reserved for the states.

It is unsurprising that Congress understood net metering as a component of retail service that does not implicate the Commission's jurisdiction over wholesale sales.[96] After all, that is the very position that the Commission itself had taken in *MidAmerican.* The notion that Congress instead implicitly overruled *MidAmerican* when it encouraged states to exercise their retail ratemaking authority to adopt net metering programs, and expressly reserved state authority to adopt programs that deviated from those proposed, is almost laughable.

Petitioner's theory is inconsistent not only with Congress's treatment of net metering in the EPAct of 2005, but also with the purpose of the Federal Power Act. The Federal Power Act was enacted to fill the gap in regulation recognized by the U.S. Supreme Court in *Attleboro*.[97] That gap involved interstate sales of electricity, which states had no power to regulate under the dormant Commerce Clause. While filling that gap with federal regulation, the Federal Power Act left undisturbed state authority to regulate essentially local service.[98] Congress extended federal jurisdiction only to those matters not otherwise subject to regulation by the states, stating that the Commission's jurisdiction to regulate interstate wholesale sales "shall not apply to any other sale

[95] Section 117 states that "[n]othing in this chapter prohibits any State regulatory authority or nonregulated electric utility from adopting, pursuant to State law, any standard or rule affecting electric utilities which is different from any standard established by this subchapter." 16 U.S.C. § 2627(b).

[96] *See generally* Comments of G. Dotson in Opposition to the April 14, 2020 Petition for Declaratory Order by NERA (filed June 13, 2020).

[97] *See Elec. Power Supply Ass'n*, 136 S. Ct. at 767 (citing *Pub. Util. Comm'n of R.I. v. Attleboro Steam & Elec. Co.*, 273 U.S. 83 (1927)).

[98] *See* 16 U.S.C. § 824(b)(1).

of electric energy."[99] Consequently, "the Commission may not regulate either within-state wholesale sales or … retail sales of electricity (*i.e.,* sales directly to users). State utility commissions continue to oversee those transactions."[100]

Net metering is precisely the kind of essentially local matter that Congress intended to leave to the states. It concerns the relationship between the retail customer and the local utility: how to measure the quantity of energy provided by the utility, the amount due for that retail service, and the terms of that service. The necessary implication of Petitioner's argument is that federal law prohibits utilities from installing or allowing customers to use bidirectional meters, and instead requires "that two meters be installed in these situations, one to measure the flow of power from the utility to the homeowner or farmer, and another to measure the flow of power from the homeowner or farmer to the utility."[101] The Commission cannot commandeer state commissions into enforcing a two-meter requirement, and the drafters of the Federal Power Act could not have envisioned the new federal agency, designed to fill the "*Attleboro* gap" in regulating the interstate sale of electricity, taking legal action to compel the installation of new meters on individual homes and businesses across the country.

The economic rationale for federal rate regulation also has no application to net metering programs. The purpose of granting the Commission power to review and set just and reasonable rates was to prevent natural monopolies from exploiting their market power and overcharging customers.[102] Section 205 of the Federal Power Act protects the consumer interest "in being

[99] *See id*.

[100] *Elec. Power Supply Ass'n*, 136 S. Ct. at 768 (internal citation omitted).

[101] *MidAmerican*, 94 FERC ¶ 61,340, at 62,263.

[102] *See New York v. FERC*, 535 U.S. 1, 5 (2002) ("In 1935, when the [Federal Power Act] became law, … most [utilities] operated as separate, local monopolies subject to state or local regulation").

charged non-exploitative rates."[103] But when it comes to net metering, there is no monopoly seller, and Petitioner does not complain about wholesale rates, much less that those rates are "exploitative." Instead, Petitioner complains about the effects of net metering on retail rates. Yet Petitioner's interest in avoiding retail rates is, "at best, 'orthogonal' to the purposes of" the federal rate regulation."[104] Nor is there any need for uniform federal regulation because of the possibility of conflicting state authority, as there was in *Attleboro*, where two states could equally claim the authority to regulate. When it comes to net metering, there is no potential for conflict between dueling state regulators each trying to regulate the same activity.

The Petition, and Petitioner's expert, spill much ink arguing that net metering is bad policy because it allegedly misallocates costs among retail customers.[105] Assuming the Petitioner could identify a net metering program that negatively impacts its members, that argument must be made to a state regulator or state legislature; it cannot be made to the Commission. The Commission has no statutory mandate to address the allocation of costs among retail customers, and no authority to second guess states' retail ratemaking decisions. The costs that are included in retail rates, the policies they are designed to promote, and the allocation of costs among particular ratepayers or classes of ratepayers are all matters of state authority.[106]

Furthermore, despite complaining about the supposed effects of net metering programs on wholesale markets, the Petition does not advance any argument that the Commission should assert

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[103] *Grand Council of Crees (of Quebec) v. FERC*, 198 F.3d 950, 956 (D.C. Cir. 2000) (quoting *Jersey Central Power & Light Co. v. FERC*, 810 F.2d 1168, 1178 (D.C. Cir. 1987)).

[104] *Nw. Requirements Utils. v. FERC*, 798 F.3d 796, 809 (9th Cir. 2015) ("wholesale energy customers" interested in "reduc[ing] [their utility's] costs, which are passed on to them by statutory mandate," lacked prudential standing under the Federal Power Act).

[105] Petition at 42-44.

[106] *See Elec. Power Supply Ass'n*, 136 S. Ct. at 766 (the Federal Power Act "leaves to the States alone[] the regulation of … any retail sale[ ]of electricity").

its "effects" jurisdiction,[107] and for good reason: because net metering has the same indirect effect on wholesale markets as a reduction in demand, the Commission could not properly assert its "effects" jurisdiction to regulate the practice.[108] Indeed, from the standpoint of the Bulk Power System, the effect of net metering is identical to a demand-side measure such as energy efficiency or retail demand response.[109] All of these programs simply reduce the load drawn by the local utility from the interstate power grid, and the Commission lacks the authority to regulate them merely because they effect wholesale rates. As the Supreme Court has found, "markets in just about everything—the whole economy, as it were—might influence [utilities'] demand. So if indirect or tangential impacts on wholesale electricity rates sufficed, FERC could regulate now in one industry, now in another, changing a vast array of rules and practices to implement its vision of reasonableness and justice. We cannot imagine that was what Congress had in mind."[110] The Commission should not expand its "wholesale sale" jurisdiction to cover a practice whose effects on the wholesale market are so peripheral as to place it outside the Commission's "effects" jurisdiction.

C. Even if Net Metering Did Trigger the Commission's Jurisdiction, Preemption Would Still Be Unwarranted.

Petitioner's theory suffers from another problem as well: it erroneously presumes that if the Commission finds that outflows are wholesale sales subject to the Commission's jurisdiction,

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[107] Instead, the Petition only suggests that "[a] reasonable argument" for effects jurisdiction "could be made." Petition at 11, fn.15. But it does not develop that argument.

[108] The Commission cannot regulate on the basis of "indirect or tangential impacts on wholesale electricity rates." *Elec. Power Supply Ass'n*, 136 S. Ct. at 774. Instead, "'affecting' jurisdiction [is limited] to rules or practices that '*directly* affect the [wholesale] rate.'" *Id.* (citation omitted) (bracket in original).

[109] *See* Exhibit B (Affidavit of Sam Wheeler) at 4-5.

[110] *Elec. Power Supply Ass'n*, 136 S. Ct. at 774.

then state net metering programs must be preempted.[111] That syllogism is incorrect. If the Commission were to abandon *MidAmerican*'s holding that no jurisdictional sale occurs when usage is netted against output, the Commission would need to set a rate for payments to the customer for the newly recognized wholesale sales. States, however, would still be entitled to apply whatever billing conventions they might wish in measuring <u>retail</u> service and setting <u>retail</u> rates. Thus—perhaps ironically—if Petitioner is correct, the only effect would be that net metering participants gain access to a new revenue stream: compensation for sales that, under current law, are not being made.

Petitioner seeks a declaration that goes far beyond the recognition of an outflow as a wholesale sale. Petitioner instead requests a ruling that states may not apply netting rules when measuring the extent of the retail service they regulate—that, in effect, states must charge retail customers for consuming a greater quantity of electricity at retail than the state has authorized in its retail tariffs. But the Commission has no power to tell states when retail sales have occurred or what retail rates should be charged. The Supreme Court has made clear that the Commission may not "specif[y] terms of sale at retail"—this "is a job for the States alone."[112] The Federal Power Act "places beyond FERC's power, and leaves to the States alone, the regulation of … any retail sale[ ]of electricity."[113] Thus, the requested declaration—forcing the state to charge for retail sales that the state does not recognize—would not "just sideswipe state jurisdiction; it attacks it frontally."[114]

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[111] *See* Petition at 44-45 (requesting that the Commission "find unlawful, and therefore reject, state net metering laws").

[112] *Elec. Power Supply Ass'n*, 136 S. Ct. at 775.

[113] *Id.* at 766 (citing 16 U.S.C. § 824(b)).

[114] *S. Cal. Edison*, 603 F.3d at 1001.

The cases on which Petitioner places the greatest reliance—*Southern California Edison* and *Calpine*—in fact underscore the fatal flaw in its position. In both decisions, the D.C. Circuit held that the Commission lacked jurisdiction to decide whether a retail sale has or has not occurred.[115] As the D.C. Circuit made clear in *Calpine*, the Commission has no power to decide the "circumstances" in which "a generator [can] be charged retail rates for either drawing from the grid or self-supplying its [own] power."[116] "While the regulation of transmission charges is undoubtedly within FERC's jurisdiction, retail charges are not."[117]

In placing such great weight on these cases, Petitioner fundamentally misinterprets their holdings and how those holdings bear on the declaration requested here. According to Petitioner, after *Calpine*, the Commission has no discretion to employ netting to determine whether a wholesale sale has occurred.[118] But at issue here is not whether the Commission can employ netting with regard to wholesale sales, but rather whether the Commission may intervene to prevent states from employing netting with regard to retail sales. In *Calpine* and its predecessor case, *Southern California Edison*,[119] the D.C. Circuit rejected just this kind of gross intrusion into the states' regulatory authority.

In *Southern California Edison*, the Commission sought to apply its own netting policy to determine that no retail sale had taken place when a greater quantity of power was transmitted by the power plant than consumed as station power during a billing cycle. The court rejected the

[115] *See Calpine*, 702 F.3d at 50 ("retail charges are not" within FERC's jurisdiction); *S. Cal. Edison*, 603 F.3d at 1002 (FERC had yet to explain how its general concern about competition "c[ould] be grounds to preempt the state's authority to set the netting period for station power—i.e., the pricing mechanism—in the retail market").

[116] *Calpine*, 702 F.3d at 43, 50.

[117] *Id.* at 50.

[118] *See* Petition at 18.

[119] *S. Cal. Edison Co.*, 603 F.3d 996.

Commission's "insist[ence] that it c[ould] determine that no retail sale has taken place."[120] The court acknowledged that the Commission was free to use whatever netting policy it wished to measure transmission charges,[121] but held that the question of whether a retail sale had occurred was one left to the state as regulator of the retail market. The court also noted the Commission's argument that state policy recognizing a retail sale might affect the wholesale markets, but chided the Commission for failing to explain "why that general concern can be grounds to preempt the state's authority to set the netting period for station power—*i.e.*, the pricing mechanism—in the retail market."[122]

When this issue reappeared at the court in *Calpine*, the Commission conceded that "it lacked a jurisdictional basis to determine when the provision of station power constitutes a retail sale."[123] In *Calpine*, an independent generator resisted that conclusion, arguing that FERC had jurisdiction to apply a netting interval to station power because doing so would regulate the wholesale market. According to the generator, "the amount of consumed energy that may be netted against gross power directly determines how much energy is deemed available for sale at wholesale, so a netting interval is really just a regulation of the wholesale market."[124] The D.C Circuit rejected that claim as confusing a retail billing convention with regulation of the wholesale market: "The netting interval is, in essence, a kind of billing convention that determines (at the end of the month) how much a generator will be assessed for transmission and retail charges," but

[120] *Id.* at 999, 1001.

[121] *Id.* at 998 ("FERC has the undeniable right to approve the netting methodology to determine how much electricity generators deliver to and take from the grid for transmission purposes").

[122] *Id.* at 1002.

[123] *Calpine*, 702 F.3d at 45.

[124] *Id.* at 48.

it "does not determine how much energy is actually available at wholesale."[125] In sum, *Calpine* concluded that netting "simply determines under what conditions generators will be assessed … retail charges …. While the regulation of transmission charges is undoubtedly within FERC's jurisdiction, retail charges are not."[126] The court again upheld the state's power to apply the accounting convention of its choice in defining its retail service and again confirmed the Commission's lack of authority to preempt the state's choice.

Petitioner's argument here is weaker than the generator's argument in *Calpine*. In *Calpine*, the state had recognized a retail sale that, according to the generator, reduced the amount of power available for the generator to sell at wholesale. Still, the D.C. Circuit affirmed the state's right to recognize whatever retail sales it wished for its own retail billing purposes. Here, the state is declining to recognize certain retail sales. Petitioner is insisting that the state cannot do so, and instead must recognize more retail sales than the state thinks has occurred. The Commission's jurisdiction over wholesale sales offers no conceivable ground for compelling a state to recognize the existence of a retail sale.

Thus, even if Petitioner is right that the Commission should recognize outflows from a home or business to a utility as wholesale sales, and arrange for a rate to be paid for those "sales," the state would still be free to offset such outflows from inflows when measuring the amount owed for retail service. As *Southern California Edison* and *Calpine* affirm, the Federal Power Act does not preclude states from applying a netting interval for retail charges that is different from the

[125] *Id.* at 49.

[126] *Id.* at 50.

netting rule applied by this Commission to determine wholesale charges.[127] There is no basis for the Commission to provide the requested declaration.

III. NET METERING DOES NOT INVOLVE SALES IN "INTERSTATE COMMERCE."

The Petition fails for another, independent reason: even if the utility's management of any outflow of energy from a rooftop solar panel or similar small injection of energy onto the distribution system were deemed to be a wholesale sale, such a wholesale sale would not be one in interstate commerce. Thus, the Commission would have no jurisdiction over it. The Federal Power Act extends federal jurisdiction only to matters not subject to state jurisdiction, and only to wholesale sales "in interstate commerce."[128] As the Supreme Court has explained, "the Commission may not regulate … within-state wholesale sales."[129] The Commission bears the burden of establishing that a wholesale sale occurs in interstate commerce.[130]

Petitioner brushes aside this issue by asserting that a wholesale sale automatically occurs in "interstate commerce" if the sale is made to a utility that "comingles the energy with other energy sources on the interstate electric grid."[131] Petitioner again misstates the law and its relevance to the case at hand. A wholesale sale is "in interstate commerce" on the basis of

[127] *S. Cal. Edison*, 603 F.3d at 1002; *Calpine*, 702 F.3d at 48.

[128] *See* 16 U.S.C. § 824(a) (federal regulation of the sale and transmission of electric energy in interstate commerce "extend[s] only to those matters which are not subject to regulation by the States"); *id.* § 824(b) (granting the Commission jurisdiction over "the sale of electric energy at wholesale in interstate commerce"); *Fed. Power Comm'n v. S. Cal. Edison Co.*, 376 U.S. 205, 215-16 (1964) (finding the Federal Power Act extended FPC jurisdiction "to all wholesale sales in interstate commerce except those which Congress has made explicitly subject to regulation by the States").

[129] *Elec. Power Supply Ass'n*, 136 S. Ct. at 768.

[130] *See Fed. Power Comm'n v. Fla. Power & Light Co.*, 404 U.S. 453, 455, 459 (1972); *Conn. Light & Power Co. v. Fed. Power Comm'n*, 324 U.S. 515, 532 (1945).

[131] Petition at 19-21.

commingling with out-of-state energy only if that commingling occurs upstream of the sale.[132] Here, that standard is not satisfied because there is nothing upstream of the net metered generation resource.

Downstream commingling cannot convert an intrastate sale to one made in interstate commerce, unless the upstream seller knows that the energy will be transmitted across state lines and intends that result. As discussed in Section III.B, below, the cases finding interstate commerce based on downstream commingling involve upstream sellers who intend to make an interstate sale but have structured the sale to use in-state intermediaries in an attempt to avoid the Commission's jurisdiction. Net metering is easily distinguishable. A customer participating in a net metering program is completely indifferent to what the local utility does with any outflows, and has no reason to think that such energy will be transmitted across state lines. And in fact, backflow from the local distribution network to the interstate grid is highly unusual.[133] Thus, the standard for "interstate commerce" is not satisfied.

A. A Wholesale Sale of Energy Is Not "In Interstate Commerce" on the Basis of Commingling When There Is No Commingling Upstream of the Sale.

Whether commingling with out-of-state energy converts an intra-state wholesale sale into one "in interstate commerce" depends on whether the electricity being sold was commingled, upstream of the sale, with electricity that flowed in interstate commerce. For instance, in *Federal Power Commission v. Southern California Edison Company*, the Supreme Court upheld the Federal Power Commission's ("FPC") assertion of jurisdiction over wholesale sales to the City of Colton where the record showed "that out-of-state energy from Hoover Dam was included in the

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[132] *See, e.g.*, *S. Cal. Edison Co.*, 376 U.S. at 208-10 (upholding the exercise of FERC jurisdiction over wholesale sales that included out-of-state energy).

[133] *See generally* Exhibit B (Affidavit of Sam Wheeler).

energy delivered … to Colton."[134] Likewise, in *Pennsylvania Water & Power Co. v. Federal Power Commission*, the Court held that a Pennsylvania utility's wholesale sales to Pennsylvania customers were "in interstate commerce" because the utility relied on energy from out of state to meet its power supply needs.[135] Because the utility's power flow was "commingled" with out-of-state sources upstream of the sales, the sales were within FPC jurisdiction.[136] Circuit courts have applied this upstream commingling test to determine if a wholesale sale qualifies as "in interstate commerce."[137] And, the Commission has asserted jurisdiction over the sale of electricity from a utility to an entity connected by a low-voltage system when the electricity had crossed state lines upstream of the sale.[138] That test makes practical sense: the Commission, after all, regulates the sale, and so the Commission's jurisdiction over the sale turns on whether the electricity sold by the seller has traveled in interstate commerce upstream of the sale.

Here, this test for interstate commerce indisputably cannot be satisfied. Net metered customers' energy output is not commingled with out-of-state power before the point of sale, because there is no power upstream from the customer. At the moment of discharge onto the local distribution network—the moment when Petitioner claims the electricity is sold[139]—the electricity is purely intrastate in character.[140]

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[134] *S. Cal. Edison Co.*, 376 U.S. at 208-09.

[135] *See Pa. Water & Power Co. v. Fed. Power Comm'n*, 343 U.S. 414, 419-20 (1952).

[136] *Id.* at 420.

[137] *See, e.g.*, *Ark. Power & Light Co. v. Fed. Power Comm'n*, 368 F.2d 376, 379 (8th Cir. 1966) (stating that "[t]he basic question" in analyzing whether an Arkansas' utility's wholesale sales occurred in interstate commerce was "whether the Commission's finding that all of the twenty-three wholesale purchasers received interstate energy [wa]s supported by substantial evidence").

[138] *See People's Elec. Coop.*, 84 FERC ¶ 61,229, at 62,109, 62,107-14, 62,131 (1998).

[139] *See* Petition at 21.

[140] The Commission's decision in *California Public Utilities Commission* is not to the contrary. *See Cal. Pub. Utils. Comm'n*, 132 FERC ¶ 61,047 (2010), *order clarified on reh'g by*, 133 FERC ¶ 61,059 (2010).

B. Petitioner's "Downstream" Commingling Theory of Jurisdiction Is Unsupported by Law.

The Petitioner nevertheless claims that net metering involves wholesale sales "in interstate commerce" because, once transferred to the local utility, the energy joins a commingled pool of energy that has traveled in interstate commerce.[141] That theory improperly subjects an upstream seller to Commission jurisdiction because of downstream actions taken by the buyer. The case law does not support Petitioner's theory.

Petitioner cites *Florida Power & Light* for its broad interpretation of the Commission's jurisdiction, but its reliance on that case is misplaced.[142] The Federal Power Act "unambiguously authorizes [the Commission] to assert jurisdiction over two separate activities—transmitting and [wholesale] selling."[143] *Florida Power & Light* evaluated whether a Florida utility had engaged in a <u>transmission</u> in interstate commerce, not whether it had made a wholesale <u>sale</u> in interstate commerce. That distinction is significant because the Federal Power Act specifically defines energy transmitted in interstate commerce as energy "transmitted from a State and consumed at any point outside thereof."[144] Thus, the key question in *Florida Power & Light* was whether any

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There, the Commission refused to exempt distribution-level facilities and distribution-level feed-in tariffs from the Commission's jurisdiction. *Id.* at P 72. The Commission discussed its jurisdiction over these facilities and tariffs in a single, cursory paragraph that did not address whether the resales at issue were "in interstate commerce." *Id.* Two of the three cases on which the Commission relied concerned the "local distribution facilities" exception to federal jurisdiction, rather than the requirement that wholesale sales take place in interstate commerce. *See id.* at P 72 n.100 (citing *Transmission Access Policy Study Group v. FERC*, 225 F.3d 667, 695-96 (D.C. Cir. 2000), *aff'd sub nom. New York v. FERC*, 535 U.S. 1 (2002); *Detroit Edison Co. v. FERC*, 334 F.3d 48, 51 (D.C. Cir. 2003)). The third case, *Florida Power & Light Co.*, 404 U.S. 453, likewise did not resolve whether wholesale sales including no out-of-state energy can qualify as in interstate commerce, for the reasons given below.

[141] *See* Petition at 20-21.

[142] *See id.* at 20 n.40 (citing *Fla. Power & Light Co.*, 404 U.S. at 457-58).

[143] *New York v. FERC*, 535 U.S. at 19-20.

[144] 16 U.S.C. § 824(c) (emphasis added).

output from the utility reached an out-of-state recipient—or, as the Court put it, whether "any [of the utility's] power," "no matter how small the quantity," "ha[d] reached Georgia."[145] The Supreme Court held federal jurisdiction to be proper because the FPC provided sufficient evidence "that some FP & L power [went] out of state."[146]

Florida Power & Light does not allow the Commission to assert jurisdiction over net metering programs, for three reasons. **First**, as discussed above, the test for wholesale sales is different than the test for interstate transmission. A wholesale sale is in interstate commerce if the electricity sold crossed state lines upstream of the sale, while a transmission occurs in interstate commerce if the transmitted energy crosses state lines downstream of the transmission. To the extent *Florida Power & Light* bears on the interstate nature of a wholesale sale (rather than a transmission), the case exemplifies the established rule that a wholesale sale is "in interstate commerce" only if the seller's energy has commingled with out-of-state energy upstream of the sale.[147] Because FP&L commingled its energy with out-of-state sources through its interconnection with Georgia Power, any wholesale sales FP&L made to customers in Florida would have drawn on a commingled pool of energy and thus would have qualified as sales "in interstate commerce." That same cannot be said of energy generated by net metering customers and transferred to the local distribution utility.

[145] *Fla. Power & Light Co.*, 404 U.S. at 461 n.10. The Court reached a similar result in *Jersey Central Power & Light Co.*, holding that a New Jersey utility was a public utility subject to federal regulation under the Federal Power Act because some of the power it produced was transmitted to New York. *Jersey Cent. Power & Light Co. v. Fed. Power Comm'n*, 319 U.S. 61, 68-69 (1943). The *Jersey Central* Court relied heavily on the definition of interstate transmission in reaching that conclusion. *Id.* at 71-72.

[146] 404 U.S. at 461, 463.

[147] *See S. Cal. Edison Co.*, 376 U.S. at 208-09.

Second, in the rare cases where courts have found a wholesale sale to be in interstate commerce because of what occurs downstream of the sale, federal jurisdiction has never attached merely because the energy joined a pool of other energy that previously traveled in interstate commerce. Instead, to assert jurisdiction, the Commission must demonstrate that the seller knew that the energy sold would cross state lines and intended that result. Where the "connection of the seller with the steps taken by the buyer after the sale" is "too remote," the sale retains its intrastate character.[148]

In *Hartford Electric Light Company v. Federal Power Commission*, for instance, the Second Circuit held that a Connecticut energy producer was engaged in sales in interstate commerce because the producer was "fully aware" with "no mere indifferent knowledge" that some of the energy it provided to an in-state purchaser was "unavoidably destined by the buyer for interstate use."[149] The court stressed that it was "not … saying that a mere sale by A, within a state, to B, who ships the commodity in interstate commerce, would necessarily be a sale in interstate commerce."[150] Rather, the court emphasized that the proper classification of a

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[148] *Superior Oil Co. v. Miss. ex rel. Knox*, 280 U.S. 390, 396 (1930). Courts interpreting other federal statutes with interstate commerce elements likewise have recognized that sales within a state generally qualify as intrastate. *See, e.g., Veney v. John W. Clarke, Inc.*, 28 F. Supp. 3d 435, 443-44 (D. Md. 2014) (under the Fair Labor Standards Act, "[w]hether the transportation is of an interstate nature can be determined by reference to the intended final destination of the transportation" and "[m]ere contemplation that property may be further shipped from where it was delivered does not amount" to the "fixed and persisting intent" required on the part of the shipper (internal quotation marks omitted)); *Safari Club Int'l v. Salazar*, 852 F. Supp. 2d 102, 121 (D.D.C. 2012) (the Endangered Species Act generally "does not regulate 'purely intrastate activities'" and thus plaintiffs would be able to "sell [animals] to another party within the state without a permit" (citation omitted)).

[149] *Hartford Elec. Light Co. v. Fed. Power Comm'n*, 131 F.2d 953, 960 (2d Cir. 1942) (emphasis added; internal quotation omitted).

[150] *Id.* at 958.

transaction may turn on "the character and extent of the seller's knowledge of the purpose of the purchaser to ship across state lines."[151]

In the same vein, the Supreme Court held, in *United States v. Public Utilities Commission of California*, that wholesale sales by a California generator to the Navy and to a Nevada county were "in interstate commerce."[152] The Court noted that the California generator sold the energy "for consumption" in Nevada, but had structured the transaction so that the purchasers "figuratively" assumed control in California, before the power reached the border.[153] The Court held that this was "irrelevan[t]" to the jurisdictional issue, in the context of a transaction the entire purpose of which was to sell power generated in California to be used in Nevada.[154] *PUC of California* thus confirms the common-sense conclusion that Commission jurisdiction attaches when a seller knows and intends that a purchaser will transport energy out of state for resale.

Other cases reflect the same principle. For example, in the pre-Federal Power Act case of *Attleboro*, the Supreme Court held that the sale of locally produced electricity was in interstate commerce when the sale was made "with knowledge that the buyer would utilize the energy extrastate."[155] Additionally, in *Connecticut Light & Power Co.*, the Commission held (although the Court did not reach the question) that a company was a public utility in part because the company sold energy to a municipal entity that, "with knowledge of the Company, resold a portion of this energy to a corporation which transmitted it" out of state.[156]

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[151] *Id*. at 958-59 ("A distinction has been taken between sales made with *a view to a certain result* and those made simply with indifferent knowledge that the buyer contemplates that result.").

[152] 345 U.S. 295, 299 (1953).

[153] *Id.* at 297 (emphasis added).

[154] *Id.* at 300.

[155] *Jersey Central*, 319 U.S. at 69 (citing and discussing *Attleboro*, 273 U.S. at 86).

[156] 324 U.S. at 520-21, 535.

Thus, to the extent the Petition seeks to establish jurisdiction based on what happens downstream from the transfer to the local utility, federal jurisdiction does not attach merely because the energy flows from a retail customer's on-premise generation onto a local distribution network containing energy that previously flowed in interstate commerce. Rather, to establish jurisdiction, Petitioner would need to demonstrate that (a) the energy placed onto the local distribution network by the net metering participant subsequently flowed across state lines, and (b) the net metering participant knowingly intended that result.

C. Petitioner Fails to Show That Outflows Cross State Lines, or That Net Metering Participants Knowingly Intend That Result.

The Petition does not even attempt to meet its burden to show that outflows from net-metered facilities cross state lines, or that net metering participants knowingly intend to sell excess power in interstate commerce. That is unsurprising, since the Petition could not possibly establish such facts. As to the first—the requirement that, to be a wholesale sale in interstate commerce, the energy sold by the net metering participant must subsequently flow across state lines—small outflows on the distribution system will not cross state lines in the ordinary course.[157] Indeed, most local distribution networks are engineered to prevent such backflow onto the interstate transmission network.[158] And even if one could construct a case when there could be backflow that would migrate beyond upstream local distribution equipment and cross the boundary onto the bulk power system, the burden lies with the Petitioner to establish, and the Commission to find based on substantial evidence, that such backflow has occurred with respect to a particular program

[157] *See generally* Exhibit B (Affidavit of Sam Wheeler).

[158] Frank R. Lindh & Thomas W. Bone Jr., *State Jurisdiction Over Distributed Generators*, 34 Energy L.J. 499, 537 (2013); *see also* Exhibit B (Affidavit of Sam Wheeler) at 4-5.

and utility.[159] As the Petition does not provide such evidence, the Commission cannot issue the broad declaration sought.

Second, even if there were occasionally backflow on a particular system, Petitioner would still need to establish that the net metering program customer—the "seller" alleged to have engaged in a wholesale sale in interstate commerce—knew of that possibility and intended its electricity to be transmitted across state lines. As the Supreme Court explained almost a century ago, "[a] distinction has been taken between sales made with a view to a certain result and those made simply with indifferent knowledge that the buyer contemplates that result."[160] It is absurd to think that Petitioner could ever establish such knowledge and intent among net metering participants, as a national matter or even as general matter among customers using net metering within a state. Net metering participants are indifferent to where their outflows go, and likely expect that any excess electricity they produce and transfer to their utility will be delivered to their neighbors and possibly other utility customers on the same local distribution system. That is especially so given the fact that any backflow onto the interstate transmission grid would be an unpredictable, highly unusual aberration.[161]

For these reasons, the Petition fails to establish that net metering programs involve transfers of power "in interstate commerce."

IV. A RULING IN FAVOR OF PETITIONER WOULD HAVE PROFOUNDLY DISRUPTIVE CONSEQUENCES.

Millions of Americans—homeowners, farmers, businesses, school districts, hospitals, and state, local, and federal government facilities—have invested in small-scale, behind-the-meter,

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[159] *See Fla. Power & Light Co*., 404 U.S. at 455.

[160] *Superior Oil Co.*, 280 U.S. at 395.

[161] *See generally* Exhibit B (Affidavit of Sam Wheeler).

distributed generation in reliance on state net metering programs. In turn, many of those programs are available to customers because state legislatures and regulatory commissions have acted in reliance on the Commission's decisions in *Sun Edison* and *MidAmerican*, and on Congressional direction that states consider adopting net metering programs. A change in Commission policy would disrupt those reliance interests, and that is something the Commission must consider. Yet the Petition fails to address these reliance interests at all.

A. Retail Customers Have Made Significant Investments In Reliance on Net Metering Programs

A home solar photovoltaic array costs between $15,000 and $40,000, depending on size and location – a hefty investment for the average residential retail customer.[162] The investment is also long-term, since the useful life for such a system is approximately 20 years.[163] Whether customers choose to own or lease their systems, they make these substantial, long-term investments in reliance on the structure and pricing under the net metering programs made available to them.[164] Particularly in states where utilities are required by law or regulation to provide net metering—the vast majority of states—those customers' assumptions are eminently reasonable. Granting the Petition would profoundly disrupt significant investment decisions made by millions of individual retail customers.

B. Legislatures and Regulatory Commissions Have Relied on the Commission's Precedent

States began adopting net metering programs in the early 1980s, shortly after PURPA was enacted. Neither this Commission nor Congress acted to limit the adoption of those programs, or

[162] *See* Exhibit A (Affidavit of Carl Pechman, Ph.D.) at 10, n.19.

[163] *Id.*

[164] *See id*.

alter the terms of the programs. To the contrary, in 2001, this Commission, in *MidAmerican*, confirmed states' understanding that federal law does not preempt them from permitting retail service to be measured on a net basis.[165] Shortly thereafter, Congress enacted the EPAct of 2005, which not only left existing state net metering programs unimpaired, confirming the Commission's holding in *MidAmerican*, but expressly called on all states to consider adopting net metering programs at the state level. After 2005, states could also rely on the fact that Congress also directed that they could enact, and in fact must consider enacting, net metering programs.[166] Indeed, it is likely that Congress itself acted in light of the Commission's findings in *MidAmerican* that net metering fell outside of its jurisdiction under the Federal Power Act and PURPA, and its decades of forbearance from interfering with state net metering policy, in choosing to direct the net metering provisions of the EPAct of 2005 to states rather than to the Commission. And, in keeping with that unbroken history, in 2009, this Commission again confirmed its understanding that net metering is within the province of states.[167]

Over decades, states have responded to this direction, carefully crafting new net metering programs and revising existing programs, acting in reasonable reliance on the Commission's findings and on federal law. The Petition completely fails to recognize this context.

C. The Commission Must Take Account of the Practical Implications of the Requested Declaration

The Petition's willful blindness to context is a fatal flaw. Although agencies are empowered to alter their existing policies, they must remain "cognizant that longstanding policies may have engendered serious reliance interests that must be taken into account," and provide a

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[165] *MidAmerican*, 94 FERC ¶ 61,340, at 62,263.

[166] *See* 16 U.S.C. § 2621(d)(11).

[167] *Sun Edison*, 129 FERC ¶ 61,146, at 61,620-621.

reasoned explanation if they "disregard[] facts and circumstances that underlay or were engendered by the prior policy."[168] The Petition fails to acknowledge, let alone justify disregarding, the fact that retail customers and state and federal policy makers have relied for decades on this Commission's determination that net metering falls within state retail ratemaking jurisdiction. Petitioners ignore the potential disruption that would result from a changed interpretation.

To grant the Petition, the Commission must address the fact that the Petition would federalize much retail energy policy, an unreasonable result that is inconsistent with the dual system of regulation. An order granting the requested declaration would require the more than two million retail customers with net metered facilities to choose between: (i) registering under PURPA; (ii) investing in behind-the-meter storage or designing their systems so as to avoid any outflow; or (iii) filing for a federal cost-based rate for their exported energy. The requested declaration could render obsolete, or at least materially reduce the usefulness and value of, utilities' significant investment in technologies to modernize the grid and enable bidirectional flows of power. It could lead to the federalization of many initiatives to support the electrification of transportation, including vehicle-to-grid capabilities currently under development. It could encourage customers to develop otherwise uneconomic or inefficient microgrids that involve minimal or no interaction with distribution utilities to avoid the added layers of regulation Petitioner would have this Commission impose.

Along with the harm to customers' reasonable reliance, these ripple effects of Petitioner's jurisdictional theory counsel strongly in favor of rejecting the Petition.

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[168] *Encino Motorcars, LLC v. Navarro*, 136 S. Ct. 2117, 2126 (2016), quoting *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515-16 (2009).

CONCLUSION

The Petition should be dismissed, or alternatively should be denied on the merits.

Dated: June 15, 2020

Respectfully submitted,

/s/ Suedeen G. Kelly

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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in these proceedings.

Dated: June 15, 2020

By: /s/ Suedeen Kelly
Jenner & Block LLP

Exhibit A

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

New England Ratepayers Association	)))	No. EL20-42

AFFIDAVIT OF CARL PECHMAN, PH.D., IN SUPPORT OF THE PROTEST OF THE NATIONAL ASSOCIATION OF REGULATORY UTILITY COMMISSIONERS

I, Carl Pechman, Ph.D., declare:

1. I am Director of the National Regulatory Research Institute ("NRRI").

2. I have been involved in the economic analysis of the electric utility industry and the practice of regulation since the early 1970s. During that time, I have participated in all aspects of the industry's transformation. My activities have included:

- Member of the Blue Ribbon Task Force Strategizing an Electric Energy Policy and Regulatory Framework in Puerto Rico;
- Analyst/co-author of U.S. department of Energy Quadrennial Energy Review (QER) – 1.1: Transforming U.S. Energy Infrastructures in a Time of Rapid Change and 1.2: Transforming the Nation's Electricity System;
- Analysis of the future of the distribution utility and utility business model, including new planning paradigms, the emergent role of distribution system operators, and the role of utilities in developing electric vehicle charging infrastructure;
- Developed method and supervised modeling of "Avoided Costs" pursuant to Public Utilities Regulatory Policies Act of 1978 (PURPA) in New York;
- Led multi-party technical development of blueprint to create the NYISO and restructure the New York electric utility industry;
- Consultant to the Speaker of the California State Assembly on resolving the California Energy Crisis, including addressing issues such as the role of bonds to repay the state budget for dollars spent to purchase power, developing strategies to avoid bankruptcy and return Southern California Edison to financial health, and restructuring wholesale power markets;
- Led review and release of "Enron Trader Tapes," and made them public in testimony in EL03-180;

- Author of white paper for the Public Policy Institute of California on the state's restructuring of utility regulation and resource acquisition in response to the "Energy Crisis";
- Created "cost effectiveness test" for demand response, relied on by the Supreme Court in affirming FERC Order 745 in *FERC v. EPSA*; and,
- Pro bono consultant to the City of Santa Cruz School system on entering into power purchase agreements for development of a solar array on school building.

3. My book, *Regulating Power: The Economics of Electricity in the Information Age*, (Kluwer Academic Publishers, 1993) explains how market design can be used as an instrument for gaining market power. It introduced the concept of "jurisdictional ambiguity" to explain the complex interaction between state and federal electricity regulators. And, it provides the first explanation of the need for differential locational installed reserve requirements in New York State, which were a precursor to locational capacity markets.

4. I earned my Ph.D. in Resource Economics from Cornell University in 1990. My curriculum vitae is attached as Attachment 1.

I. PURPOSE OF AFFIDAVIT, SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

5. I have been asked by counsel for the National Association of Regulatory Utility Commissioners ("NARUC") to analyze, from an economic and regulatory perspective, the petition for declaratory order submitted to the Federal Energy Regulatory Commission (the "Commission") by the New England Ratepayers Association ("NERA"), and the supporting expert report by Ashley C. Brown ("Brown Report").

6. I conclude that, contrary to NERA's assertions, the practice of net metering is a retail service that is properly regulated at the state level. NERA's attempt to characterize certain components of net metering service as a wholesale sale ignores reality. Furthermore, adoption of NERA's position would upset states' efforts to advance legitimate state policy goals, and individual customers' reasonable reliance on the net metering programs available to them. It would create jurisdictional ambiguity where none currently exists, to the detriment of utilities, competitive providers, and ratepayers.

II. NET METERING IS A RETAIL SERVICE

7. Net metering is a means of measuring the retail electric service used by a utility customer. Net metering is available in almost every state, and while the details of the programs differ from state to state and even utility to utility, they all share the common feature that retail service is measured so that "electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric energy provided by the electric utility to the electric consumer during the applicable billing period."[1]

8. The primary purpose of net metering is to enable retail customers to self-supply a portion of their electricity needs, typically in a manner consistent with state environmental objectives, while maintaining the reliability of the distribution system. Each net metering program is designed to advance these regulatory objectives in a manner tailored to the unique circumstances facing the utility and the state in which the service is provided.

A. NERA Draws a Misleading Distinction between Full Net Metering and Other Net Metering Programs

9. The Petition attacks a version of net metering it entitles "full net metering" ("FNM"). The Brown Report defines FNM as a mechanism "in which the costs that are netted out … as compensation for the energy they deliver to the grid reflect all of the costs in bundled retail rates, including not only energy, but all fixed, demand, and other variable costs as well."[2]

10. "Net energy metering," ("NEM"), on the other hand, the Brown Report finds acceptable. According to the Brown Report, NEM is a mechanism under which "all fixed costs are recovered on a fixed basis, all demand costs are recovered on a demand basis, and only variable costs, primarily energy, are recovered on a volumetric basis … but the energy component of the bill would be adjusted to net the energy purchased off the grid against the energy produced on premises."[3]

11. Thus, according to the Brown Report, the difference between appropriate net metering – which presumably may continue uninterrupted by the Commission's determination on the Petition

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[1] 16 U.S.C. § 2621(d)(11).

[2] Brown Report at 9.

[3] *Id.*

– and inappropriate net metering is whether the program provides a credit to the customer that can be used to offset components of the customers' bill above the cost to the utility of energy supply.

12. The net metering programs in effect today do not neatly correspond to the categorization set forth in the Brown Report. Instead, crediting mechanisms are far more complex than the Report and the Petition imply. The complexity is apparent from even the few examples of supposedly-FNM programs cited in the Petition: California; New Hampshire; Connecticut; Rhode Island; and Massachusetts. Indeed, it's not clear that any of the cited examples satisfy the criteria set forth in the Petition for FNM.

- California: Customers receive credits to their utility account for excess energy, above their consumption during the netting period, on a per-kWh basis, but continue to pay all non-bypassable charges; once per year, any unused credits are "cashed-out" to the customer at a per-credit value equal to the 12-month average rate for wholesale energy supply in the California ISO.[4]
- New Hampshire: Customers receive credits to their utility account on a per-kWh basis. Once per year, customers with credit for more than 600 kWh may elect to receive economic compensation. The utility may elect to compensate customers who installed their systems prior to September 2017 at the default service rate for energy supply, or at annually-updated values for energy and capacity that are based on costs in ISO-NE markets.[5] Customers who installed their systems after that date receive credits equal to 100% of the value of kWh charges for energy and transmission service, and 25% of the value of distribution service. All net metering customers continue to pay all non-bypassable charges for all electricity imports from the grid, including the monthly fixed customer charge.[6]

[4] California Public Utilities Commission, *Net Energy Metering (NEM)*, https://www.cpuc.ca.gov/NEM/ (accessed June 12, 2020).

[5] New Hampshire Code of Admin. Regs., Chapter PUC 900, Net Metering for Customer-Owned Renewable Energy Generation Resources of 1,000 Kilowatts or Less, §PUC 903.02(i), https://www.puc.nh.gov/Regulatory/Rules/PUC900.pdf (accessed June 15, 2020). Those provisions are applicable under the standard net metering tariff available to customer-generators until September 2017, and those grandfathered under that standard net metering tariff, pursuant to N.H. Public Utilities Commission Order No. 26,029 (June 23, 2017) issued pursuant to waiver authority granted in N.H. Rev. Stat. Ann. §362-A:9, XVI.

[6] N.H. Public Utilities Commission Order No. 26,029 (June 23, 2017); https://www.eversource.com/content/general/about/about-us/doing-business-with-us/builders-contractors/interconnections/new-hampshire-net-metering, (accessed June 15,, 2020); and, https://new-

- Connecticut: There is no statewide net metering law or regulation, but utilities have proposed and obtained approval for individual net metering tariffs. Under the Eversource tariff, for example, customers receive credits for excess energy on a per-kWh basis; once per year, unused credits are "cashed out." For net metering customers with solar PV systems, credits are based on the average real-time Locational Marginal Price in the Connecticut ISO-NE zone between 10 a.m. and 4 p.m. during the previous 12-month period; for all other generation resources, credits are based on the average of real-time locational marginal price ("LMP") in all hours. And, net metering customers pay the monthly customer charge.[7]
- Rhode Island: Customers receive credits for excess energy, but only up to 125% of the customer's usage during the billing period. Customer charges, and demand charges if any, are non-bypassable. The value of these credits is equal to the utility's avoided cost rate, defined as is standard offer service kWh charge. Alternatively, utilities may offer an elective monthly billing plan that reflects expected credits so that monthly billings are even over a 12-month period, regardless of actual production and usage.[8]
- Massachusetts: Net metering systems are classified depending on the generation technology used (*e.g.*, solar, wind, agricultural digesters, hydro), system size, and whether they begin operation after a pre-determined capacity cap is reached, for each regulated utility company. Depending on the class of the facility, customers receive credits for excess energy that are equal to either 100% or 60% of the basic service kWh charge in the ISO-NE load zone where the customer is located, plus distribution, transmission, and transition per-kWh charges. Net metering customers remain responsible for customer charges, kW-based charges, and system benefit charges.[9]

hampshire.libertyutilities.com/acworth/commercial/my-account/my-bill/rates-tariffs/net-metering.html, (accessed June 14, 2020).

[7] Eversource, *Connecticut Net Metering*], https://www.eversource.com/content/ct-c/about/about-us/doing-business-with-us/builders-contractors/interconnections/connecticut-net-metering (accessed June 12, 2020)

[8] *National Grid Net Metering Provision, RIPUC No. 2207 Compliance Filing*, RI PUC Docket 4790 (Aug. 9, 2018, Sheet 9 (¶8), http://www.ripuc.ri.gov/eventsactions/docket/4790-NGrid-Net%20Metering-Compliance(8-9-18).pdf (accessed June 15, 2020).

[9] Massachusetts 220 CMR 18.00, *Net Metering*, https://www.mass.gov/files/220_cmr_18.00_final_12-1-17_1.pdf (accessed June 15, 2020). *See especially* § 18.04.

13. And none of these states refer to or understand their programs to be "FNM." None of the documents cited in support of the Petition's discussion of these programs uses the phrase "full net metering" or the acronym FNM.[10]

14. It thus appears to me that FNM, as defined in the Brown Report and used throughout the Petition, is a fiction. In reality, each state, and each utility in each state, has implemented net energy metering with its own particular rates, terms, and conditions of service.

B. The Brown Report does not Support NERA's Position that Net Metering Service Includes Wholesale Sales

15. The Brown Report spends considerable time explaining that FNM results in "perverse effects," including subsidies (cross-subsidies),[11] inefficiency, socially-regressive and anti-competitive effects, "unfairness to competing technologies," and intermittency. Much of the Brown Report is irrelevant to the arguments made in the Petition. Fully a quarter of the Brown Report is devoted to dismissing the concept of the Value of Solar without citing a single study on the Value of Solar. The Petition does not even mention the term Value of Solar. The Brown Report should be entirely disregarded, for two reasons.

16. First, as illustrated above, it is not clear that FNM exists in the form that NERA and the Brown Report allege. Instead, most current programs appear closer in concept to NEM (as that term is used in the Brown Report and the Petition) than FNM. The Brown Report acknowledges that at least some of the alleged harms of FNM are mitigated by NEM.[12] In sum, because the

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[10] The footnote supporting the Petition's discussion of the California program includes a reference to a document entitled "California Net Energy Metering (FNM) Draft Cost-Effectiveness, FNM Study." Petition at 2, fn. 4. However, that is not the title that appears on the underlying document. The actual title is "California Net Energy Metering Draft Cost-Effectiveness Evaluation, Study." *See* CPUC Energy Division, *California Net Energy Metering (NEM) Draft Cost Effectiveness Evaluation, NEM Study Introduction,* (Sept. 26, 2013), *available at* https://www.heartland.org/_template-assets/documents/publications/cpucnemdraftreport92613.pdf (accessed June 15, 2020). The Petition also misrepresents the content of this document. The Petition states that "99 percent of customers on FNM tariffs had installed solar photo voltaic (PV) …" equipment. *See* Petition at 2, fn. 4.

The Petition states that "under N.H. Rev. Stat. § 362-A:9 (2019) FNM customers receive a price …" However, the New Hampshire statute does not mention FNM or have any requirements for FNM customers. The Petition goes on to claim that "[o]ther New England States also require FNM." No New England state requires FNM.

[11] In order to support its position, the Brown Report has conflated the economic term subsidy with cost shift, even while his own reference goes to lengths to clarify the difference. *See* Scott P. Burger, "Rate Design for the 21st Century: Improving Economic Efficiency and Distributional Equity in Electricity Rate Design, Ph.D. Dissertation, MIT (Sept. 2019) at 89, *available at* https://dspace.mit.edu/handle/1721.1/123564 (accessed June 15, 2020).

[12] Brown Report at 28.

Brown Report ignores the nuances of the net metering programs it purports to analyze, the "perverse effects" described in the Brown Report are nothing more than unsubstantiated musings.

17. Second, and more importantly, none of the "perverse effects" alleged in the Brown Report constitutes a basis for federal jurisdiction over net metering. Instead, each is a consequence of a policy choice that states alone are empowered to make, or a factor that state legislatures and commissions can and have considered in making the policy choice to implement net metering, or both. For example, although I disagree with the Brown Report as to the extent of cross-subsidies and "socially regressive"[13] effects, if they do occur, they occur between retail customers, as a result of retail ratemaking choices. It is not this Commission's role to police retail ratemaking choices to correct those impacts.[14] Likewise, the "inefficiency" and intermittency effects described in the Report are factors that might be considered in shaping net metering policies – but again, it is not the role of this Commission to determine whether states have reached appropriate conclusions to balance the inefficiency and intermittency of small-scale renewable generation against the benefits states perceive. Finally, the alleged "anti-competitive effects"[15] and "unfairness to competing

[13] Many organizations are working to extend the benefits of net energy metering to low-income customers. A report for Clean Energy States Alliance ("CESA") lists 38 programs in 13 states plus the District of Columbia that provide methods for extending the benefits of solar energy to low-income consumers. As that report explains, service providers are creatively combining their states' net metering offerings with other opportunities presented by federal, state, and local low-income support programs to benefit low-income customers and many of the entities that provide services to low-income constituencies. Paulos, B., *Bringing the Benefits of Solar Energy to Low-Income Consumers – A Guide for States & Municipalities. Report for Clean Energy States Alliance* (May 15, 2017), *available at* https://www.cesa.org/resource-library/resource/bringing-the-benefits-of-solar-energy-to-low-income-consumers/ (accessed June 15, 2020). In the District of Columbia, the Solar for All Implementation Plan, has as its express aim "to reduce by at least 50% the electric bills of at least 100,000 of the District's low-income households with high energy burdens by December 31, 2032." That program is working with both rooftop and community solar installations. District of Columbia, Department of Energy and Environment, *Solar for All Implementation Plan*, (March 10, 2017) *available at* https://doee.dc.gov/node/1226501 (accessed June 15, 2020). Illinois is implementing a program through which "environmental justice communities" can be designated, which then helps to ensure that new solar projects will be developed in areas that were previously exposed to higher risks due to local pollution and socioeconomic factors. Illinois Solar for All, *Environmental Justice Communities* https://www.illinoissfa.com/environmental-justice-communities/ (accessed June 5, 2020). New Hampshire has also made energy efficiency and solar programs available to low-income customers. The programs integrate accessible financing, incentives for small solar installations, and net metering. https://www.energysage.com/local-data/solar-rebates-incentives/nh/ (accessed June 15, 2020).

[14] This was a fundamental issue in Order No. 745 when the pricing of demand response ("DR") programs was debated. *See generally Demand Response Compensation in Organized Wholesale Energy Markets*, 134 FERC ¶61,187 (March 15, 2011). The Commission rejected efforts to price DR in a manner that would have corrected for inefficiencies in retail ratemaking. Specifically, advocates for correcting "inefficiencies" in retail rates wanted to price DR at LMP-G where LMP is the locational marginal price and G measured the contribution to fixed cost recovery in the variable portion of the retail rate. The Commission rejected that argument and found that the just and reasonable rate was LMP.

[15] The basis for the Brown Report's contention that FNM leads to "anti-competitive effects" appears to be that sometimes solar providers pass on cost reductions to customers and at other times they do not. *See* Brown Report

technologies," if any could be demonstrated, are simply outgrowths of states' choices to incentivize particular forms of in-state generation resources. This Commission is not in the business of second-guessing those choices.

18. The Brown Report contains no support for the principle, alleged in the Petition, that components of net metering service are in fact wholesale sales in interstate commerce that would be subject to this Commission's jurisdiction. The Brown Report does not analyze what constitutes a wholesale sale, or demonstrate that net metering service occurs in interstate commerce.

III. ADOPTION OF NERA'S POSITION WOULD NEGATIVELY IMPACT RATEPAYERS

A. Clarifying the Impact of NERA's Position on Net Metered Customers

19. NERA asks the Commission to assert jurisdiction over one component of net metering service, while leaving other components to the states. Under NERA's theory, when the output of net-metered facilities exceeds customer load, this Commission will hold ratemaking authority; at all other times, state regulators will hold ratemaking authority. NERA recognizes that its proposal would cause a split in jurisdiction, noting that its Petition "asks the Commission to declare its jurisdiction over energy sales from rooftop solar facilities and other distributed generation located on the customer side of the retail meter (i) whenever the output of such generators exceeds the customer's demand or (ii) where the energy from such generators is designed to bypass the customer's load and therefore is not used to serve demand behind the customer's meter."[16]

20. Figure 1, below, illustrates where the jurisdictional lines would be drawn under NERA's proposal, as applied to an illustrative net metering customer with solar PV.

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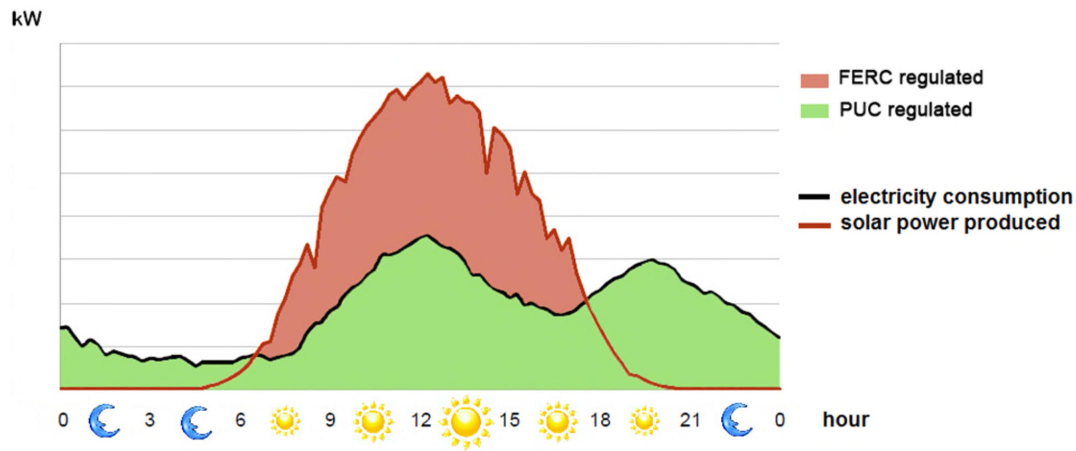
at 19-22. That is not anticompetitive behavior; it is simply a pricing strategy. True anti-competitive practices are those that "include activities like price-fixing, group boycotts, and exclusionary exclusive dealing contracts or trade association rules, and are generally grouped into two types: (i) agreements between competitors, also referred to as horizontal conduct; and (ii) monopolization, also referred to as single-firm conduct." Federal Trade Comm'n, "Anticompetitive Practices," https://www.ftc.gov/enforcement/anticompetitive-practices (accessed May 29, 2020). The Brown Report contains no information that either type of anti-competitive practice is occurring, or has occurred. Furthermore, it fails to explain how the price reductions in its primary source on this topic, the MIT Future of Energy Study, are indicative of market power. Massachusetts Institute of Technology, Energy Initiative, *The Future of Solar Energy: An Interdisciplinary MIT Study,* (2015) *available at* http://energy.mit.edu/wp-content/uploads/2015/05/MITEI-The-Future-of-Solar-Energy.pdf (accessed May 28, 2020).

[16] Petition at 5-6.

Figure 1. Jurisdictional Implications under NERA's Assumption[17]



As Figure 1 demonstrates, NERA appears to believe that the energy produced at certain times during the day should be subject to two different regulatory jurisdictions, each with its own pricing mechanism. During the hours when production from the net-metered facility exceeds the customer's consumption, the portion used to satisfy on-site consumption would be subject to state jurisdiction while the excess portion (shown in red) would be subject to federal jurisdiction.

B. Consequences if NERA's Position is Adopted in its Entirety

21. Neither NERA's Petition nor the Brown Report account for the continued ability of states to measure the quantity of retail service using netting, and credit customers for net output on their retail bills. Under this circumstance the NERA petition actually could create a windfall for NEM customers through double payment. Instead, NERA appears to assume that FERC's assertion of authority would prevent states from fully crediting customers' retail bills.[18] Although NERA provides no support for this premise, it is worth evaluating the consequences that would result from accepting that position.

[17] Figure is a modification of figure at https://heliopower.com/wp-content/uploads/2014/03/Daily_net_metering.png (accessed June 3, 2020).

1. Uncertainty and its Fallout

22. Acceptance of NERA's position would create tremendous price, contract, and regulatory uncertainty, which will in turn harm a wide variety of customers that have installed distributed generation resources, including homeowners, religious institutions, schools, hospitals, commercial and industrial establishments, and municipal and governmental entities. Indeed, disruption of the existing price, contract, and regulatory certainty may be a goal of the Petition.[19]

23. The net metering construct allows for an expectation of stable revenue streams that enable customer-investors to rationally evaluate whether to install distributed generation. For most customers, this is a significant investment.[20] To evaluate the economics of an on-site distributed generation facility, the customer would compare the installation and ongoing operating cost (or lease cost) of the facility versus their expected savings from avoided utility bills, over the life of the asset – typically twenty years. Customers are generally unwilling to undertake such significant, long-term capital investments unless they understand the financial implications, including the pay-back period. Net metering programs enable that understanding by ensuring that consistent technical requirements and economics are applicable to all such installations in a utility's territory. They smooth the learning-curve that would otherwise discourage many individual customers who have no independent understanding of energy pricing or grid functionality.

24. NERA's petition would disrupt the existing financial arrangements of the approximately two million net metering customers nationwide who have already made the monumental decision to invest in distributed generation, and would leave an indelible cloud of uncertainty over future decisions to invest. The potential for significant disruption, and the possible implications of such disruption, have been discussed in state regulatory proceedings at length. In response to those concerns states have made incremental changes to their net metering programs over time, and the vast majority have ensured that existing net-metering customers are "grandfathered-in" to the

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[19] The Brown Report states that net metering "operates to make rooftop solar more attractive than other forms of renewable generation via subsidies from non-solar ratepayers, diverting resources (including capital) to the least efficient energy source and away from competing (and, arguably, superior), technologies." Brown Report at 30.

[20] In 2018, median prices for an installed residential solar array ranged from \$3.0/W to \$5.0/W (prior to incentives), with most below \$4.0/W, and the median size of a residential solar array was 6.4 kW. Barbose, G. and Darghouth, N., *et al*., "Tracking the Sun: Pricing and Design Trends for Distributed Photovoltaic Systems in the United States, 2019 Edition," Lawrence Berkeley National Laboratory (Oct. 2019), at 10, 30 *available at* https://eta-publications.lbl.gov/sites/default/files/tracking_the_sun_2019_report.pdf (accessed June 15, 2020). Thus, the median cost of a residential solar array in 2018 was approximately \$25,000, prior to any applicable incentives.

ratemaking mechanism that applied when their facility became operational. Adoption of NERA's position would disrupt the financial terms that existing net metering customers relied upon in making their investment in distributed generation, and would undermine consumer and investor confidence in a stable regulatory environment, which is critical to the continued adoption of distributed generation.

25. The Petition and the Brown Report would have the Commission believe that the typical solar customer is "wealthy," and neither document discusses or describes any type of solar host other than affluent.[21] The logical conclusion would be that the only "harm" is to wealthy customers. This is not true. The Petition's remedy will harm a wide variety of customers that have installed distributed generation, including low income customers, religious institutions, schools, hospitals, commercial establishments, municipal and governmental buildings, and industrial concerns.

26. The Commission need only look outside its own windows to see the potential for damage to programs directed to low-income retail customers. Net metering forms the nucleus of the District of Columbia's Solar for All program. The goal of the District's program is "to reduce by at least 50% the electric bills of at least 100,000 of the District's low-income households with high energy burdens by December 31, 2032."[22] Low-income customer participation is generally predicated on either individual net metering (for rooftop solar installed on single family dwellings) or community net metering (for housing complexes, neighborhood, and community-based installations). The program offers each customer the opportunity to choose their own competitive electric service provider. In developing the initiative, the DC Department of Energy & Environment solicited vendor projects that would cut low-income customer utility bills at least in

[21] The Brown Report cites to a draft California Public Utilities Commission report in support of its characterization that net-metering customers have a median income 78% greater than the median California income. However, the final version of that report reflects that the median income of net metering customers in California is 68% greater than the median California household income. *See* Brown Report at 23, fn. 37, *citing* California Pub. Utils. Comm'n Energy Division, "California Net Energy Metering Ratepayer Impacts Evaluation," (Oct. 2013), *available at* https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=4292 (accessed June 15, 2020). Further, the Brown Report's characterization of the socially regressive impact of net metering is based upon a 2013 study (Brown Report at 23, fn. 37) and does not mention state regulatory actions to address the issue of cost shifts or low-income programs to encourage on-site solar.

[22] District of Columbia, Department of Energy and Environment, March 10, 2017, *Solar for All Implementation Plan*, https://doee.dc.gov/node/1226501 (accessed June 15, 2020). *See also* DC Department of Energy & Environment, *Solar for All*, https://doee.dc.gov/solarforall (accessed June 9, 2020).

half, if not more. By the end of 2019, about 5.3 MW of solar had been installed as part of multiple projects serving 9,000 low- and moderate-income customers. Urban Ingenuity, LLC, working collaboratively with the National Housing Trust, has already installed solar "on 24 affordable housing complexes across the district, with projected savings of $3.25 million over the next 15 years."[23] The Solar for All program "also includes a job training initiative, to prepare the city's low-income youth for careers in solar."[24]

27. In addition, the Petition may have an adverse impact on employment. There are now a quarter of million solar-related jobs in the United States. Of that, over 150,000 are related to installation. Importantly, the makeup of the solar installation work force is diverse, including 26% women, 7.7% African-American, 17.2 % Hispanic, and 8.5% Asian-American workers.[25]

28. This Petition, if approved, will reduce the progress toward electrification by creating regulatory chaos and establishing an incoherent regulatory system in which customer purchases are regulated by state regulators and injections into the grid are regulated by an overlapping regime of state and federal regulation. In addition, the Petition will adversely affect efforts to increase resilience. It does so by violating one of the principle tenets of making electric systems more resilient, which is to move generation closer to load. Both the Petition and the Brown Report have a clear preference for utility-scale solar distanced from load, rather than solar at the customers' premises.[26]

2. Technical Challenges

29. NERA's preferred outcome is technically infeasible to implement. NERA asserts that the output of net metered facilities is subject to FERC jurisdiction "whenever the output of such generators exceeds the customer's demand."[27] This is a real-time notion, and requires constant, real-time communication with the net-metered customer about changes in the applicable regulatory

[23] Kaufmann, K., "DC's Solar For All forges new pathways for solar in low-income communities" *PV Magazine* (June 3, 2020) ***available at*** https://pv-magazine-usa.com/2020/06/03/dcs-solar-for-all-forges-new-pathways-for-solar-in-low-income-communities/ (accessed June 9, 2020). *See also* Urban Ingenuity, *Solar Solutions*, https://urbaningenuity.com/solar-finance/ (accessed June 9, 2020).

[24] *Id*.

[25] Personal communication email from Shawn Rumery, Director of Research, SEIA, to Tom Stanton, NRRI, May 28, 2020.

[26] Petition at 40; Brown Report, at 20, 29, 30.

[27] Petition at 5.

scheme.[28] Failure to track and convey information to the net-metered customer about the instantaneous division in regulatory treatment of PV output would be economically inefficient and unjust, because customers would not have the information they need to make decisions about their own consumption relative to their production.

30. If communication did not occur in real-time, but over a longer period, such as a billing period, the meter would not be able to track the actual value of the power produced and consumed. Equity in pricing generator output is critical to the Commission's regime of just and reasonable market design in which the markets it regulates track production used as the basis for billing and payments on sub-hourly increments. No other generator has output that is only metered over a long billing period. As a consequence, the only way to implement NERA's preferred jurisdictional outcome in a just and reasonable manner is to do so based upon billing increments consistent with the organized wholesale markets that the Commission regulates.

31. Thus, the feasibility of the Petitioner's remedy is dependent on appropriate metering technology and accounting systems. Petitioner recognizes that metering plays a crucial role in the implementation of net metering.[29]

32. However, the metering equipment described in the Petition is not sufficient to implement its preferred outcome. The Petition states, "to the extent the customer does not already have appropriate metering, avoided cost pricing for FNM generation requires that the customer have a meter that is capable of measuring the net flow of energy between the customer and the utility on an hourly or shorter-term basis."[30] But in order to practically implement NERA's proposal, the meter will need to differentiate between power generated by net-metered facilities that is under FERC regulated prices and the power that is subject to the net metering practices of the state or

[28] The Brown Report misrepresents current capabilities to pass real-time prices on to all retail customers.: "in those parts of the country with organized markets, we now have transparent locational marginal cost pricing that provides real-time price data on energy prices and, in some places, deployment of time-sensitive retail pricing that would enable more efficient price signals for retail customers, including those deploying rooftop solar." Brown Report at 12. As the Commission well knows, the capability to pass on LMP price signals in all of the organized markets that it regulates, just does not exist.

[29] The Brown Report describes the metering technology and its effect on pricing the output of rooftop systems: "When rooftop solar systems were first connected to the grid in the 1980s and 1990s, most households had a single meter capable only of running forwards, backwards, and standing still. This characteristic left utilities and their ratemaking authorities with limited options for pricing the output of the rooftop systems." Brown Report at 7.

[30] Petition at 33.

utility. Each meter would need to reflect the appropriate pricing depending on which part of the customers' consumption and production it was reading. Neither the Petition nor the Brown Report explains whether the technology currently exists to implement a dual jurisdictional real-time pricing scheme.

33. These metering challenges are analogous to those faced by storage resources, which the Commission has acknowledged. In a Commission Order concerning PJM Interconnection's revisions to its Open Access Transmission Tariff in compliance with Order No. 841, the Commission noted that some utilities may be "unable—due to a lack of the necessary metering infrastructure and accounting practices—or unwilling to net out any energy purchases associated with an electric storage resource's wholesale charging activities from the host customer's retail bill, [and Order No. 841] found that [regional transmission organizations/independent system operators] would be prevented from charging that resource wholesale rates for the charging energy for which it is already paying retail rates."[31]

34. Moreover, neither the Petition nor the Brown Report acknowledges that approximately 2 million retail customers' meters would need to be replaced to support its proposed scheme. Neither document explains who would pay for those meters, or whether the associated costs would be recoverable in wholesale or retail rates. Finally, neither document describes whether meters capable of this complex metering are even available.[32]

IV. CONCLUSION

35. The Petition asks the Commission to institute the most significant change in the structure of regulation since its adoption of Order No. 888, but offers no cogent basis for that outcome, or any semblance of a plan for a transition to a new regulatory scheme. Adopting the proposal in the absence of a cogent basis or a plan will create uncertainty over existing contractual relations. The electric utility industry is progressing towards an environment of increasing electrification, which is based largely upon the "two-way" flow of energy. This Petition, if approved, will reduce the

[31] *PJM Interconnection, LLC,* Docket No. ER19-469-000, Order on Compliance Filing, Instituting Section 206 Proceeding, and Establishing Paper Hearing (Oct. 17, 2019).

[32] After the Petition was filed, President Trump issued "Executive Order on Securing the United States Bulk Power System Infrastructure & Technology," (May 1, 2020), which would impose new requirements that the FERC must consider with respect to the availability of adequate meters and the practical feasibility of Petitioner's proposed remedy. *See* https://www.whitehouse.gov/presidential-actions/executive-order-securing-united-states-bulk-power-system/ (accessed June 3, 2020).

progress toward electrification by creating regulatory chaos and establishing an incoherent regulatory system in which customer purchases are regulated by state commissions while energy banked by the distribution utility is regulated by an overlapping regime of state and federal regulation.

36. NERA's Petition and the Brown Report mischaracterize the net metering programs currently in existence, to imply that the problems they allege are both widespread and easily resolved. Neither is actually true. The Brown Report does not support the position taken in NERA's Petition that net metering service involves wholesale sales, and the "perverse effects" of net metering identified in the Brown Report do not support the exercise of federal ratemaking jurisdiction. Even if the Commission were to accept NERA's theory that excess energy produced by net metered facilities is entitled to a federally-regulated revenue stream, neither the Petition nor the Report demonstrates why states would be prevented from continuing to credit customers for that excess energy when calculating the quantity of retail service consumed. Finally if the Commission did find that such retail netting is preempted, it would significantly disrupt the expectations on which existing net metering customers relied in making substantial investments, and could cause ripple effects throughout the energy economy. For all these reasons, I conclude the Commission should not grant NERA's requested declaration.

37. This concludes my affidavit.

I declare under penalty of perjury that the foregoing is true and correct.

Carl Pechman

Carl Pechman, Ph.D.

15 June 2020

Date

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EDUCATION

Ph.D.	*Resource Economics*, Cornell University, Ithaca, New York
M.S.	*Applied Econometrics and Quantitative Analysis*, Cornell University
B.A.	*Biology*, Cornell University

PROFESSIONAL HISTORY

2018 -	**Director**, National Regulatory Research Institute, Washington, D.C.
2009 - 2018	**Economist/Supervisory Energy Industry Analyst**, Federal Energy Regulatory Commission, Office of Energy Policy and Innovation.
2013–2017	**Senior Electricity Advisor**, United States Department of Energy, Office of Energy Policy and System Analysis (on detail from the FERC – two stints), Washington, DC. (Q clearance).
1999-2009	**President and Founder**, Power Economics, Inc., Santa Cruz, Ca.
1997-99	**Director,** LECG, Emeryville, Ca.
1979-97	**Supervisor of Energy and Environmental Economics**, New York Public Service Commission, Albany, NY.

EXPERIENCE AND ACCOMPLISHMENTS

Industry transformation

- Analyst/co-author of U.S. Department of Energy Quadrennial Energy Review (QER) – 1.1: *Transforming U.S. Energy Infrastructures in a Time of Rapid Change* and 1.2: *Transforming the Nation's Electricity System.*
- Analysis and papers on the future of the distribution utility and utility business model, including new planning paradigms, empowering customers and utilities' role on the customers' side of the meter.
- Developed concept of "integrated electricity security planning" proposed in QER 1.2.
- Developed concept of a "Smart City Audit" adopted for implementation by the New Orleans City Council.
- Author: *Regulating Power: The Economics of Electricity in the Information Age*, Kluwer Academic Publishers. 1993 – which included the first published analysis on the importance of locational based generation reserve requirements; analysis of information structures as impediments to industry transformation and promoted strategies for harmonizing state and federal regulation.
- Led multi-party technical process that resulted in the blueprint for the development of the New York Independent System Operator.
- Author of white paper on the adoption of affiliate codes of conduct for the Edison Electric Institute.
- Advisor to the City of Santa Cruz School System for Purchase Power Agreements to develop 1.5MW of solar photovoltaics. Designed a contract provision that limits power payments to what the school system would have paid had it not developed solar.
- Developed competitive power acquisition strategy for New York City's own load requirements.

- Initiated and managed early development of "Grid Architecture."
- Advice and counsel to the Puerto Rico Energy Bureau on restructuring the Commonwealth's bankrupt municipal utility (PREPA) and development of a resilient and resilient electric system.

California/Western Energy Crisis

- Advisor to Speaker Hertzberg and Speaker pro tempore Keeley of the California State Assembly regarding efforts to resolve the California electricity crisis. Developed regulatory strategy that allowed Southern California Edison to avoid bankruptcy.
- Expert witness for the California Parties and various public and investor-owned utilities in the West, in proceedings before the Federal Energy Regulatory Commission (FERC) related to refunds of charges in real-time markets and modification of long-term contracts, as related to the California energy crisis.
- Analysis, review and testimony on evidence of Enron's violation of its market-based rate authority, financial fraud, and power market manipulation, including supervision of review and testimony that made the Enron trader tapes public.
- Analysis and testimony providing evidence of market power abuse during the California Energy Crisis
- Author of white paper for the Public Policy Institute of California on the state's restructuring of utility regulation and resource acquisition in response to the "Energy Crisis."

Market Structures/Rates

- Developed method through negotiated and litigated proceedings, and supervised modeling of "Avoided Costs" pursuant to Public Utilities Regulatory Policies Act of 1978 (PURPA) in New York.
- Created "cost effectiveness test" for demand response, relied on by the Supreme Court in affirming FERC Order 745 in FERC v. EPSA.
- Design of market mechanisms for demand response, frequency regulation and renewable integration.
- Design of capacity markets for resource adequacy in New York, New England and California.
- Preparation of cost studies, rate design, incentive rate mechanisms.
- Testimony and analysis on unbundling utility rates.
- Expert witness on inter-relation of market design and market manipulation.
- Empirical analysis and oversight of projects to calculate the Value of Loss Load.
- Design of market mechanisms for maintaining resource adequacy in organized markets.

Grid modernization

- Initiated, managed development and promoted new paradigm of Grid Architecture.
- Member US DOE Grid Tech Team charting strategic direction of grid modernization,
- Evaluation of changing role of customers on grid and distribution design and operation.
- Analysis of reliability concepts for both operation and maintenance of resource adequacy.
- Policy development of interoperability and small generator interconnection standards.
- Developed concept of "Integrated Electric Security Planning," to coordinate planning between different jurisdictions responsible for cyber-security standards and protection.

Environmental Analysis

- Principal NYPSC staff witness on economics of the "need" for energy-related facilities, including coal-fired power plants, electric transmission lines and natural gas pipelines, as well as the re-conversion of coal capable oil-fired generating units to coal in order to reduce oil imports.
- Economics of multi-use resources, such as balancing interests of lake level regulation.
- Responsible for determination of "significance" of regulatory actions pursuant to the New York State Environmental Quality Review Act.
- Analysis of utility compliance of the Clean Air Act Amendments of 1990.
- GHG reduction strategies and their impact on organized electricity markets.

- Analysis of the social cost of carbon and implications for the future of existing nuclear reactors.
- Oversight of project to calculate the environmental costs of electricity.
- Member, President's Pollinator Health Task Force

Modeling

- Managed implementation and use of production cost modeling at the New York Public Service Commission for evaluating energy efficiency programs, capacity additions and price forecasts.
- Developed early financial models for evaluating nuclear finance and rate recovery.
- Led task force investigating alternative modeling methods for calculating the cost of transmission wheeling.
- Project manager for development of the CCMU – an annually recursive policy scenario analysis policy model that integrated power system operations, utility accounting and costs of meeting environmental objectives.
- Modeling for and review of Integrated Resource Plans and generation expansion proposals and scenarios.
- Review of California Energy Commission load forecasting methods.

Training/Education

- On-site training programs for Public Utility Commissions
- Development of the Regulatory Training Initiative = a remote training platform on regulation that will be open to regulators, legislators and stakeholders.
- Various courses taught at Cornell University, Adjunct, University of California at Santa Cruz, Skidmore College and Rensselaer Polytechnic Institute.

Study Groups

- Participant, Aspen Energy Roundtable.
- Agency Representative, New York State Energy Master Plan working group.
- Agency Representative, New York State Governor's Office of Regulatory Reform. Task force on development of a cost-benefit handbook.
- Member, Keystone Dialog on Environmental Externalities.
- Member. Part of a project team sent by the United States Environmental Protection Agency to work with Mosenergo (the Moscow electric utility), and other academics and government officials on developing a strategy for transformation to a market economy.

Stakeholder Relations

- Consultant to a diverse group of industry stakeholders including: utilities, Independent System Operators, state and federal regulatory agencies, municipalities, attorneys general, environmental groups, and representatives of low-income, commercial building owners and industrial customers.
- Managed modeling efforts based upon stakeholder input.
- Mediated numerous multi-party negotiations.

International

- Member of USEPA team that worked with Mosenergo (the Moscow electric utility) in preparation for the transition from a planned to a market economy.
- Numerous outreach meetings with international contingents.

BOOKS

Regulating Power: The Economics of Electricity in the Information Age. Kluwer Academic Publishers, 1993.

SELECT PUBLICATIONS AND REPORTS

"Determining the Scope of the Electric Distribution Utility of the Future," Paper published as part of the Smart Electric Power Alliance 51st State Initiative, 2017. https://sepapower.org/resource/51st-state-ideas-determining-scope-electric-distribution-utility-future/.

"Modernizing the Electric Distribution Utility to Support the Clean Energy Economy." U.S. Department of Energy White Paper. 2016 https://www.energy.gov/epsa/downloads/modernizing-electric-distribution-utility-support-clean-energy-economy.

"Investing in Solar Photovoltaics: A School District's Story." Electricity Journal, with Peter Brown. 2008.

"California's Electricity Market: A Post-Crisis Progress Report." California Economic Policy California Economic Policy, Public Policy Institute of California. 2007. http://www.ppic.org/main/publication.asp?i=731

"A Review of the Economic Analysis of the Demand Curve Proposal." Prepared for Multiple Interveners, presented to the New York Independent System Operator. 2003

"Designing an Alternative Form of Regulation for Wyoming." Private report prepared for PacifiCorp. 2003.

"The California Electricity Crisis: A Report to the Building Owners and Managers Association (BOMA) of California." With Miles Bidwell, prepared for Building Owners and Managers Association of California. 2001.

"A Demand Response Will Lower Peak Prices." With Miles Bidwell, prepared for Multiple Interveners for submission to the New York Independent System Operator.

"Retail Competition in New York: A Status Report." Prepared for Utility.com. 2000.

"Developing Codes of Conduct: An Analysis of Parties and Positions." With Robert G. Harris, Edison Electric Institute. 1999.

"Cost-Benefit Handbook: A Guide for New York State's Agencies." Co-author. 1997.

"Exporting Integrated Resource Planning to Less-Developed and Post-Communist Countries." With Marc Ledbetter, David Wolcott and Mark Cherniack, Proceedings ACEEE Study on Energy Efficiency in Buildings, Integrated Resource Planning Volume. 1992.

"Determining the Value of Electricity from Waste-to-Energy Facilities: A Comparison of Pricing Based Upon Avoided Costs and Bidding." Proceedings: Fifth Annual Conference on Solid Waste Management and Materials Policy, 1989.

"The Regulator as Mediator/Negotiator." Proceedings: National Association of Regulatory Utility Commissioners (NARUC) Sixth Biennial Regulatory Information Conference. 1988.

"Equity, Efficiency, and Sulfur Emission Reductions." Public Utility Fortnightly, (paper originally presented at the 1984 Air Pollution Control Association Annual Meeting, San Francisco, California). 1985.

"The Role of Public Utility Commissions in Evaluating Sulfur Emission Reduction Strategies." With William Deehan, Proceedings: NARUC Fourth Biennial Regulatory Information Conference, 1984.

"REVREQCON: A Model for Evaluating the Revenue Requirement of Coal Conversion Expenditures." With Charles Dickson, Electric Ratemaking, vol. 1, no. 3. 1982.

"Converting Oil Fired Generating Units to Coal in New York State." With Jack Lebowitz, Northeastern Environmental Science, vol. 1, no. 2. 1982.

SELECT PRESENTATIONS

"The Smart City Audit as a Building Block for Developing Smart Cities," City Council of New Orleans Smart and Sustainable Cities Committee, December 2018.

"Administration Activities to subsidize coal and nuclear," NARUC Electricity Committee. 2018.

"Overview of the History and Practice of Electric Regulation," Blue Ribbon Task Force *Strategizing an Electric Energy Policy and Regulatory Framework in Puerto Ric,* 2018.

"QER: Status Report," Presented to EPRI Power Delivery & Utilization Sector Council. 2015.

"The Agile Utility: Aligning Consumer Demand with Distributed Generation," Georgia Tech Enterprise Innovation Institute. 2014.

"Realizing the Value of Transactive Energy," Plenary Speaker, 2014 Transactive Energy Conference. 2014.

"A New Paradigm for Electricity Distribution: The Forces for Change" presented at Joint EPRI and EEI workshop "Role of the Electric Distribution System in an Integrated Grid." 2014.

"FERC innovations in market design and the future of solar." Plenary talk at SolarTech 2012 4th Annual Solar Leadership Summit. San Jose, Ca. 2012.

"Transformational Changes and Resource Planning – looking "back to the future" – or forward to "where no one has gone before?" Keynote address - EUCI, Integrated Resource Planning Conference. 2010.

"Enron in the West" Presented at the 21st Annual Western Conference of the Advanced Workshop in Regulation and Public Utility Economics, sponsored by Rutgers University, 2008.

"Market Structure and Design Issues Affecting California Electric Sector" Power Association of Northern California. April, 2008.

"Lessons on Deregulation: the US Experience" Allahabad University Department of Economics seminar. February, 2008.

Wrap-up speaker at "Forming Expectations: the Emerging Capacity Markets of the Northeast and Mid-Atlantic" sponsored by the Northeast Energy and Commerce Association. 2007.

"Territoriality of Electricity" Presented at the American Association of Geographers, Annual Meeting, San Francisco, Ca. Association of American Geographers. 2007.

”The Policy Response to the California Energy Crisis – Is it Adequate?” Presented at the 19th Annual Western Conference of the Advanced Workshop in Regulation and Public Utility Economics, sponsored by Rutgers University, Graduate School of Management Center for Research in Regulated. 2006.

“Regulatory Implications of the California Energy Crisis.” Invited Presentation to the Public Policy Institute of California. 2005.

“Is FERC’s Plan for National Electric Transmission Grid Equitable? Should State Regulatory Oversight be Strengthened?” Presented at National Black Caucus of State Regulators. 2003.

“Managing Regulatory Risk.” Presented at EUCI Enterprise-Wide Risk Management Conference. 2002.

"The Regulatory Treatment of Power Costs and Customer Vulnerability to Market Power." Presented at the 15th Annual Western Conference of the Advanced Workshop in Regulation and Public Utility Economics, sponsored by Rutgers University, Graduate School of Management Center for Research in Regulated Industries. 2002.

“The Energy Crisis & Commercial Real Estate: Winning Lower Prices and Increased Reliability.” Building Owners and Managers Association's National Advisory Council Spring Conference. 2001.

“The Changing Role of Regulation in Competitive Electric Markets.” Presented at the Independent Power Producers of New York, 13th Annual Spring Legislative Conference. Albany, New York. 1999.

“Retail Competition in New York’s Electric Power Market.” Presented at Competitive Power Sourcing for Industrial Customers, sponsored by InfoCast. Chicago, Illinois. 1995.

“Environmental Implications of Electric Market Transformation.” Presented at New York State Network for Economic Research, Research-in-Progress Conference. 1994.

“State Regulatory Perspectives on Emissions Trading.” Presented at SO2 Emissions Trading in the Electric Utility Sector, sponsored by, The Wharton School and Philadelphia Electric Company. 1993.

“The Evolution of Integrated Resource Planning: Incorporating Environmental Externalities.” Invited paper presented at the Third USSR/US Bilateral Conference on the Use of Economic Instruments in Environmental Protection. Moscow, USSR. 1991.

“The Economics of Environmental Dispatch.” Presented at the conference DSM and the Global Environment, sponsored by the US Environmental Protection Agency, The Edison Electric Institute, and the New York State Energy Research and Development Authority. 1991.

“Model Access and Administratively Determined Prices.” Presented at the Eighth Annual Conference of the Rutgers University Advanced Workshop in Regulation and Public Utility Economics. 1989.

“Information Cartelization and the Control of Regulation.” Presented at the Allied Social Science Association Annual Meeting. 1988.

“Electric Capacity Planning in New York: Model Limited Choice and Inefficient Investment in Reliability.” Presented at the Sixth Annual Conference, Rutgers University Advanced Workshop in Regulation and Public Utility Economics. 1987.

"Using Production Costing Models to Estimate PURPA Buyback Rates: The New York Experience." National Association of Regulatory Utility Commissioners (NARUC) Fifth Biennial Regulatory Information Conference. 1986.

"Estimating Long Run Avoided Costs for New York State Electric Utilities." Fourth Annual Conference, Rutgers University Advanced Workshop in Public Utility Economics and Regulation. 1985.

"The Future of Energy Imports to the Northeastern United States." Presented at the Corpus Energy Group – Energy Pricing Conference. Toronto, Canada. 1983.

"An Estimate of the Capacity Cost of the Shoreham Nuclear Power Plant." Presented at the American Association for the Advancement of Science Annual Meeting. Detroit, Michigan. 1983.

TESTIMONY

Extensive testimony in federal court, bankruptcy court, state courts and before the FERC and various state PUCs on a wide variety of electricity issues including, market design, electric ratemaking (both determination of revenue requirements, cost studies and rate design), resource adequacy, prudence of utility power acquisition, the western electricity crisis, determination of avoided costs, power contracts and damages, investor confidence and finance and siting (generation, transmission and gas pipelines).

TESTIMONY AS INDEPENDENT EXPERT

Western energy crisis

Critique of Federal Energy Regulatory Commission market mitigation proposal

Affidavit prepared for the California Assembly before the Federal Energy Regulatory Commission (Dockets No. EL00-95-012, No. EL00-98-000, No. RT01-85-000, No. EL01-68-000) (2001).

Analysis of and remedies for Enron gaming behavior

Testimony presented on behalf of the Snohomish County Public Utilities District before the Federal Energy Regulatory Commission in Enron Power Marketing, Inc. and Enron Energy Services, Inc. (Docket No. EL03-180-000 et al.) (2004, 2005).

Demonstrations of market power abuse

Testimony on behalf of the City of Tacoma and the Port of Seattle before the Federal Energy Regulatory Commission in Puget Sound Energy, Inc., et al., v. All Jurisdictional Sellers of Energy and/or Capacity at Wholesale Into Electric Energy and/or Capacity Markets in the Pacific Northwest, Including Parties to the Western Systems Power Pool Agreement (Docket No. EL01-10-005) (2002).

Testimony presented on behalf of the California Parties before the Federal Energy Regulatory Commission in Puget Sound Energy, Inc. Complainant, v. All Jurisdictional Sellers of Energy and/or Capacity at Wholesale into Electric Energy and/or Capacity Markets in the Pacific Northwest, Including Parties to the Western Systems Power Pool Agreement (Docket Nos. EL01-10-000, EL01-10-001) (2001).

Method for calculating Mitigated Market Clearing Prices (MMCPs)

Testimony presented on behalf of the California Parties before the Federal Energy Regulatory Commission in San Diego Gas & Electric Company, Complainant, v. Sellers of Energy and Ancillary Services into

Markets Operated by the California Independent System Operator Corporation and the California Power Exchange (Dockets EL00-95-045, EL00-98-042) (2002).

Effect of contract modification on investor confidence

Testimony presented on behalf of PacifiCorp before the Federal Regulatory Commission in PacifiCorp v. Reliant Energy Services, Inc., Morgan Stanley Capital Group, Inc., Williams Energy Marketing & Trading Company, El Paso Merchant Energy, L.P. (Docket Nos. EL02-80-000, EL02-81-000, EL02-82-000, EL02-83-000). (2003).

Interpretation and calculation of benchmark prices for long-term power contracts

Testimony presented on behalf of the California Public Utilities Commission and Electricity Oversight Board before the Federal Energy Regulatory Commission in Public Utilities Commission of The State of California v. Sellers of Long Term Contracts to the California Department of Water Resources and California Electricity Oversight Board, v. Sellers Of Energy And Capacity Under Long-Term Contracts With the California Department of Water Resources (Docket No. EL02-60-003 and Docket No. EL02-62-003) (2003).

Appropriate natural gas price to use for calculating power refunds

Declaration presented on behalf of the California Parties before the Federal Energy Regulatory Commission (Dockets EL00-95-004, EL00-95-005, EL00-95-019, EL00-95-031, EL00-98-004, EL00-98-005, EL00-98-018, EL00-98-030, EL01-10-000, EL01-10-001) (2001).

Damages associated with Enron's market manipulation and fraud

Affidavit presented on behalf of Snohomish County Public Utility District in Enron Corporation (Case No. 01-16034) before the United States Bankruptcy Court, Southern District of New York (2006).

Expert report on behalf of Snohomish County Public Utility District in Public Utility District No. 1 of Snohomish County, Washington v. Citigroup, Inc., et al., before the United States District Court, Southern District of Texas (2006).

Generation siting

Testimony on behalf of the Owners Committee on Electric Rates (OCER) before the New York State Board on Electric Generation Siting and the Environment - Application of TransGas Energy Systems LLC, for a Certificate of Environmental Compatibility and Public Need to Construct and Operate a 1,100 Megawatt Combined Cycle Cogeneration Facility in the Borough of Brooklyn, New York. (Case 01-F-1276) (2003).

Hydro-electric asset divestiture

Testimony on behalf of Humboldt County, California, before the California Public Utilities Commission -- Application of Pacific Gas and Electric Company to Market Value Hydroelectric Generating Plants and Related Assets Pursuant to Public Utilities Code Sections 367(b) and 851 (1999).

Market design

Testimony on behalf of the Connecticut Department of Public Utility Control, the Connecticut Office of Consumer Counsel, Richard Blumenthal, Attorney General the State of Connecticut and Southwestern Area Commerce and Industry Association of Connecticut, before the Federal Energy Regulatory Commission in the matter of Devon Power, LLC, et al. (Docket No. ER03-563-030) (2005).

Affidavit on behalf of the City of New York before the Federal Energy Regulatory Commission in the matter of New York Independent System Operator, Inc. (Docket No. ER03-647) (2003).

Determination of planning (installed) reserve margins

Affidavit on behalf of the Connecticut Office of Consumer Counsel; Richard Blumenthal, Connecticut Attorney General; the Vermont Department of Public Service; the Vermont Public Service Board; the Rhode Island Public Utilities Commission; the New Hampshire Public Utilities Commission, and the Connecticut Light and Power Company by its agent Northeast Utilities Service Company before the Federal Energy Regulatory Commission in the matter of ISO New England Inc. (Docket No. ER-5-715, 2005/2006 Power Year Installed Capacity Requirements) (Objective Capability Values) (2005).

Prudence of utility power acquisition

Testimony presented on behalf of the Nevada Attorney General's Bureau of Consumer Protection in the matter of the Application of Nevada Power pursuant to A.B. 369 as enacted by the 2001 Nevada Legislature for authority to establish a Deferred Energy Accounting Adjustment (DEAA) rate to clear purchased fuel and power costs of $922 million accumulated between March 1, 2001 through September 30, 2001 from its deferred energy account balance over three years, to recalculate its Base Tariff Energy Rate (BTER) to reflect anticipated ongoing purchased fuel and purchased power costs, and for other relief properly related thereto (2003).

Testimony presented on behalf of the Nevada Attorney General's Bureau of Consumer Protection in re Application of Sierra Pacific Power Corporation for authority to establish a Deferred Energy Accounting Adjustment (DEAA) rate to clear purchased fuel and power costs of $205 million accumulated between March 1, 2001 through November 30, 2001 from its deferred energy account balance to recalculate its Base Tariff Energy Rate to reflect anticipated ongoing purchased fuel and power costs, and for other relief properly related thereto (2003).

Cost analysis and rate design

Testimony on behalf of the Owners Committee on Electric Rates (OCER) before the New York Public Service Commission Case # 00-E-1208 - Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc.) For Electric Service (Case 04-E-0572) (2004).

Testimony on behalf of the Owners Committee on Electric Rates (OCER) before the New York Public Service Commission Case # 00-E-1208 - Proceeding on Motion of the Commission in the Matter of Consolidated Edison Company of New York, Inc.'s Plans for Electric Rate Restructuring with Respect to Service Provided in Westchester County (2000).

Testimony on behalf of the Owners Committee on Electric Rates (OCER) before the New York Public Service Commission Case 99-S-1621 - Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Steam Service (1999).

Testimony on behalf of Public Service Company of New Mexico before the New Mexico Public Utility Commission, in the matter of the application of and complaint by Residential Electric, Incorporated, vs. Public Service Company of New Mexico (Case No. 2867) and in the matter of the application of Residential Electric, Inc. for a Certificate of Public Convenience and Necessity (Case No. 2868) (1998).

Power contracts and damages

Testimony presented on behalf of North Star Steel Company before the United States Court of Claims – North Star Steel Company, v. the United States (No. 00 238C) (2005).

Testimony presented on behalf of Hydrocarbon Generation, Inc., before the Superior Court of the State of New York, Cattaraugus County in the matter of Hydrocarbon Generation, Inc., and Allegany Limited Partnership v. Niagara Mohawk Power Corporation (2001).

Testimony presented on behalf of the Norcon Power Partners before the United States District Court for the Southern District in the matter of Norcon Power Partners v. Niagara Mohawk Power Corporation (1999).

Testimony on behalf of Imperial Irrigation District before the Superior Court of the State of California, County of San Bernardino, in the matter of Coachella Valley Water District v. Imperial Irrigation District (1999).

Commercial contract litigation

Testimony (jury) presented on behalf of Corbin, Inc., before the Superior Court of the State of California in the County of Monterey. Doyle and Schmidt v. Corbin (2000).

TESTIMONY AS STAFF OF THE NEW YORK PUBLIC SERVICE COMMISSION

Power plant and transmission (electric and gas) siting

Case 80010 - Application of Halfmoon Cogeneration Project for a Certificate of Environmental Compatibility and Public Need pursuant to Article VIII of the Public Service Law.

Case 88-T-132 - Empire State Pipeline (May 1989).

Case 70126 - Power Authority of the State of New York - Marcy-South 345 KV Transmission Facility (August 1983).

Energy security: conversion of oil-fired generating units to coal

New York State Energy Master Plan and Long Range Electric & Gas Report.

Case 29083 - Central Hudson Gas & Electric Corporation - Danskammer Coal Conversion (August 1985).

Central Hudson Gas & Electric Corporation - Application No. UPA 2083-0544 - Danskammer Coal Conversion (August 1984).

Long Island Lighting Company - UPA #10-82-0350 - Port Jefferson Coal Conversion.

Consolidated Edison Company of NY, Inc. - UPA #20-81-0002 - Ravenswood Coal Conversion; UPA #20-81-0009 - Arthur Kill Coal Conversion.

Determination of Avoided Costs: used as basis for paying renewable generation and qualifying facilities under the Public Utilities Regulatory Policies Act of 1978

Case 92-E-0508 - Methods for Calculation and Payment of Avoided Generation (May and June 1993).

Case 29670 - Niagara Mohawk Power Corporation (April 1988).

Cases 29674-5-6 - Rochester Gas & Electric (December 1987).

Cases 29541-42 - New York State Electric & Gas Corporation (July 1987).

Case 29484 - Long Island Lighting Company (May 1987).

Case 29433 - Central Hudson Gas & Electric Corporation (January 1987).

Case 29426 - Rochester Gas & Electric Corporation (December 1986).

Case 29327 - Niagara Mohawk Power Corporation (August and September 1986).

Case 29195 - Central Hudson Gas & Electric Corporation (January 1986).

Cases 29069-70 - Niagara Mohawk Power Corporation (August 1985).

Case 29029 - Long Island Lighting Company (August 1985).

Electric ratemaking: utility regulation, cost of service studies, incentive regulation, prudence evaluations

Case 96-E-0891 - New York State Electric & Gas Corporation's Plans for Electric Rate/Restructuring Pursuant to Op. No. 96-12 (March and May 1997).

Cases 93-E-1075, 93-E-0912 - Generic FAC/Buyback Rates and Long-Run Avoided Costs (June 1995).

Case 94-E-0334 - Consolidated Edison Company of NY, Inc. (September 1994).

Cases 94-E-0098, 94-E-0099, 94-G-0100 - Niagara Mohawk Power Corporation (August 1994).

Cases 88-E-081 & 92-E-0814 - Petitions for Approval of Curtailment Petitions (March 1993).

Case 91-E-0462 - Consolidated Edison Company of New York, Inc. (Great whale) (September 1991).

Case 90-E-1185 - Long Island Lighting Company (May 1991).

Cases 29189-91 - Rochester Gas & Electric Corporation (December 1985).

Case 28824 - New York State Electric & Gas Corporation (September 1984).

Case 28798 - Niagara Mohawk Power Corporation (August 1984).

Case 28525 - Niagara Mohawk Power Corporation (August 1983).

Case 28211 - Consolidated Edison Company of NY, Inc. (August 1982).

Case 27741 - Fuel Adjustment Clause (July 1982).

Case 28252 - Shoreham Ratemaking Principles.

Water rates: methods of reflecting salt water intrusion and VOC contamination in rates

Case 89-W-062 - Jamaica Water Supply Company (August 1989)

Case 29268 - Jamaica Water Supply (September 1986)

SERVICE

2006-2007	Volunteer, Advisor and negotiator for the City of Santa Cruz School System for contracting and acquisition of solar photovoltaics
2001-2004	Sponsor, Journal of Regulatory Economics.
2001	Assistant Den Leader, Cub Scouts.
2001-2005	Team Sponsor, Santa Cruz Youth Soccer.
1999-2001	Board Member, Chair of Finance Committee, Temple Beth El, Santa Cruz, California.
1992-1995	Board Member, Temple Berith Shalom, Troy, New York.
1988-2005	Member, Organizing Committee, Center for Research on Regulated Industries, Rutgers University.
1969-71	Secretary, Rockville Center Environmental Committee, Committee reporting to Village Council. Developed one of the first post WWII municipal recycling programs in Metropolitan New York.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

New England Ratepayers Association	)))	No. EL20-42

AFFIDAVIT OF SAM WHEELER, IN SUPPORT OF THE PROTEST OF THE NATIONAL ASSOCIATION OF REGULATORY UTILITY COMMISSIONERS

I, Sam Wheeler, declare:

1. I am Sam Wheeler. I am an electrical engineer and an energy consultant with extensive experience in commercial, industrial, and utility electric power.

2. I have been an independent energy consultant since 2003. I have worked in nearly every utility, industrial, and commercial setting, on projects on the utility and customer side of the meter. As a consultant, I have completed power system equipment, technology, and methodology evaluations for the U.S. Department of Energy, the National Renewable Energy Laboratory, the World Bank, Xcel Energy, WEL Energy (New Zealand) and United Energy (Australia). I have designed and reviewed the grid-interconnection portions of energy projects in Illinois, New Jersey, Hawaii, Puerto Rico, El Salvador, and China. My work has supported engineering design, specifications, power system protection, code reviews, technical and safety training related to the interconnection of renewable energy facilities with the grid in Hawaii, Wisconsin, and Texas. Prior to 2003, I worked as an engineer for several investor-owned and municipal utilities in Colorado.

3. I earned a B.S. in Electrical Engineering from the University of Colorado in 1980. I obtained the Association of Energy Engineers designation of Certified Power Quality Engineer in 1999. My curriculum vitae is attached as Attachment 1.

I. PURPOSE OF AFFIDAVIT, SUMMARY OF CONCLUSIONS, AND RECOMMENDATIONS

4. I have been asked by counsel for the National Association of Regulatory Utility Commissioners ("NARUC") to explain how distributed energy resources ("DER") owned or operated by retail customers participating in net metering programs actually interact with the local

distribution system and under what conditions, if at all, the output of that DER flows onto the interstate transmission system.

5. The Petition for a declaratory order filed by the New England Ratepayers Association ("NERA") addresses those issues only in generalities and with little if any recognition of how the grid is designed and operated. NERA assumes that the output of net-metered DER flows in interstate commerce – that any outflow moves across state lines or at least flows onto the interstate transmission system. However, as I explain, that is not typically the case and, for most net metered installations, will likely never be the case. Net metering programs vary across the states, and many different types of customers participate. But, only rarely, under unusual circumstances or atypical conditions, will energy generated by DER participating in net metering programs flow onto the transmission system. The output will not in general exceed the energy required to serve the load of the participating customer, the load of other customers on the same local distribution feeder, and other load supplied by the same local distribution substation or intermediate voltage local distribution facilities. Further, most net metering programs, the tariffs that implement them, and the design and operation of the distribution interconnections and networks make it difficult or impossible for the outflow from net-metered DER to reach the bulk power system.

II. DISCUSSION

6. As a general rule, the design of the distribution system makes it difficult for energy produced by DER participating in net metering programs to reach the transmission system. Most such DER is installed behind retail customers' meters and interconnected with distribution feeders. Distribution networks are designed so that outflow from net-metered DER will not normally reach the bulk power system. For energy produced by such DER to reach the transmission system, the output would have to exceed not only the customer's own load (which is all NERA appears to assume is required), but also exceed the other load being served by the feeder to which the DER is connected, as well as the loads being served by other feeders supplied by the same local distribution substation. Electricity follows physical and scientific laws, and outflow from a DER to its distribution feeder will flow to points of usage along the distribution feeder at customer taps; it will only flow to the nearest distribution substation in the event of oversupply from DER. Normally, any such oversupply is detected and restricted by the utility's relaying system. In cases

where the utility distribution substation accepts additional supply from a DER, the normal path would be out to any of the many other distribution feeders connected with the distribution substation, not further upstream to the facilities that supplies the substation, as long as the feeders and substation have net load.

7. For purposes of explanation, let us examine the case of a single residential customer who installs net metered DER. The customer is interconnected with the local distribution utility and is served by a feeder. That feeder is supplied by a distribution substation, which is interconnected to a network of other distribution substations and feeders serving other customers. Some of these distribution facilities are connected to higher-voltage facilities, which run further "upstream" to eventually connect with a transmission-distribution substation, and the bulk power system.

8. Assume that this particular customer's net metered DER produces more power than the customer is simultaneously consuming for several hours during the afternoon. The excess power will flow through the customer's meter, and onto the distribution feeder that serves the customer. But, distribution feeders typically serve entire neighborhoods as single-phase loads – it would be highly unusual for a feeder to serve just a single customer. When the net-metered customer's DER is producing more power than the customer is consuming, other individual customers on that same feeder will use that excess power. The excess power from the net-metered DER will flow first to the other customers on the local feeder. For the excess power from the net-metered DER to flow beyond that neighborhood feeder, there would need to be a sufficient quantity of power injected to offset the simultaneous consumption of all other customers on the feeder.

9. Typically, local distribution feeders are supplied by other distribution substations and, sometimes, by higher voltage distribution or sub-transmission substations that also supply other feeders but do not feed onto the transmission system. Distribution substations normally connect with many distribution feeders routed to customer loads. It is unlikely that a feeder is supplied directly from the transmission system. If any of the excess energy produced by the net-metered customer's DER did ultimately flow "upstream" past the feeder serving that individual customer, it would then flow "downstream" along other feeders serving other end-use customers. Excess power generated by the net-metered customer's DER would flow further "upstream"

beyond the local distribution substation only if it more than offset all of the consumption of all of the other customers interconnected to that distribution substation. Again, this is unusual not only because of the topology of the grid, but also because the utility and DER relaying and metering systems are intentionally designed to limit DER output to avoid or limit over-production based on the distribution system's needs. Finally, the industry is increasingly considering DER as a potential solution for issues of "transmission constraint," meaning where the transmission grid is inadequate to supply the needs of the customer base at a particular location. One solution is to add DER inside the local distribution system, using the output to displace or defer transmission need by displacing the power that would otherwise have been routed through the transmission system. In these situations, the intent is to prevent DER output from ever reaching the transmission grid.

10. The underlying engineering concepts discussed above in the context of a single customer are applicable to every distribution system. Even if multiple net-metered customers are interconnected to the same feeder, all of their facilities are producing excess energy at the same time, and that cumulative excess energy more than offsets all of the load of other, non-net-metered customers on the same feeder, the cumulative excess would flow first to neighboring distribution feeders.

11. In addition to the inherent implausibility of the assumption that outflows from net-metered DER reach the transmission system, the design of net metering programs, of the implementing tariffs and regulations, and of interconnections, relay protection schemes, and advanced inverter control devices and Smart Metering make it even less likely. Partly as one of the important outcomes of the extensive effort by this Commission and interested parties invested in designing and implementing the FERC Small Generator Interconnection Procedures ("SGIP"), but also as a result of state-jurisdictional rules and operator standards, interconnection procedures all over the country for net-metered systems include steps intended to make sure that unintended backflow is not likely to happen. This further attenuates the potential for the energy produced by small DER at any particular point on the grid to flow onto the bulk power system. In addition, net metering programs typically include limits on the size of individual net metered facilities and/or aggregated limits, and those limits are often set at levels that ensure that the primary purpose of the generation is to offset the individual customer's load, not to produce excess energy in a quantity

that is likely to offset the load of every other customer served by that feeder, let alone upstream distribution facilities.

12. Most, if not all, net metering programs include an interconnection application or review process. Distribution utilities are obligated to evaluate these applications, almost always under the requirements of the IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems, which was initially approved by the IEEE Standards Board in June 2003 and most recently amended in 2018,[1] and is being amended and updated on an ongoing basis. That standard calls on the utility to determine whether the addition of the individual net metered facility could potentially cause power to flow "upstream" through the transformer. If so, the utility is obligated to notify the entity responsible for the facilities on the high-side of the transformer (either the transmission department of a vertically-integrated utility, or the independent transmission owner). Utilities can and do also take affirmative operational steps to limit the potential for backflow of energy from the local distribution system to the bulk power system. These steps may include voltage supervised reclosing on the distribution feeder, or modifications of other relays on the transformer. In more and more cases, smart metering and advanced inverters are being used to accomplish load and load flow control on distribution feeders. Note that, if the backflow were to ever affect any transmission system components, the transmission owners and operators would be notified and have their own opportunities to model, address, and mitigate those possibilities.

13. For all these reasons, I conclude that while excess power could theoretically flow onto the transmission system from a DER, it is not a usual or desired effect, and the overall grid would automatically countermand such an occurrence to maintain grid reliability and performance. As a result, it is highly unlikely that excess power generated by a net metered DER can or will travel "upstream" far enough to enter the bulk power system. For the same reasons, it is not accurate to claim that a general characteristic of net metering programs is that power generated by participating DER flows onto the transmission system.

14. I note three other important implications of the facts I have explained. First, since energy from net metered DER does not generally flow onto bulk power facilities, the transmission

[1] On February 12, 2020, the Board of Directors of NARUC unanimously approved a resolution recommending that state commissions nationwide review and adopt the newly revised IEEE 1547-2018 distributed energy resource interconnection standard.

system will physically "see" net metered DER as local load reduction regardless of how it is billed. Just as the output of a particular customer's DER results in a reduction in the retail load of that customer, when the output of the DER connected to a feeder or other distribution system element does not exceed its total connected load, the result will be a reduction in the flow from the transmission system to supply those distribution facilities. Put another way, flows on the interstate transmission system will be the same when it supplies (i) a feeder with 10 MW of load and 500 kW injection from net metered DER, or (ii) when it supplies a feeder with a 9.5MW of load and no DER.

15. Second, because outflows onto the transmission system from DER participating in net metering programs occur only in atypical circumstances, and because program rules and grid operating practices also in general discourage those flows, net metering customers cannot in general expect that the output of their DER will reach the transmission system.

16. Third, and somewhat obviously, most DER output is intermittent and only available on a limited basis relative to the overall generation supplying the grid. For example, wind power is only available during windy days and solar power is only available during certain hours of the day when cloud cover or other obstructions are minimal. Thus, the amount of power actually released onto the distribution system is a fraction of the actual nameplate rating of any given DER. Utilities can and do react to this. For example, during the morning hours in non-winter months solar can add to the load flow during a peak use time when customers and businesses are starting up for the day. Solar can continue to contribute during the day, and utilities reduce baseload power accordingly to reduce their fuel and operations costs during this time. During most of the year, a second peak in the residential sector occurs when customers come home prepare dinner. This is counteracted by commercial and industrial facilities shutting down for the day, all of which is understood and accounted for by utilites' long experience at performing load flow adjustments, based on well understood usage patterns by their customer bases. Utility power flow is a dynamic procedure that is constantly occurring around the clock, and as DERs are added and removed from the overall load profile, utilities must compensate actively. This process tends too reduce baseload power generation during times when DERs are the most active, reducing the likelihood of DER generation being exported to the transmission grid, confirming that Solar-based DER in particular is essentially used up by local utility customer need.

III. CONCLUSION

17. NERA's Petition assumes energy produced by net metered DER in excess of the host customer's load, in general and across the nation, is sold in interstate commerce. To the extent that this conclusion rests on the premise that such flows generally or routinely reach the interstate transmission system, that assumption is unsupported and incorrect.

18. This concludes my affidavit.

I declare under penalty of perjury that the foregoing is true and correct.

Sam Wheeler

6/13/20
Date

Sam Wheeler
Electrical Engineer, Energy Consultant
Relevant Experience

13496 Vine Street
Thornton, CO 80241
T – (303) 875-4681
E – sam.wheeler@earthlink.net

Overview

Sam Wheeler is a degreed Electrical Engineer (University of Colorado, 1980) with extensive experience with commercial, industrial and utility electric power. His experience includes:

- Building Commercial, Industrial and Utility electrical design with experience in nearly every utility, industrial and commercial setting, on both sides of the electric meter
- Extensive familiarity with the NEC & NFPA 70E, NESC, API and IEEE Codes and Standards
- Power system cost estimating
- Power quality, ARC Flash, Hazardous locations
- Creating complete drawing packages, written specifications and equipment evaluations
- Troubleshooting electrical system problems

He has specific experience working in nearly every utility, commercial and industrial environment including:

- Oil and gas fields, production, gathering, refineries
- Light and heavy manufacturing – food, automotive, aircraft, injection molding, clean rooms, laboratories
- Data Centers
- Healthcare - hospitals, clinics
- Renewables - wind, PV, energy storage, interconnections
- Utilities – distribution, substations, interconnections

Work History

- 2003 – Present: Sam Wheeler, Energy Consultant, Thornton, CO
- 2000 – 2003: Johnson Controls, Denver, CO
- 1997 – 2000: PSCO/Xcel Energies, Denver, CO
- 1994 – 1997: UtiliCorp United, Pueblo, CO & Kansas City, MO
- 1989 – 1994: The City of Longmont Electric Department, Longmont, CO
- 1984 – 1989: National Center for Atmospheric Research, Boulder, CO
- 1980 – 1984: Rockwell International, Golden, CO (2 time periods)

Related Project Experience – Broad Summary Related to Affidavit

The following is a representative list of Sam Wheeler's engineering experience. It is not a comprehensive list.

- Minnesota Department of Commerce – Independent Engineer – Acted as an Independent reviewer of Solar Energy Farm installations that were being disputed between Solar Farm Companies and Utility in Minnesota. Reviewed Tariffs, Codes, Standards, and best practices and ruled on finding under Minnesota DOC & PUC Guidelines.

- Altairnano Inc., Indianapolis, IN – Consultant - supported large-scale energy storage battery manufacturer, with engineering design, specifications, power system protection, code reviews, technical and safety training, etc., for work on Wind Farm and PV projects, working with utilities HELCO, HECO, and MECO in Hawaii with Hawaiian Natural Energy Institute (HNEI). Also designed grid-interconnection portion of system interconnections and protective relaying, for sites in Illinois, New Jersey, Hawaii, Puerto Rico, El Salvador, China.

- City of Pueblo, Pueblo, CO – Evaluated the Transmission and Distribution systems of the Aquila (formerly West Plains Energy) power system in Southern Colorado for possible sale to the City of Pueblo, Colorado. Part of a team that evaluated the entire assets of Aquila in Colorado, Sam's role concentrated on the transmission, distribution and substation assets of this 12.47 kV to 230 kV system.

- Microgy Inc., Golden, CO – Consultant - designed and supported construction efforts on five (5) utility grid interconnected biogas powered generator sites using manure powered engine-generators to supply power to three different rural utility distribution grids in the States of Wisconsin and Texas.

- Public Service of Colorado/Xcel Energy, CO – Denver CO - Product Development Engineer, direct employee. Developed utility and customer solutions for power quality and system interconnections with industrial customers.

- UtiliCorp-United – International/CO/KS/MS – Senior Engineer – Distribution and Substation design engineer, designed and supported all aspects df distribution, sub-transmission and generation systems across US and foreign asset. Power Quality expert for international utility.

- City of Longmont Electric Department, CO – Senior Engineer - direct employee, Senior Distribution Engineer for municipal utility City's 12.47 kV distribution system, including all aspects of power system design, cost estimating, construction supervision, both overhead and underground construction. Developed budgets, schedules, equipment specifications and evaluated vendor and contractor bids.

- Sam Wheeler has also done power system equipment, methodology and technology evaluations for DOE, NREL, The World Bank, Xcel Energy, WEL Energy (New Zealand), United Energy (Australia).

Education

- University of Colorado – B.S. Electrical Engineering, 1980
- Certified Power Quality Engineer – Association of Energy Engineers, 1999
- Certified SafeLand Operator – Oil, gas and chemical site safety training – Petroleum Energy Council 2013

Associations

- Member – National Fire Protection Association (NFPA) – Related to National Electric Code – NFPA 70 - NEC and NFPA 70E

Publications

- *Wheeler, Sam*, Etal, Studies for Grid Connection of Variable Renewable Energy Generation Plants, ESMAP Division of the World Bank, July 2019. World Bank technical guidebook covering the studies needed to build and support DER assets internationally.

- *Wheeler, Sam*, Power Quality Monitors, NEC Digest, Vol. 1, pp 50-55, November 2002. Article covering the range of currently available portable power quality and energy monitors.

- *Wheeler, Sam*, Looking Abroad – Retail Utility Services in New Zealand, Power*Value*, Vol. 3, No.8, pp 21-23, March-April 2000. Article on utility approaches to providing services to high tech customers in New Zealand.

- *Wheeler, Sam*, Power Factor - An Old Issue Becomes a New Opportunity, E SOURCE Tech Update, TU-98-1, January 1998.

- *Stein, J., Velguth, K.., Robertson,C., Wheeler, Sam*, Delivering Services to Semiconductor and Related High-Tech Industries, Parts 1&2. E SOURCE Multi-Client Study, 1997- 1998.

- *Wheeler, Sam*, New High-Speed Power Transfer Switches Offer Enhanced Power Quality Solutions, E SOURCE Tech Update, TU-97-13, November 1997.

- *Rhodes, S., Wheeler, S.E.,* Rural Electrification and Irrigation in the US High Plains, Journal of Rural Studies, Vol. 12, No. 3, pp. 311-317, 1996.

COMMUNITY POWER COALITION OF NEW HAMPSHIRE

14 Dixon Ave. Suite 201 | info@cpcnh.org | www.communitypowernh.org

CITIZEN PETITION: Vote "NO" on HOUSE BILL 315

February 11, 2021

To:
Representative Michael Vose
Honorable Chairman of the House Science, Technology & Energy Committee
New Hampshire House of Representatives

CC:
Vice-Chairman Douglas Thomas; Representative Fred Plett; Representative Michael Harrington; Representative Jeanine Notter; Representative Troy Merner; Representative Lex Berezhny; Representative JD Bernardy; Representative Jose Cambrils; Representative Tom Ploszaj; Representative Nick White; Representative Peter Somssich; Representative Jacqueline Cali-Pitts; Representative John Mann; Representative Lee Oxenham; Representative Kenneth Vincent; Representative Kat McGhee; Representative Rebecca McWilliams; Representative Jacqueline Chretien; Representative Roderick Pimentel; Representative Lucius Parshall

Subject: Please Vote "No" on House Bill 315, Relative to Aggregation of Electric Customers

Body:

To Chairman Michael Vose and the Honorable Members of the New Hampshire House Science, Technology & Energy Committee,

As voters and community leaders, we write to respectfully request that you vote "No" on House Bill 315, relative to aggregation of electric customers (HB 315).

In 2019, Governor Sununu demonstrated his leadership on energy issues when he signed into law an update to RSA 53-E, Relative to Aggregation of Electric Customers by Municipalities and Counties. This "Community Power Law" democratizes energy by enabling cities, towns, and counites to procure and provide electricity and related services on behalf of their residents and businesses.

Over the past year, many towns and cities across the state have begun working to leverage Community Power for the benefit of their citizens. Now, before we have even had the chance to launch our initial programs, Community Power comes under threat.

House Bill 315, introduced at the request of Eversource, would gut RSA 53-E and undercut the innovative potential of businesses to offer customers new products and services through Community Power. This bill would strength monopoly control over competitive markets, burden communities with arduous regulations, and altogether sabotage the potential for municipalities to make their own energy supply decisions through Community Power. HB 315 entirely undermines the intent of Governor Sununu's innovative update to RSA 53-E, which was supported by a bipartisan legislature.

The purpose of RSA 53-E is to:

- *"provide small customers with similar opportunities to those available to larger customers in obtaining lower electric costs, reliable service, and secure energy suppliers…"*
- *"to provide such customers access to competitive markets for supplies of electricity and related services…"*
- *"to encourage voluntary, cost effective and innovative solutions to local needs with careful consideration of local conditions and opportunities."*

HB 315 undermines the purpose of RSA 53-E by:

1. Eliminating Community Power authority to provide electric power supply and related customer service, load management and energy conservation;
2. Restricting energy services available to Community Power to only monopolistic and regulated ones;
3. Removing Community Power access to data necessary for program implementation;
4. Subjecting Community Power to regulation by the Public Utilities Commission.

Community Power aims to harness competitive markets and economies of scale to help lower energy costs and give communities greater choice. We are excited about the potential benefits that Community Power can bring to our cities and towns. But those benefits will be never be realized if HB 315 is to become law.

Community Power represents a "New Hampshire Way" forward on energy issues, one that chooses markets over mandates; local control over monopoly control; and innovation over regulation. Please do not allow this attack on Community Power to take away our local authorities.

Please, vote “No” on HB 315.

Sincerely,

1	**Acworth**	William Sandoe	31	**Brevard**	Suzanne Moffat
2	**Alstead**	Steve Fortier	32	**Bristol**	Nancy Dowey
3	**Alton**	Anne Marie Allwine	33	**Brookfield**	Donna M San Antonio
4	**Alton Bay**	Philip Tatro	34	**Brookline**	Sarah Marchant
5	**Amherst**	Charles Matthews	35		Dona Eaton
6	**Andover**	Steven Darling	36	**Campton**	Janet I Englund
7		Lee Wells	37		Michelle Piro
8		Carmeiita Moe	38	**Canaan**	Andrew Van Abs
9		Mary Anne Broshek	39		Charles Lewis Townsend
10		Susan F Chase	40		Ellen Woodward
11		Ken Wells	41		Andrea Lynn Geoghegan
12	**Antrim**	Donald Winchester	42		Amy Thurber
13		Marion Noble	43		Hope Stragnell
14	**Atkinson**	Michelle Veasey	44		James Laffan
15		Atkinson Energy Commission	45	**Canterbury**	Ruth Heath
16	**Barrington**	Julie Coleman	46		Fred Portnoy
17		Joshua Roberts	47	**Center Harbor**	Carol Sullivan
18	**Bath**	Jim Oakes	48	**Center Sandwich**	Tim Miner
19	**Bedford**	Anne Grossi	49		Cynthia Archibald
20		William Coder	50		Dick Devens
21		Christine Pattison	51		Virginia Heard
22		Charlie Beaton	52		Rick Van de Poll
23		Mary Millett	53	**Chesterfield**	J Kondos
24	**Bethlehem**	Betsey Phillips	54	**Chichester**	Ellen Tanguay
25	**Boscawen**	Jessica LaPlante	55	**Claremont**	Rebecca B MacKenzie
26	**Bradford**	Geoffrey Gardner	56		James Contois
27		Nancy Rae Mallery	57		Janis Hamel
28		Barbara Southard	58		Anna Kuta
29		Sandra Bravo	59		John R Hurley
30	**Brentwood**	Susan Jane Mitchell	60	**Concord**	Henry Herndon

61		John Reardon	94		Jean Burling
62		Rachel Gourvitz	95		Karen Vanwyck Heaton
63		Hannah MacBride	96		Doug Heaton
64		Samuel Golding	97		Emil Brown
65		Chloe LaCasse	98		William Palmer
66		Catherine Corkery	99		Mary O'Connor
67		Jessica L Forrest	100		Ginny Wood
68		Gregory d'Hemecourt	101		Ginny Wood
69		Paul Hodes	102		Diane Miller Liggett
70		Dorothy Currier	103	**Derry**	Joshua Bourdon
71		Donna Reardon	104		Craig Lazinsky
72		Mary Heslin	105		Corinne Dodge
73		Chris Hallowell	106	**Dorchester**	Elizabeth A Trought
74		Maura Willing	107	**Dover**	Rebecca Beaulieu
75		Ruth Perencevich	108		Josie Pinto
76		James Brennan	109		William Baber
77		Kevin Porter	110		Nate Hathaway
78		Lucy Crichton	111		Walter King
79	**Contoocook**	Carol Hooper	112	**Dublin**	Wendy Pierrepont White
80	**Cornish**	Nancy Wightman	113		Heather Stockwell
81		Daniel Poor	114		Maureen Hulslander
82		Joanna Sharf	115	**Durham**	Eve Kornhauser
83		Jane Crandell	116		Robin Mower
84		Jonathan Glass	117		Coleen Fuerst
85		Linda Leone	118		Steve Weglarz Jr
86		Janice Orion	119		Susan F Richman
87		Bill Gallagher	120		Charles Forcey
88		Christine Alexander	121		Linette Miles
89		Margaret Yatsevitch	122		Deborah Hirsch Mayer
90		William Cable	123		Anita Mathur
91		Alice Davison	124		Christine Soutter
92		Doug Miller	125		Barbara Dill
93		Jeffrey Proehl	126		Kathy Collins

127	**Enfield**	Sharon Parker
128		Jo-Ellen Courtney
129		Gail McPeek
130		Carol Chichester
131		Kim Quirk
132		Joan Holcombe
133		David Del Sesto
134		Susan Abel
135		Marta Cernoi
136		Mark Buck
137		Charles H Clark
138		Malcolm Schongalla
139		Sylvia alberta
140	**Epping**	Karen Merriam
141		Elaine Gatchell
142		Walter Atigian
143	**Etna**	John Z Torrey
144		Kathleen Chapman
145		Honor Passow
146		Mark Hopkins
147		Abigail Fellows
148		Martha Rigby
149		Christian Passow
150		Fletcher Passow
151		Jan Hopkins
152		Paul Tobias
153		Nitzah Winter
154		Bruce King
155		Liz Marshall
156		Brenda Silver
157		Debby Cromwell
158		Any Stephens
159		Mary King
160		David W Eckels
161		Judy Wild
162		Herbert Roland
163		Alexandra Hickson Corwin
164	**Exeter**	Amy Farnham
165		Michele Chapman
166		Gary Lamphere
167		Renay Allen
168		Elizabeth Stevens
169		Denise Short
170		Sarah DeWitt
171		Joan Pratt
172		Christopher Zigmont
173		Maura Fay
174		David Reyes
175		Eileen Flockhart
176		Anne Torrez
177		Lisa Cooper
178		Sarah Koff
179		Patty Surrette
180		Lindsay Sonnett
181		Lisa Jennings
182		Chetana parmar
183		Sheri Gushta
184		Herb Moyer
185		Judy Lamphere
186		Elizabeth Reyes
187		Emma Carey
188		Sherrill Nixon
189		Lewis Hitzrot
190		Cliff Sinnott
191		Scott Donnelly
192		Andrew Koff

193		Katie McCaffery	226		Robin Kaiser
194	**Farmington**	Emmanuel Krasner	227		Susan Edwards
195	**Francestown**	Kaela Law	228		Dennis E Robison
196		Daniel Field	229		Peter Christie
197	**Franconia**	Susan Moore	230		Judith Pettingell
198		JS Fitzpatrick	231		Barbara Callaway
199		Joanne Carey	232		Jason Aaron
200	**Gilmanton**	Sarah Thorne	233		Robert Hawthorne
201	**Gilsum**	Carol Ogilvie	234		Lydia Hansberry
202		James Chapman	235		Barry Harwick
203		Abbe Hamilton	236		Erin Pearson
204	**Glencliff**	Eric J	237		Brian Edwards
205	**Goshen**	Lydia Hawkes	238		Kristin Bruch Lehmann
206	**Grantham**	Deb Roberts	239		Gunnar Blix
207		Peter Casey	240		Kirsten Elin
208		Karen McAuliffe	241		Robert Drysdale
209		Michael Cressey	242		Jonna Mackin
210		Amy Cranage	243		Miles Blencowe
211		Barbara H Jones	244		J Edward Eliades
212	**Greenville**	Jim Giddings	245		Stanley Dunten
213	**Groton**	Michele Lacroix	246		Susan Shadford
214	**Hampton**	Janna Biggs	247		Stuart White
215		Seth McNally	248		Elizabeth Barry
216	**Hancock**	Janet Altobello	249		Robert Taylor
217		Billy Horton	250		Christopher Kennedy
218	**Hanover**	Marjorie Rogalski	251		Erika Bacon
219		Peter Kulbacki	252		Mary Lindley Burton
220		Julia Griffin	253		Yolanda Baumgartner
221		Katie Aman	254		Ben Steele
222		Robert Keene	255		Sarah Billmeier
223		Sylvia Field	256		Mary Brown
224		Rebecca Kvam Paquette	257		Cristina Hammond
225		Sarah Young	258		Elisabeth L Shewmaker

259		Barbara Sumanis	292		Chris Bentivoglio
260		Martha Beattie	293		Bruce Williamson
261		Brendan Higgins	294		Rebecca Kazal
262		Jim Beattie	295		Corinne Sullivan
263		Judith Pettingell	296		David L Webb
264		Melissa Herman	297		Nicole Ives
265		Russell Muirhead	298		Silvia Spitta
266		Mary Waugh	299		Denis Rydjeski
267		Sarah	300		Ellis Rolett
268		Spencer Burdge	301		Joyce Mechling
269		Karen Washburn	302		Judy Payne
270		Dodd Stacy	303		Carol Weingeist
271		Sarunas Burdulis	304		Claudio Pikielny
272		Beth McKinnon	305		Jonna Mackin
273		Elizabeth Shabel	306		Richard Rogalski
274		Mary Stelle Donin	307		Catherine Stanger
275		Marilyn Denk	308		Karen Geiling
276		Caroline Barbour	309		Ann Carper
277		Bryant Denk	310		Marianne Lillard
278		John Dolan	311		Maureen Ripple
279		Julie Dolan	312		Rosalind Lee
280		Mary Jane Mulligan	313		Richard Fellows
281		Edward Craxton	314		Hal Coughlin
282		Nancy Serrell Coonley	315		Marlene Mahlab
283		Robert Keene	316		Robert Grabill
284		Jean Keene	317		Margaret Jernstedt
285		Judith Bail Colla	318	**Harrisville**	Andrea Hodson
286		Terryl Stacy	319		David Blair
287		Erich Osterberg	320		Deborah Ann Abbott
288		Mary Castaldo	321		Jack Calhoun
289		Suzanne Kelly	322		Noel Greiner
290		Nina Banwell	323		Mary Day Mordecai
291		William Geraghty	324		Ned Hulbert

325		Christine Destrempes
326		Barbara Watkins
327		Leslie LaMois
328		Andrew Maneval
329		Kathleen R Hamon
330		Thomas R Hamon
331		Roshan Swope
332		Nathan Beuttenmueller
333		Charles J Michal Jr.
334		Andrea Polizos
335		Erik Anderson
336		Bonnie Rill
337		Kathleen Bollerud
338		Donald Kilgus
339		Diana Shonk
340		Solveig Tryba
341	**Hartland**	Sandy Gmur
342		Daniela Blaise
343	**Hebron**	Paul Hazelton
344		Martha Twombly
345	**Henniker**	Jan Palm
346	**Hillsborough**	Susan Durling
347		Susan Shamel
348		Brett Cherrington
349		Michael Brown
350		Brett Cherrington
351	**Holderness**	Gerald Beck
352		Arianne Fosdick
353		Terri Potter
354	**Hollis**	Phillip Stephenson
355		Marsha Feder
356		Harvest Stephenson
357		Marilyn Learner
358	**Hooksett**	Eric St Pierre
359	**Hopkinton**	Jeff McGlashan
360		Laura McGlashan
361		Melissa Birchard
362	**Hudson**	Linda Kipnes
363		Debra Putnam
364		Ruth Sessions
365		James Caron
366		Kara Roy
367		Ted Trost
368		Craig Putnam
369		Barbara Blue
370	**Jackson**	Emily Benson
371		Molly Mundy
372	**Jaffrey**	Peggy Ueda
373		Tory McCagg
374		Madison Springfield
375		Carl Querfurth
376	**Keene**	Elizabeth Dragon
377		Catherine Koning
378		Mary Kate Sheridan
379		Robert E King
380		Ann Shedd
381		Mark A Meess
382		Nancy Gillard
383		Todd Horner
384		Zach Luse
385		Monica Marshall
386		Meg Kidd
387		April Galarza
388		Chalice Michele
389		Mike Giacomo
390		Donna Robbins

391		Kathleen Halverson
392		Allen Ansevin
393		Terry Clark
394		Rosemary Gianno
395		Tracy Bartella-Metell
396		Sarah Harpster
397		Sylvie Singh-Lamy
398		Suzanne Butcher
399		Elizabeth Caldwell
400		Lawrence Dachowski
401		Diana Damato
402		William Gillard
403		Christa Daniels
404		Paul Richard Roth
405		Robert Gogolen
406		Peter Hansel
407		Thaddeus Jude Nuru
408		Mari Brunner
409		Nancy S Sporborg
410		Catherine Behrens
411		Christine Btunner
412		David Goldsmith
413		Carolyn B. Jones
414		Charles Weed
415		Elisabeth Dignitti
416		Larry Welkowitz
417		Terri O'Rorke
418		Sarah Bulger
419		Jim Duncan
420		Joseph Staples
421	**Kingston**	Morgan D
422	**Lancaster**	Emily Roscoe
423	**Langdon**	Peter Wotowiec
424	**Lebanon**	Jonathan Chaffee
425		Clifton Below
426		Patricia McGovern
427		Darla Bruno
428		Charles DePuy
429		Liane Avery
430		Kathleen Beckett
431		Ann Garland
432		Hanna Schaffer
433		Susan Kaplan
434		Matthew Rasmussen
435		Albert Miltner
436		S Girard
437		Angelina Lionetta
438		Lianne Moccia
439		Carol Williams
440		Marie McCormick
441		Greg Pregent
442		Elizabeth Nestler
443		Lorenza Viola
444		Doreen Schweizer
445		Sarah Riley
446		Devin Wilkie
447		Julie Puttgen
448		Susan Almy
449		Jenna Luce
450		Roger Lohr
451		Michael Savage
452	**Lempster**	Amanda Solomon
453	**Lincoln**	Elizabeth Terp
454	**Litchfield**	Richard Husband
455	**Littleton**	Elaine French
456		Maryjo

457		John Stanley
458		Wayne Ruggles
459	**Londonderry**	Michelle Harrison
460		Nick Bristol
461		Patricia Anastasia
462		Mike Speltz
463	**Loudon**	George Saunderson
464		Wiltrud R MottSmith
465	**Loudon**	Jodi Doody
466	**Lyme**	Paul Guyre
467		Jordan Fields
468		Theresa Mundy
469		Beatriz Pastor
470		Liz Ryan Cole
471		Kathleen Waste
472		James Graham
473		Jane Kitchel
474	**Lyndeborough**	Lucius Sorrentino
475	**Madbury**	Shaune McCarthy
476	**Madison**	Noreen Downs
477		Marcia McKenna
478		Russ Lanoie
479		Frederick Slader
480		Russell F Dowd
481	**Manchester**	Tyler Jones
482		Grace Kindeke
483		Hannah Rowell-Jore
484		Dave Dutilley
485		Richard Maynard
486		Karen Greene
487		Tom Hobbs
488		Laura Aronson
489	**Marlborough**	Marge Shepardson
490		Charlie Gibson
491		Robert Shore Goss
492		Frederick G Mead
493		Carl Shepardson
494		Ira Gavrin
495		Kathryn Kerman
496	**Mason**	Liz Fletcher
497		Douglas Whitbeck
498		Gwen Whitbeck
499		Garth Fletcher
500	**Meriden**	Jennifer Lenz
501		Susan and David Russo
502	**Merrimack**	Jana Howe
503		Carol M DiPirro
504		Mary Beth Raven
505		Michael Redding
506	**Milford**	Richard Edwards
507	**Mirror Lake**	Robert J Zimmerman
508	**Munsonville**	Alfrieda Englund
509	**Nashua**	Carolyn Nevin
510		Dan Weeks
511		Jon Gundersen
512		Michael Joseph
513		JoAnne St John
514		Sylvie Stewart
515		Tod Davis
516		Pamela Jordan
517		John McCannon
518		Elise MacDonald
519		Assunta Riley
520	**Nelson**	Dave Birchenough
521		Sam and Julie Osherson
522		Beth Draper

523	**New London**	Joy Kubit	556		Sharon
524		Paula Minaert	557		Annie Henry
525		John Raby	558		Bruce Tucker
526		Alan Shulman	559		Dorothea
527		Robin Walkup	560		David Flemming
528		Nicholas Oourusoff	561		Cathy Lanigan
529		Joseph George Kubit	562		Emily Manns
530	**Newbury**	Lisa Correa	563		Susan Chollet
531		Mary Fuller	564		Carol Wyndham
532		Deborah Benjamin	565		Regina Bringolf`
533		Joy B Nowell	566		Thomas Westheimer
534		John Magee	567		Ruth Bednarz
535		Andrew Cockerill	568		Bryan Field
536	**Newmarket**	Peter Nelson	569		Thomas Cowan
537		Kristi Lockhart	570		Marsha Morrow
538	**Newport**	Linda Morrow	571	**Pittsfield**	Bruce Berk
539	**North Sandwich**	Katherine Thorndike	572	**Plainfield**	Ron Eberhardt
540	**North Swanzey**	Barbara D Reed	573		Ian Oxenham
541	**Northfield**	Christopher Hunt	574		Evan A Oxenham
542	**Northwood**	Victoria Parmele	576		Steve Ladd
543	**Norwich**	Nan Cochran	577		Anne Donaghy
544	**Orford**	Catherine Arcolio	578		Michael S O'Leary
545	**Pembroke**	Jennifer Smith	579		Rangi Keen
546	**Peterborough**	Annie Henry	580		Catherine Rodriguez
547		Jean Rosenthal	581		Julie B Murray
548		Joel Huberman	582		Susan Hardy
549		Dori Drachman	583		Susan Liebowitz
550		Anne Huberman	584		David and Susan Taylor
551		Jamie Young	585		Nancy Jay Crumbine
552		Dr Robert H Haring-Smith	586		Craig Lanzim
553		Carol Kraus	587		Elizabeth Morse
554		Barbara Jo Kingsley	588		Samantha Davidson
555		Jean Foster	589		Ronald N Bailey

590		Bill Knight
591		Lauren Symons
592		Ida Burroughs
593		Allan Reetz
594		Andrew Martin
595	**Plymouth**	Irene Garvey
596		Steven Rand
597		Barbara Jenkinson
598		Barbara Spike
599		Steven Woodbury
600		Richard Hage
601		Rachelle Lyons
602	**Portsmouth**	Peter Vandermark
603		Tracey Cameron
604		Brian Murphy
605		Valentina Giordana
606		Matt Doubleday
607		Ned Raynolds
608		Mika Court
609	**Raymond**	Jennifer Dube
610		Dennis Garnham
611	**Richmond**	Susan Opal Wyatt
612	**RIndge**	Patrick McGlynn
613		A Thomas
614		Patricia Martin
615		Rachel Ranelli
616		Stella Walling
617		Tristan Burlingame
618		Frederick Rogers
619		Dwight Schenk
620		Sebastian
621	**Rumney**	Eric Escobar
622		Wendy Hills
623	**Rye**	Howard Kalet
624		Thomas Pfau
625		Nancy J Siopes
626		Lisa Sweet
627		David Sweet
628	**Sandown**	Anna Durham
629	**Sandwich**	Margaret Longley
630		Leonard Witt
631	**Shelburne**	Michael Prange
632	**Somersworth**	Alaina Rogers
633	**South Sutton**	Elizabeth Howell
634	**Spofford**	Mary Ewell
635	**Stratham**	Roger Stephenson
636		Ted stiles
637	**Sugar Hill**	Margaret Connors
638		Alice Poole
639		Jordan Applewhite
640		Marilyn Monsein
641	**Sullivan**	Hilliare Wilder
642	**Sullivan County**	Sullivan County Board of Commissioners
643	**Sunapee**	Catherine Bushueff
644		Susan King
645		Bette Nowack
646	**Swanzey**	Cheri Domina
647		Robert Audette
648		Suzanne Whittemore
649		Michael Thompson
650		Jeanne Thieme
651		Karen Sielke
652		Jen Gordon
653		Wallace Smith
654		Barbara Skuly
655	**Tamworth**	Betsy Loughran

656		Karen Vitek
657	**Temple**	Beverly R Edwards
658		Beverly Edwards
659		Thomas Whitcomb
660		Laura Lynch
661	**Thornton**	Sally J Davis
662	**Troy**	Gail Janine Szafir
663	**Walpole**	Bennett Daviss
664		Kristen Snowman-Shelley
665		Andrew Dey
666	**Warner**	Harry Seidel
667		George Packard
668		David Bates
669		Clyde Carson
670		Faith MInton
671		Jessana Palm
672	**Warren**	Jesse Stowell
673	**Washington**	Andrew Hatch
674	**Waterville Valley**	Moses Gordon
675		Margaret Roper
676		Kimberly Rawson
677	**West Lebanon**	Lorraine Tompkins Kelly
678		Barbara Hirai
679		Peter Beardsley
680		Mary Rohr
681		Diane Root
682		Susan Pillsbury
683		Bart Guetti
684		Bob Rougvie
685		Carol Rougvie
686		Cori Hirai
687		Gregory Ames
688		L Billings
689		Bill Gleeson
690	**W. Peterborough**	Karen Johnson
691	**Westmoreland**	Pam Clark
692		John Harris
693	**Wilton**	Jennifer Beck
694		Gene Jonas
695		Ronald E Brown
696		John Zavgren
697		Donald H Sienkiewicz
698	**Winchester**	Patti Powers
699		Ralph Legrande
700	**Wolfeboro**	Nancy Hirshberg
701		James Nupp
702		Douglas Smith
703		Richard Byrd
704		Rebecca Swaffield
705		Joanne Parise
706		Robert Mathes
707		Brent Summer
708		Eric Chamberlain
709		Kathleen Gillett
710		Gogi Millner
711		Jill Duffield

Solar Savings in New England

From 2014 to 2019, small-scale solar in New England produced wholesale energy market benefits of $1.1 billion

December 2020

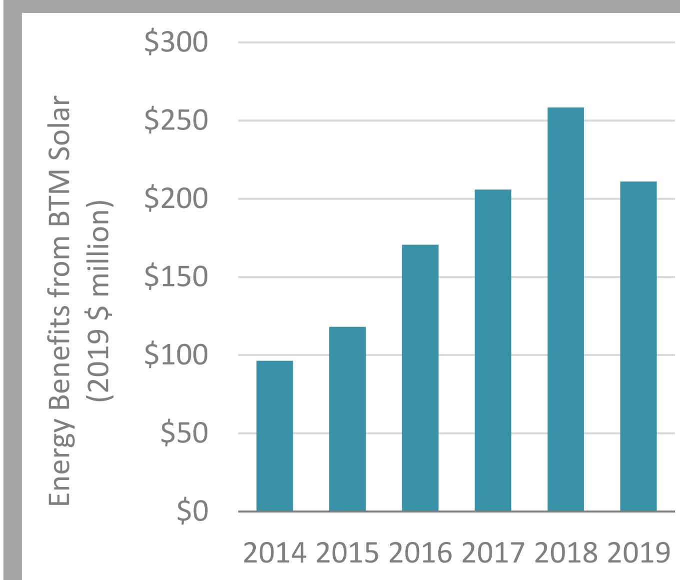
Between 2014 and 2019, behind-the-meter (BTM) solar produced more than 8,600 gigawatt-hours (GWh) of electricity in the six New England states. Electricity produced from BTM solar reduces the need to run other power plants, which reduces the amount of electricity that electric utilities need to buy and saves customers money. By avoiding the need to run the most expensive power plant, when BTM solar lowers the amount of electricity purchased, it also reduces the price that all utilities pay. Here, BTM solar is defined as small solar installations that do not participate in New England's energy markets (for more information see page 7).

Using hourly BTM solar data published in July 2020 by ISO New England, the nonprofit regional electric grid operator, Synapse estimated what demand and prices for electricity would have been without this resource.[1] We analyzed over 52,500 hourly datapoints from 2014 to 2019, and estimated that BTM solar reduced wholesale energy market costs in New England by $1.1 billion (see Figure 1). These include benefits that are shared by electricity customers throughout New England, not just the owners of the BTM solar facilities. Of this total, we estimate that benefits from price effects represent $743 million or 70 percent of the total. When the total benefits are divided by the quantity of electricity produced, we find the energy impact of BTM solar is 11.9 cents per kWh over this six-year period.

Hourly electricity benefits are just one benefit BTM solar can provide. Hourly analysis of this dataset using peer-reviewed tools published by the U.S. Environmental Protection Agency (U.S. EPA) shows that BTM solar avoided 4.6 million metric tons of climate-damaging carbon dioxide emissions in 2014 through 2019, and avoided millions of pounds of criteria pollutants proven to have negative impacts on human health. As a result, BTM solar contributed to $87 million in public health benefits in 2014 through 2019 (equal to 1.0 cents per kWh). Likewise, using a $112 per metric ton social cost of carbon, BTM solar provided $515 million dollars in climate benefits in 2014–2019 (equal to 6.0 cents per kWh).

BTM solar also provides other benefits, including reduced costs for generating capacity, transmission and distribution capacity, reliability, and retail margins. It also provides other economic benefits, such as job creation, local tax base support, and participant cost savings. All of these benefits should be considered when looking at a full societal value of BTM solar.

Figure 1. Energy benefits from BTM solar



Notes: 2018, a year with numerous heat waves and especially high summertime energy prices, has a particularly large amount of savings. Benefits described in this figure only include impacts related to the wholesale energy market. Other benefits (e.g., public health, climate, capacity, transmission and distribution, reliability, or retail margins) are not included.

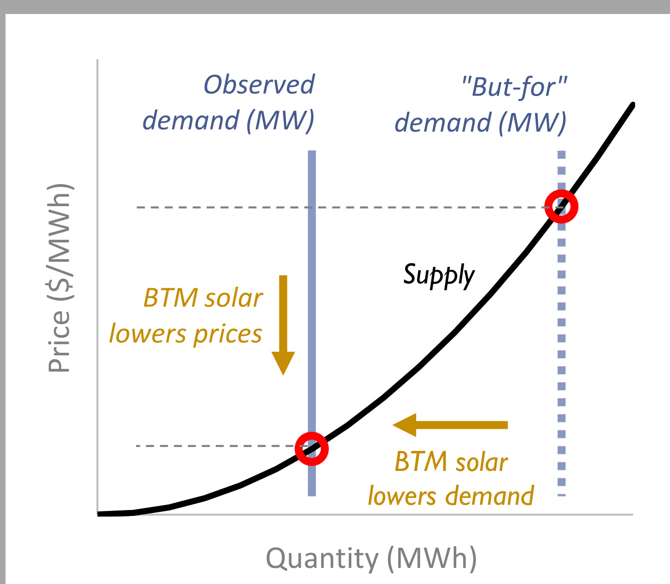
Synapse Energy Economics, Inc.

Authors: Patrick Knight, Steve Letendre, PhD, and Erin Camp, PhD

Methodology

When BTM solar produces electricity, electric utilities—and ultimately electric ratepayers—will purchase fewer kWh of electricity from other sources (e.g., fossil fuel-fired power plants). As BTM solar output increases, consumers pay less for electricity because the quantity of electricity purchased from other sources decreases. In addition, BTM solar has a second effect on electricity costs: because it reduces the demand for electricity to be purchased from other sources, it avoids the need to buy power from the most expensive power plant. This leads to a lower "market clearing price" that is paid to all electric generators on the grid (see Figure 2). As a result, more BTM solar not only decreases the quantity of electricity purchased, it also reduces the price paid for purchased electricity—which benefits all New England ratepayers .

Figure 2. Illustrative price and load impacts of BTM solar



In July 2020, for the first time, ISO New England published regionwide, hourly estimates of BTM solar generation for January 2014 through April 2020. This dataset is based on a sampling of hourly, actual solar output from individual facilities throughout New England, which are then upscaled to estimate aggregated solar production by state. After this data was posted on the ISO New England web site, Synapse deployed the "but-for" methodology (see callout) for each week from 2014 through 2019.[2]

Predictive Equations: Step-by-Step

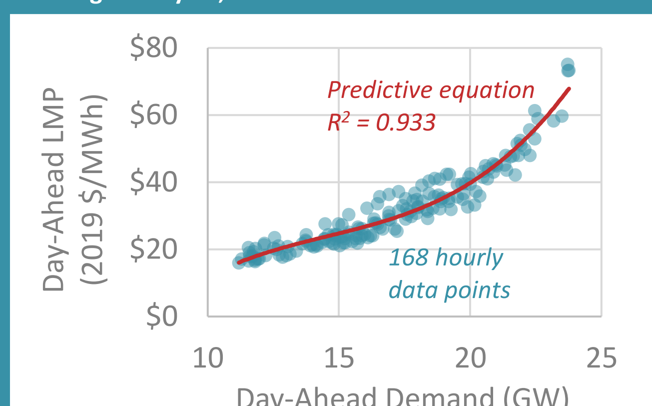
First, we assembled hourly, day-ahead price and demand data for 2014 through 2019.[3] We grouped hours into weeklong periods (Sunday through Saturday), and performed a regression for each individual week with demand as an independent variable and prices as a dependent variable. This regression provides a predictive equation of wholesale electricity price for any hourly demand in this week. For each hour, demand (measured in MW) and prices (measured in dollars per MWh) can be multiplied to calculate the total energy costs in that hour (measured in dollars).

Second, we assembled hourly BTM solar data. Each hourly datapoint was increased by 6 percent to reflect average transmission and distribution losses, then added to the demand in each hour. This provides an estimate of what demand would have been, if not for BTM solar.

Third, we used the predictive equations calculated in (1) to estimate what hourly prices would have been, if not for the BTM solar generation, all else being equal. As in (1), we can multiply the "but-for" demand by the resulting "but for" prices to estimate the total energy costs in each hour in the "but-for" hypothetical.

Fourth, we subtracted the total costs from the "but-for" costs to estimate the energy benefits resulting from BTM solar generation.

Figure 3. Illustrative predictive equation for week starting on July 28, 2019



Calculating energy benefits

For each week, we calculated the hourly total costs for each 24-hour period (24 hours x 313 weeks, producing costs for 7,512 hours) using week-specific predictive equations. Over the six-year period, the weekly predictive equations estimate total wholesale energy costs of $33.0 billion in 2019 dollars.

We then added the BTM solar output from ISO New England to each hour. Using each week-specific prediction equation, we calculated what energy costs would have been if not for BTM solar. Without BTM solar, we find that total wholesale market costs would have been $34.2 billion, suggesting that total benefits from solar are approximately 1.2 billion.

However, not all predictive equations are equally successful at estimating benefits. In some winter weeks, for example, energy market prices are more closely linked to fuel prices rather than demand for electricity. In these weeks, although BTM solar continues to reduce the demand for electricity produced from other sources, it is less able to reduce electricity costs.

To account for this, we examine two different time periods: summer weeks (any weeks in 2014 through 2019 that have at least one day in May, June, July, August, and September) and non-summer weeks (all other weeks). Summer weeks contain 43 percent of the total weeks analyzed, but 57 percent of the BTM solar produced. Predictive equations in summer weeks are generally very accurate. In 98 percent of summer weeks, estimated electricity prices are within 10 percent of the actual price. Meanwhile, non-summer weeks generally feature less successful predictive equations: only 83 percent of non-summer weeks estimate electricity prices within 10 percent of actuals.

For this analysis, we remove any weeks where the predictive equations are unable to accurately estimate prices within 10 percent, on average over the entire week. As a result, we estimate energy benefits of $1.1 billion, rather than $1.2 billion (a reduction of 10 percent). In reality, there is some non-zero quantity of energy benefits in these weeks because the BTM solar avoids the need for utilities to purchase energy from the wholesale markets. Thus, this is a conservative, lower-bound estimate as we only include those weeks with high predictive capabilities.

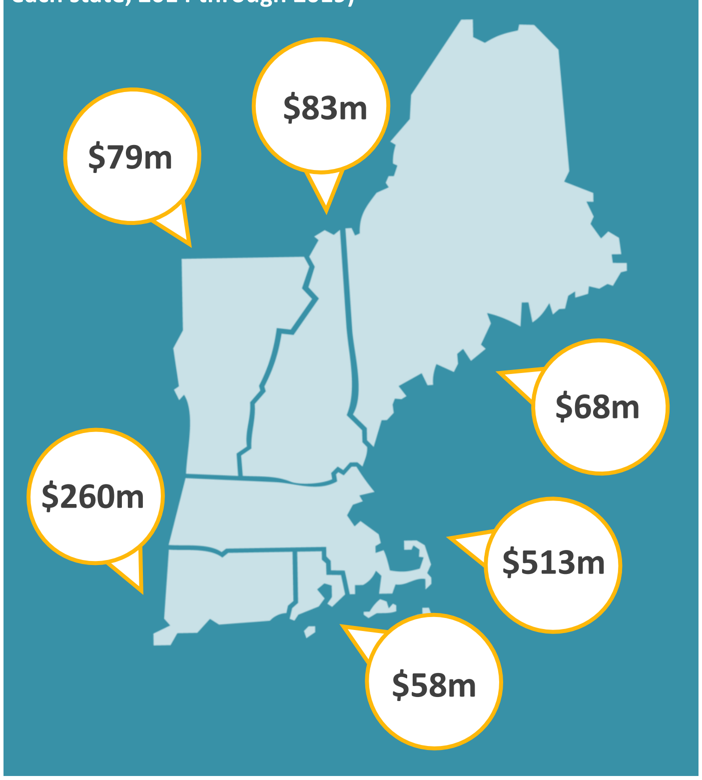
Load impacts and price impacts

The calculated energy benefits can be split into "load impacts" and "price impacts." Load impacts refer to the benefits associated with the reduction in the quantity of electricity purchased. "Price impacts" are due to the impact of reduced demand on the market-clearing price of electricity, as shown previously in Figure 2.

For each week, load impacts can be calculated by estimating energy benefits where demand is increased by the hourly BTM solar quantity but where prices are unchanged. The "price impact" can be estimated by subtracting the "load impact" from the total benefits. Over the six years analyzed, we find that load impacts provide about $317 million in benefits (30 percent of the total) while price impacts provide about $743 million in benefits (70 percent of the total). This only includes benefits for those weeks "screened into" our analysis.

To understand how each impact could be allocated to each state, we assume that load impacts are distributed across the six New England states based on each state's contribution to BTM solar production. In other words, states with more installed BTM solar accrue a greater share of the load impact.[4] Meanwhile, as shown in Figure 4's depiction of the total impacts for each state, we

Figure 4. Total energy savings from BTM solar accrued in each state, 2014 through 2019)



assume that the price impacts are distributed across the six New England states based on each state's contribution to observed day-ahead demand. In other words, states with larger electricity demand accrue a greater share of the price impact, and states with larger quantities of installed BTM solar accrue a greater share of the load impact.

Value per kWh

These energy benefits can be divided by the quantity of solar produced in each year to estimate the price impact value and the load impact value of BTM solar in cents-per-kWh terms. However, if each annual value is calculated using only the "screened-in" weeks, it will overestimate the cents-per-kWh benefits in weeks with poor predictive equations. In order to account for this, we multiply the cents-per-kWh value by the percentage of weeks that "screen in" for each year, thereby assuming the cents-per-kWh value in "screened out" weeks is 0 cents per kWh. We perform this operation separately for summer and non-summer weeks, which we then combine using an average weighted by the total number of all weeks in each seasonal period.

Figure 5 displays the resulting values for both load and price impacts in each year of the analysis. Because load impacts per kWh describe the benefits associated with reducing quantities, but not prices, they resemble

Figure 5. Energy benefits per kWh of BTM solar

average prices observed during the summer weeks. On average, over the six years analyzed, BTM solar provided a total value-per-kWh wholesale market benefit equal to 11.9 cents per kWh.

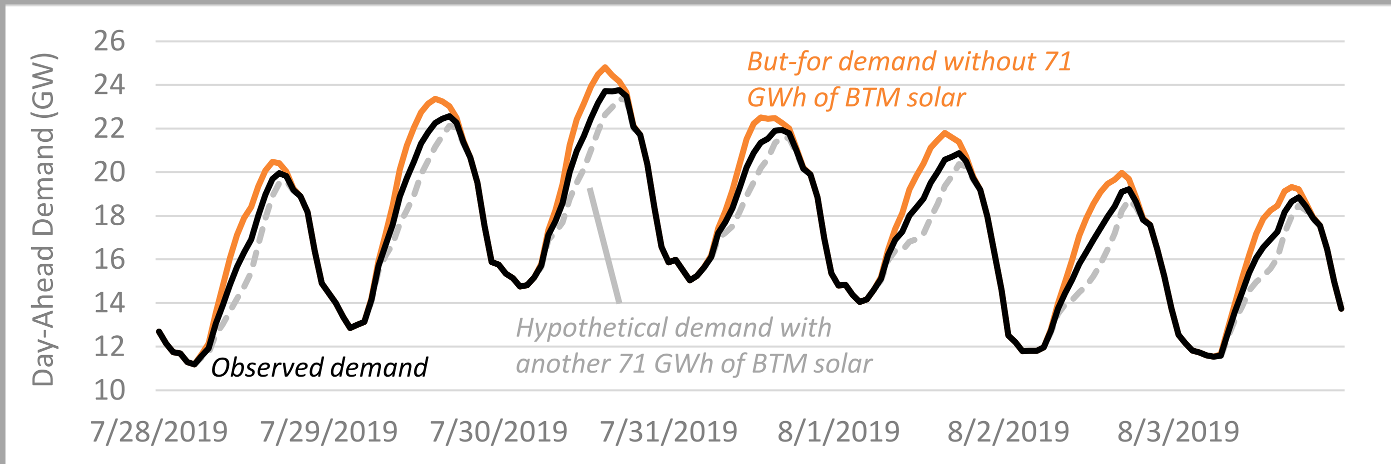
This value may vary week-to-week and year-to-year. For example, during hot years, total demand for electricity increases. This increase in demand often leads to increased prices, meaning that solar resources can avoid purchasing more energy at higher prices than in other years. 2018 in particular featured three separate heat waves, which contributed to a quantity of heating degree days that were 19 percent higher than the 2014-2019 average. This led to a year with summertime energy prices 11 percent higher than average.

Impact of increasing levels of BTM solar

Output from fixed solar facilities typically peaks around noon and decreases later in the day when demand for electricity remains high. This fact leads some to argue that as more BTM solar is installed, fewer energy benefits will accrue. Because energy prices are closely linked with demand in most summer weeks, as more solar comes online, it may increasingly reduce prices that are not necessarily the highest prices. Nonetheless, with the amount of BTM solar on the grid now, or expected in the next several years, prices at times of peak solar output are still likely to be high. Conversely, at times of high prices (e.g., later in the afternoon) systemwide BTM solar output may be reduced but not outright eliminated. As a result, additional BTM solar may provide fewer wholesale market cost benefits, but some benefits still remain.

To assess this issue, we examined one week in July 2019 with a total BTM solar output of 71 GWh. Figure 6 on the next page shows the observed hourly demand for this week in black, and the "but-for" demand in yellow. This figure also features a second hypothetical series in grey that posits what demand would have been with double the amount of BTM solar power. In our "but-for" analysis described above, the first 71 GWh of BTM solar provided $10.7 million in energy benefits. Doubling the amount of solar provides energy benefits of $19.1 million. In other words, doubling the quantity of solar would increase benefits by 80 percent.

Figure 6. Demand for illustrative week, with and without BTM solar



Note: Y-axis begins at 10 GW in order to highlight the difference between the three depicted scenarios.

This phenomenon often triggers discussions of conventional resources' capability to quickly ramp up or down to accommodate changes in solar output during the evening and morning hours, respectively. In this example week, the largest hourly change (a reduction of 2,082 MW) occurs between the hours of midnight and 1AM when solar is not operating in any circumstance. In hours when BTM solar is operating, additional BTM solar actually *reduces* the maximum hour-to-hour MW change, which occurs as demand is increasing between 7AM and 8AM (thereby likely making the morning ramp easier). Of all 112 hours in this week when BTM solar is operating, only 35 feature hourly changes that are greater after adding an additional 71 GWh of BTM solar . In these 35 hours, the maximum increase in hourly changes is 386 MW. This is equal to 2 percent of the day-ahead demand observed in that hour, or, about one-fifth the maximum hourly change observed (2,082 MW).

As discussed above, savings depend not only on how much BTM solar is installed, but also on other underlying system drivers. For example, temperatures were lower in 2019 than in 2018, leading to fewer periods of high summer prices. One way to examine these impacts is to model the 2019 quantity of solar on the weather and resulting energy prices that were observed in 2018. We find that total savings would have been \$317 million, rather than \$211 million, an increase of 50 percent.

Emissions and public health impacts

We used publicly available tools to evaluate the impact that BTM solar has on emissions and public health. First, we used the Avoided geneRation and Emissions Tool (AVERT) from the U.S. EPA. AVERT relies on actual, hourly, power plant-specific data published by U.S. EPA to statistically estimate the marginal emissions and generation avoided by renewable energy and energy efficiency.[5] According to AVERT, if the hourly output from BTM solar reported by ISO New England did not exist, 4.6 million metric tons of climate-damaging carbon dioxide would have been emitted from 2014 to 2019 (see Table 1). In addition, BTM solar avoided the release of hundreds of thousands of pounds of criteria pollutants proven to have negative impacts on human health. According to AVERT, in 2019, 94 percent of the generation avoided came from natural gas-fired power plants, while an additional 6 percent came from power plants fueled by oil, coal, or other resources.

Table 1. Estimated emissions avoided by BTM solar

Pollutant	Avoided emissions
Greenhouse gases (reported in million metric tons)	
Carbon dioxide (CO_2)	4.6
Criteria pollutants (reported in pounds)	
Sulfur dioxide (SO_2)	2,380,000
Nitrogen oxides (NO_X)	3,280,000
Particulate matter ($PM_{2.5}$)	340,000

Note: Avoided emissions for each pollutant are reported in the unit that is most commonly used for data reporting and other analysis. These emission benefits are calculated for all hours in 2014 through 2019, rather than only the weeks that met our screening criteria for energy benefits.

We then used these results in U.S. EPA's CO-Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool. COBRA uses a reduced form air quality model to estimate how criteria pollutants like sulfur dioxide (SO2), nitrogen oxides (NOX), and particulate matter (PM2.5) are transported through the atmosphere. COBRA then relies on assembled data from the literature to estimate how these pollutants impact different populations on a county-by-county level, and it translates any decreases of these pollutants into monetized public health benefits.[6] According to COBRA, the BTM solar estimated by ISO New England in 2014 through 2019 contributed to $87 million in public health benefits (see Table 2). Dividing this cost by the solar produced in this time period yields a health benefit of 1.0 cents per kWh. We also examined the benefits of reducing greenhouse gas emissions across a range of social costs of carbon. Depending on the cost of carbon modeled in this analysis, benefits from 2014 to 2019 are as high as $1.9 billion dollars. This translates into 22.6 cents per kWh of BTM solar.[7]

Table 2. Monetized benefits from improved public health and social cost of carbon

Pollutant	2019 $ M	2019 cents / kWh
Climate benefits from reduced greenhouse gas emissions		
At $112/MT	$515	6.0 ¢
At 200/MT	$918	10.7 ¢
At $425/MT	$1,948	22.6 ¢
Public health benefits from reduced criteria pollutants		
SO_2, NO_X, and $PM_{2.5}$	$87	1.0 ¢

Note: A price of $112 per metric ton corresponds to the $100 per short ton price approved by the VT PUC in Case No. 19-0397-PET. Other prices illustrate the carbon benefits of solar at higher prices. These public health benefits are calculated for all hours in 2014 through 2019, rather than only the weeks that met our screening criteria for energy benefits. See footnote 6 for additional information.

Other avoided costs

In addition to the energy benefits and public health impacts described above, BTM solar can provide other benefits. Increased quantities of BTM solar reduce the demand for grid-level capacity that must be purchased through ISO New England's Forward Capacity Market (FCM). Lowering the demand for capacity reduces capacity costs, thus reducing the overall electricity costs paid by ratepayers throughout New England. For example, we estimate that the value of capacity for solar installed in 2019 was $1.75 per kilowatt-month, or about 1.6 cents per kWh.[8]

As with the energy market, costs and prices in the FCM are calculated through supply and demand curves. This means that, as in the energy market, there is the potential for BTM solar to not only reduce the quantity of capacity purchased, but to also decrease the clearing price paid for capacity. BTM solar can also reduce other costs such as transmission and distribution capacity, reliability, and retail margins (i.e., the markup on costs observed between retail and wholesale prices that in some cases may represent utility profit). Finally, BTM solar provides other benefits to states or individual customers, including job creation, local tax base support, and participant cost savings. All of these benefits would reasonably be considered when looking at a full societal value of BTM solar.

How do energy benefits get passed to ratepayers?

Energy and capacity benefits are passed to ratepayers by load-serving entities (LSE) such as distribution utilities that purchase electricity at the wholesale level. The benefits described in this analysis are calculated for the day-ahead energy market. However, most, if not all, LSEs use out-of-market contracts to hedge their purchase of energy from the day-ahead market, which effectively acts a spot market.[9]

Each LSE may sign many different contracts with different suppliers for different quantities. Contract terms may overlap and contract terms can last weeks or years. Because the day-ahead market represents what the market is willing to pay for electricity on a spot basis, the expectation of future day-ahead market prices can be viewed as a proxy for the price of electricity paid in bilateral contracts. As such, while any one entity may not garner the exact savings from BTM solar estimated in this analysis, lower costs for electricity purchased in the day-ahead market should translate into lower contract costs, and eventually, lower costs paid by ratepayers.

Other caveats

The energy benefits described in this document only cover the solar quantity that ISO New England describes as "BTM solar." BTM solar is defined as the output from small (i.e., less than 5 MW), distributed systems that do not participate in the energy markets.[10] The dataset of hourly BTM solar production provided by ISO New England does not include any output from facilities that have a commitment in the Forward Capacity Market (FCM) or facilities that may have load co-located behind the meter but participate in the energy market. The benefits described in this document would likely be higher were output from these power plants also included. The quantity of solar that is BTM solar versus other some other type is different in each state. In Vermont, ISO New England defines virtually all of the installed solar capacity as BTM solar, while in Rhode Island and parts of Massachusetts, BTM solar, as defined by ISO New England, represents just one-third to one-half of the total solar installed capacity.[11] Hourly dispatch from these plants is estimated by "upscaling" the output from a subset of solar facilities throughout New England; actual production from BTM solar facilities may differ from the hourly estimates provided by ISO New England.

This analysis does not take into consideration how the electric grid might have otherwise been different if not for solar.

Summary of impacts

Table 3 shows a summary of the solar benefits assessed in this study. These categories of benefits should be carefully weighed against costs of solar to estimate the full benefit-cost ratio of solar policies.

Table 3. Summary of historical BTM solar benefits (2019 cents per kWh)

Benefit category	High	Medium	Low
Energy	11.9 ¢	11.9 ¢	11.9 ¢
Capacity	1.6 ¢	1.6 ¢	1.6 ¢
Criteria pollutants (SO_2, NO_X, $PM_{2.5}$)	1.0 ¢	1.0 ¢	1.0 ¢
CO_2 @ $425/MT	22.6 ¢	-	-
CO_2 @ $200/MT	-	10.7 ¢	-
CO_2 @ $112/MT	-	-	6.0 ¢
Energy, capacity, and pollution reduction benefits of BTM solar	**37.1 ¢**	**25.2 ¢**	**20.5 ¢**

Additional benefits not calculated:

- Capacity price impacts
- Transmission and distribution capacity
- Local economic benefits
- Local tax support
- Reliability benefits
- Participant savings
- Retail margin

Endnotes and Sources

1. See hourly BTM solar data published by ISO New England on July 24, 2020 at www.iso-ne.com/static-assets/documents/2020/07/btm_pv_data.xlsx. Further documentation is available at https://www.iso-ne.com/static-assets/documents/2020/07/btm_pv_data_documentation.pdf.

2. Synapse explored a variety of other regression types and found that third-order polynomials remain the regressions that best explain the relationship between electricity demand and prices .

3. Hourly data on prices and loads is available at https://www.iso-ne.com/isoexpress/web/reports/load-and-demand/-/tree/zone-info. This analysis focuses on day-ahead demand and day-ahead locational marginal prices (LMP).

4. Load impacts from net-metered solar facilities are most appropriately allocated to their owners, while load impacts from standalone solar facilities can be allocated to the entire state.

5. See https://www.epa.gov/statelocalenergy/avoided-emissions-and-generation-tool-avert for more information on AVERT.

6. See https://www.epa.gov/statelocalenergy/co-benefits-risk-assessment-cobra-health-impacts-screening-and-mapping-tool for more information on COBRA.

7. A $112 per metric ton price (in 2019 dollars) corresponds to the $100 per short ton price (in 2018 dollars) approved by the Vermont Public Utility Commission in Case No. 19-0397-PET (order available at https://epsb.vermont.gov/?q=downloadfile/417666/138298). A $200 per metric ton value is in line with the value described in Hänsel, M.C., Drupp, M.A., Johansson, D.J.A. et al. Climate economics support for the UN climate targets. Nat. Clim. Chang. 10, 781–789 (2020). https://doi.org/10.1038/s41558-020-0833-x. A $425 per metric ton value is in line with the value described in Ricke, K., Drouet, L., Caldeira, K. et al. Country-level social cost of carbon. Nat. Clim. Chang. 8, 895–900 (2018). https://doi.org/10.1038/s41558-018-0282-y.

8. Calculated by adjusting the average avoided capacity price for FCA 9 and 10 (listed in AESC 2018, Table 39, available at https://www.synapse-energy.com/sites/default/files/AESC-2018-17-080-Oct-ReRelease.pdf) to reflect peak line losses of 8 percent and a capacity credit of 19 percent (per slide 14 at https://www.iso-ne.com/static-assets/documents/2020/09/a6_a_iii_cea_mottmacdonald_presentation_cone_and_ortp.pptx) to derive $1.75 per kilowatt-month. This value was then multiplied by the peak BTM solar output in New England in 2019 (1.8 GW), then divided by the total BTM solar output reported by ISO New England (2.3 TWh). This estimation does not include the value of solar for future years (i.e., after December 2019), retail margin impacts, or capacity price suppression effects.

9. A separate real-time spot market exists to balance the differences between day-ahead demand (and supply commitments) with actual supply and demand requirements. Per ISO New England's September 2020 COO report (see https://www.iso-ne.com/static-assets/documents/2020/09/september-2020-coo-report.pdf, page 47), day-ahead demand represented 95 to 99 percent of actual, real-time demand between August 2019 and August 2020. The exact makeup of electricity power purchases (long-term contracts, day-ahead purchases, or real-time purchases) by New England LSEs is unavailable, as it represents a collection of private-party bilateral contracts and business practices. However, conversations between Synapse analysts and LSE representatives over the past two decades suggests that in general, roughly 60 percent of wholesale energy market purchases are hedged through bilateral agreements, with the remaining 40 percent purchased outright from the spot market (35 percent day-ahead, and 5 percent real-time). These rough percentages vary from LSE to LSE, and also vary over time.

10. Despite being called "BTM," this dataset does not necessarily exclude small, distributed systems that are physically installed in front of a meter.

11. See https://www.iso-ne.com/static-assets/documents/2020/07/btm_pv_data_documentation.pdf, page 8

About Synapse Energy Economics

Synapse Energy Economics, Inc. is a research and consulting firm specializing in energy, economic, and environmental topics. Since its inception in 1996, Synapse has grown to become a leader in providing rigorous analysis of the electric power sector for public interest and governmental clients.

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Support for this analysis was provided by the following organizations:

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Bill as Introduced

HB 225 - AS INTRODUCED

2021 SESSION

21-0213
10/06

HOUSE BILL ***225***

AN ACT relative to the calculation of net energy metering payments or credits.

SPONSORS: Rep. Plett, Hills. 6

COMMITTEE: Science, Technology and Energy

ANALYSIS

This bill changes the methods of calculating and paying for the energy net metered by a customer-generator to an electric distribution utility each billing period.

- -

Explanation: Matter added to current law appears in ***bold italics.***
Matter removed from current law appears [~~in brackets and struckthrough.~~]
Matter which is either (a) all new or (b) repealed and reenacted appears in regular type.

21-0213
10/06

STATE OF NEW HAMPSHIRE

In the Year of Our Lord Two Thousand Twenty One

AN ACT relative to the calculation of net energy metering payments or credits.

Be it Enacted by the Senate and House of Representatives in General Court convened:

1 Definition; Eligible Customer Generator. Amend RSA 362-A:1-a, II-b to read as follows:

II-b. "Eligible customer-generator" or "customer-generator" means an electric utility customer who owns, operates, or purchases power from an electrical generating facility either powered by renewable energy or which employs a heat led combined heat and power system, with a total peak generating capacity of up to and including [~~one megawatt~~] ***2 megawatts***, that is located behind a retail meter on the customer's premises, is interconnected and operates in parallel with the electric grid, and is used to offset the customer's own electricity requirements. Incremental generation added to an existing generation facility, that does not itself qualify for net metering, shall qualify if such incremental generation meets the qualifications of this paragraph and is metered separately from the nonqualifying facility.

2 Net Energy Metering; Calculation of Payment or Credit. Amend RSA 362-A:9, IV-VI to read as follows:

IV.(a) For facilities with a total peak generating capacity of not more than 100 kilowatts, when billing a customer-generator under a net energy metering tariff that is not time-based, the utility shall apply the customer's net energy usage when calculating all charges that are based on kilowatt hour usage. Customer net energy usage shall equal the kilowatt hours supplied to the customer over the electric distribution system minus the kilowatt hours generated by the customer-generator and fed into the electric distribution system over a billing period.

(b) For facilities with a total peak generating capacity of more than 100 kilowatts, the customer-generator shall pay all applicable charges on all kilowatt hours supplied to the customer over the electric distribution system, less a credit [~~on default service charges~~] equal to the metered ***kilowatt-hours of*** energy generated by the customer-generator and fed into the electric distribution system over a billing period ***multiplied by the average monthly locational marginal price as determined by ISO-New England for the New Hampshire load zone for the month in which the energy is generated***.

V. When a customer-generator's net energy usage is negative (more electricity is fed into the distribution system than is received) over a billing period, such surplus shall [~~either:~~

~~(a) Be credited to the customer-generator's account on an equivalent basis for use in subsequent billing cycles as a credit against the customer's net energy usage or bill in a manner consistent with either subparagraph IV(a) or IV(b), as applicable; or~~

~~(b)~~], except as provided in paragraph VI, [~~the customer-generator may elect to~~] be paid or credited by the electric distribution utility [~~for its excess generation at rates that are equal to the utility's avoided costs for energy and capacity to provide default service as determined by the commission consistent with the requirements of the Public Utilities Regulatory Policy Act of 1978 (PURPA). The commission shall determine reasonable conditions for such an election, including the frequency of payment and how often a customer-generator may choose this option versus the option in subparagraph (a)~~] ***by means of a monetary credit applied to the bill of the customer-generator***.

VI. Instead of the [~~option~~] ***monetary credit*** in [~~subparagraph V(b)~~] ***paragraph V***, an electric distribution utility providing default service to customer-generators may voluntarily elect, annually, on a generic basis, by notification to the commission, to purchase or credit such excess generation from customer-generators at a rate that is equal to the generation supply component of the applicable default service rate, provided that payment is issued at least as often as whenever the value of such credit, in excess of amounts owed by the customer-generator, is greater than $50.

3 Commission Rules; Review. Amend RSA 362-A:9, X to read as follows:

X. The commission shall adopt rules, pursuant to RSA 541-A, to:

(a) Establish reasonable interconnection requirements for safety, reliability, and power quality as it determines the public interest requires. Such rules shall not exceed applicable test standards of the American National Standards Institute (ANSI) or Underwriters Laboratory (UL); [~~and~~]

(b) ***Require periodic review, not less frequently than every 2 years, of net metering compensation rates to determine if costs are being shifted from customer-generators to non-customer-generators and to adjust such compensation rates to reduce or eliminate any shift determined through such review; and***

(c) Implement the provisions of this section.

4 Effective Date. This act shall take effect 60 days after its passage.