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Today's Energy Cost Drivers; Tomorrow's Affordability Solutions

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WHO IS ACADIA CENTER?

MISSION

Acadia Center's mission is to advance bold, effective, and equitable clean energy solutions for a livable climate and a stronger, more equitable economy.

PROGRAMS

Acadia Center focuses on eight areas of climate and clean energy, within which we prioritize consumer benefits, public health, economic growth, and equitable distribution of benefits:

- **Energy Efficiency and Building Decarbonization**
- **Clean Energy and Grid Reform**
- **Utility Innovation and Accountability**
- **Transportation and Mobility**
- **Climate, Energy, and Equity (CLEAN-E) Analysis**
- **State and Regional Climate Policies**
- **Equity, Environmental Justice, and Outreach**
- **Public Engagement and Communications**

SUPPORT

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Two Views on Affordability: Macro (Economy-Wide) and Micro (Household)

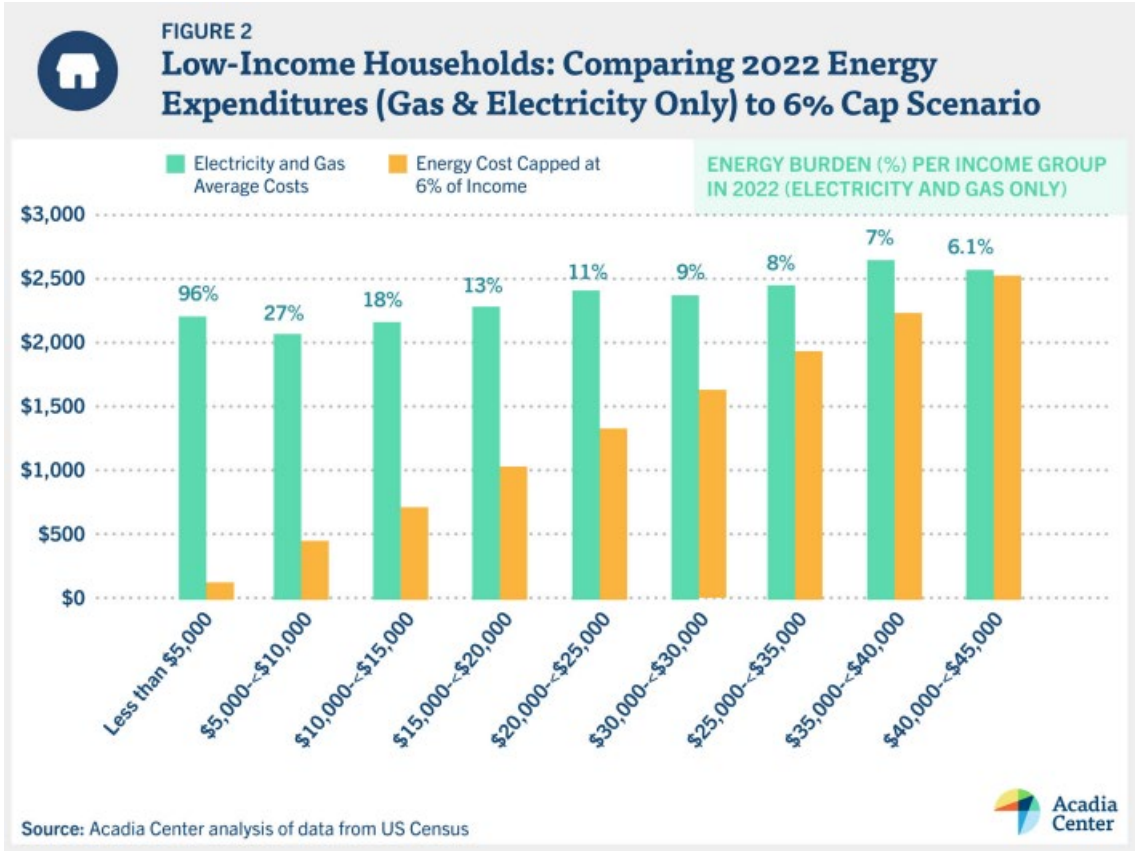
New England Energy Expenditures ($millions)

(2022 estimates - US E.I.A.)

	Natural Gas	Distillate Fuel Oil	Motor Gasoline	Electricity	Total Energy
Connecticut	1,868	3,372	5,918	5,852	18,124
Maine	485	2,252	2,554	2,072	8,347
Massachusetts	5,196	4,908	9,889	10,843	33,811
New Hampshire	427	1,366	2,660	2,279	7,646
Rhode Island	595	894	1,429	1,462	4,720
Vermont	140	833	1,125	930	3,580
	$8,711	**$13,625**	**$23,575**	**$23,438**	**$76,228**
	11.4%	17.9%	30.9%	30.7%	

New York Household Energy Burdens (2022)

(2022 data – Acadia Center and WE ACT 4 Change)



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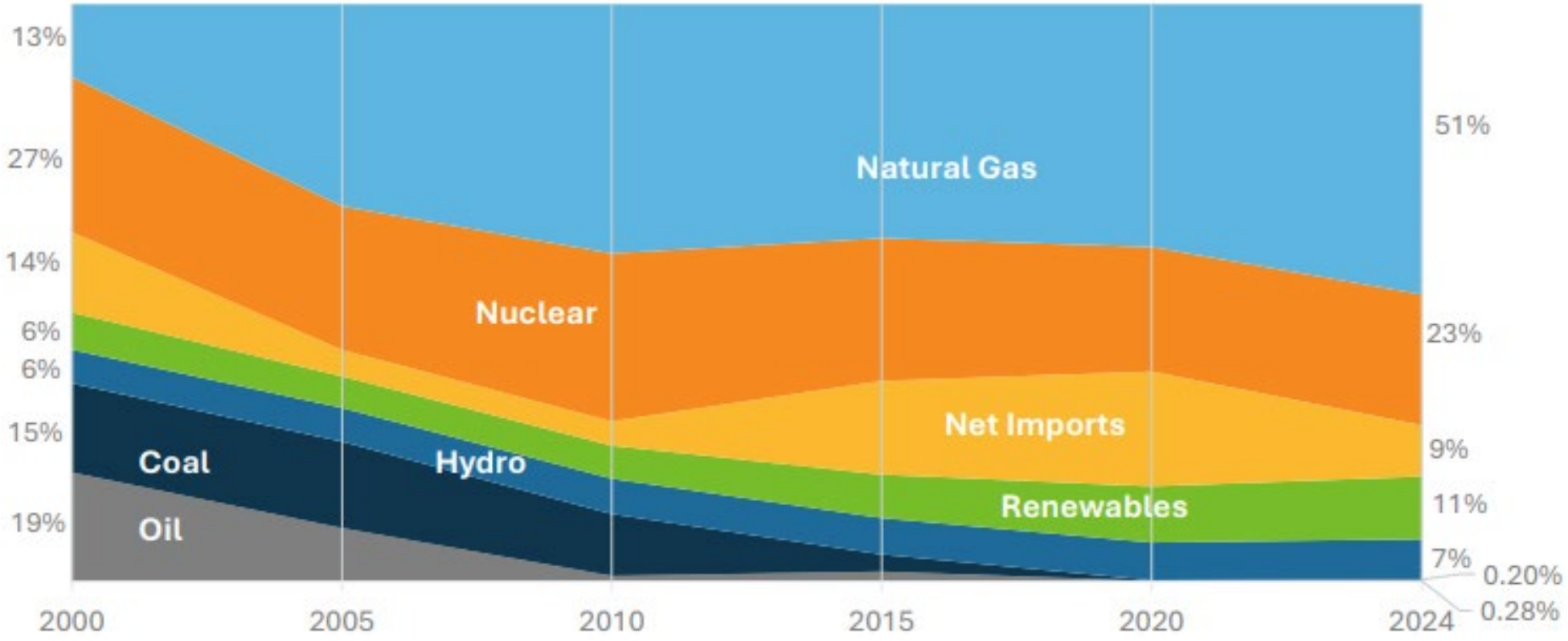
Today: Growing Reliance on Natural Gas for Electricity

Sources of Grid Electricity in New England

(Annual Net Energy for Load)



Source: ISO New England, generation data, and *Net Energy and Peak Load by Source Report*

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Overreliance on Natural Gas Reflected in Wholesale Market Costs, Supply Rates

New England Wholesale Electricity Costs

	2020		2021		2022		2023		2024**	
	$ Mil.	¢/kWh	$ Mil.	¢/kWh	$ Mil.	¢/kWh	$ Mil.	¢/kWh	$ Mil.	¢/kWh
Wholesale Market Costs										
Energy (LMPs)[b]	$2,996	2.4	$6,101	4.8	$11,712	9.0	$4,847	3.9	$5,624	4.4
Ancillaries[c]	$62	0.1	$52	0.0	$124	0.1	$183	0.1	$183	0.1
Capacity[d]	$2,662	2.2	$2,243	1.8	$1,864	1.4	$1,308	1.1	$1,248	1.0
Subtotal	*$5,720*	*4.7*	*$8,404*	*6.6*	*$13,701*	*10.5*	*$6,338*	*5.1*	*$7,054*	*5.5*
Transmission charges[e]	$2,331	1.9	$2,688	2.1	$2,739	2.1	$2,640	2.1	$2,931	2.3
RTO costs[f]	$191	0.2	$216	0.2	$214	0.2	$214	0.2	$275	0.2
	Mystic Cost of Service Agreement				$173	0.1	$465	0.4	$139	0.1
Total	$8,242	6.7	$11,308	8.9	$16,828	13.0	$9,657	7.8	$10,399	8.2

Source: ISO-NE
Q1 2025 CLG Update

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Large-Scale Renewables: Winter Reliability, Hedging Price Spikes, Moving Markets

- A new study from Europe: integrating renewables into EU grids could make wholesale electricity prices two-thirds less sensitive to natural gas prices – effectively insurance against gas price spikes.
- In 2026: NECEC transmission line and associated hydropower from Quebec will provide Massachusetts with ~20% of its electricity and reduce ratepayer bills by ~$50 million each year.
- Increasing supplies of stable clean energy estimated to yield net benefits to Massachusetts electric customers of nearly $1.2 billion by 2030.
- Consider not only contract price, but price effects on entire market (esp. for OSW)
- Opportunities to improve contracting elements and procurement frameworks:
  - Regional/multi-state procurements where possible for economies of scale
  - Flexible, state-led procurements, including for energy attributes and other products
  - Mechanisms to adjust for inflation impacts, index strike prices to wholesale market prices
  - Other flexibility for in-service dates, provisions for longer-term (e.g., 30 years)

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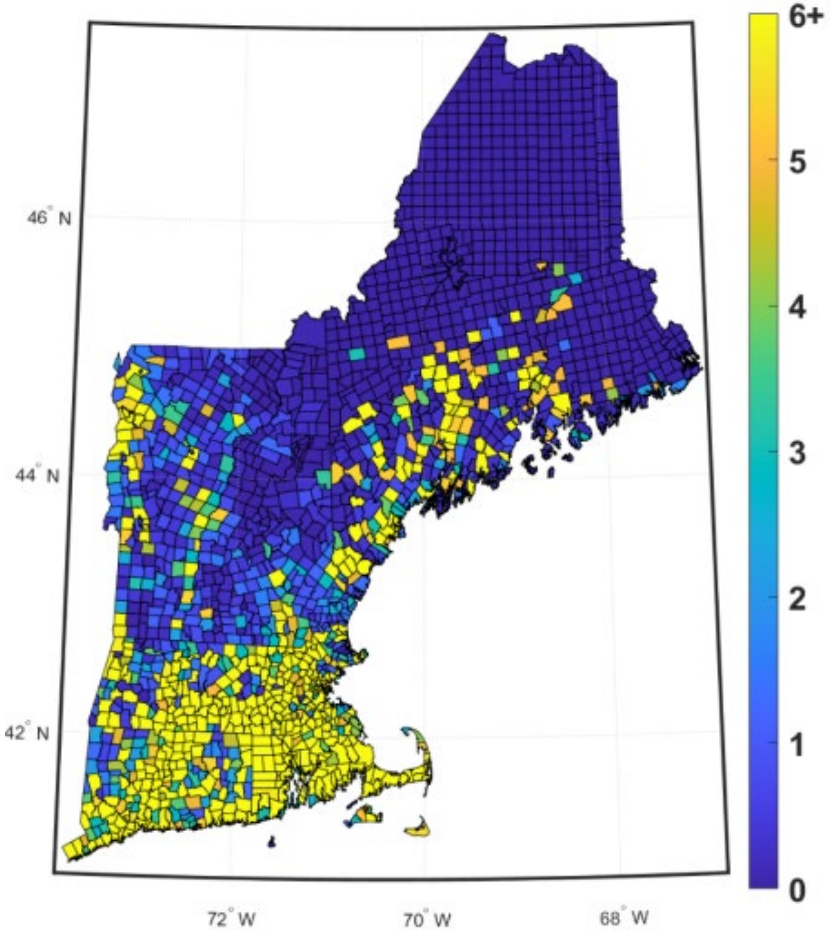
Distributed Solar and Storage: Fuel-Savers and Peak-Shavers

- ISO-NE's CELT 2025 predicts 14.3 GW of solar by 2035
- Distributed solar drove $1.1b in wholesale market savings from 2014-2019, with 8,600 GWh of production (Synapse 2020)
  - CELT 2025 foresees this amount of solar *annually* by 2029
- Current fleet of 7.6 GW presents significant opportunity for battery storage retrofits



Installed DER PV Capacity as of December 2024 (MW) – ISO-NE

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Benefits of US - Canada Interregional planning are well documented

- In different transmission and renewable addition scenarios between Québec and New York and New England… the net benefits of increased coordination and transmission are in the range of $4B per year.

  (Williams et al, Evolved Energy 2018)

- "Adding 4 GW of transmission between New England and Quebec is estimated to lower the costs of a zero-emission power system [in that region] by 17-28%."

  (MIT CEEPR, 2020)

- "It is optimal to shift the … existing hydro and transmission assets… toward a two-way trading of electricity to balance intermittent US wind and solar generation. Doing so reduces power system cost by 5-6%." (MIT CEEPR, 2020)

- "During a simulated polar vortex in February 2035, greater transmission prevented ~ 2 million customers losing power across Boston, New York City, Baltimore and Washington DC saving $1B." (GE International Study, 2022)

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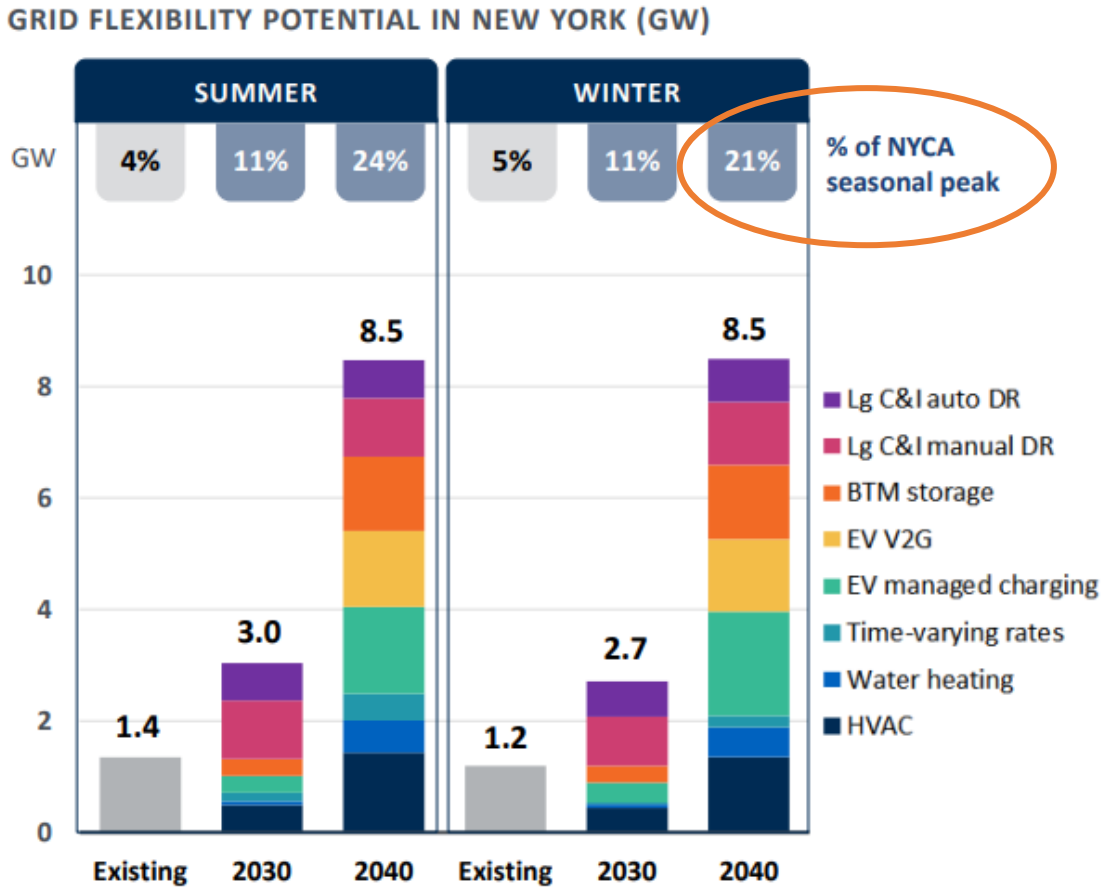
Grid Flexibility: A New Solution Set for Reducing Peak Costs



The portfolio of grid flexibility measures could avoid $2.9 billion annually in power system costs by 2040, of which $2.4 billion could be returned to customers.

This level of peak demand reductions would save New England ~$8B in transmission costs alone!

**Assuming $750 million per GW of peak reduced below 51 GW, per ISO-NE 2050 Transmission Study.

Source: Brattle Group
New York's Grid Flexibility Potential

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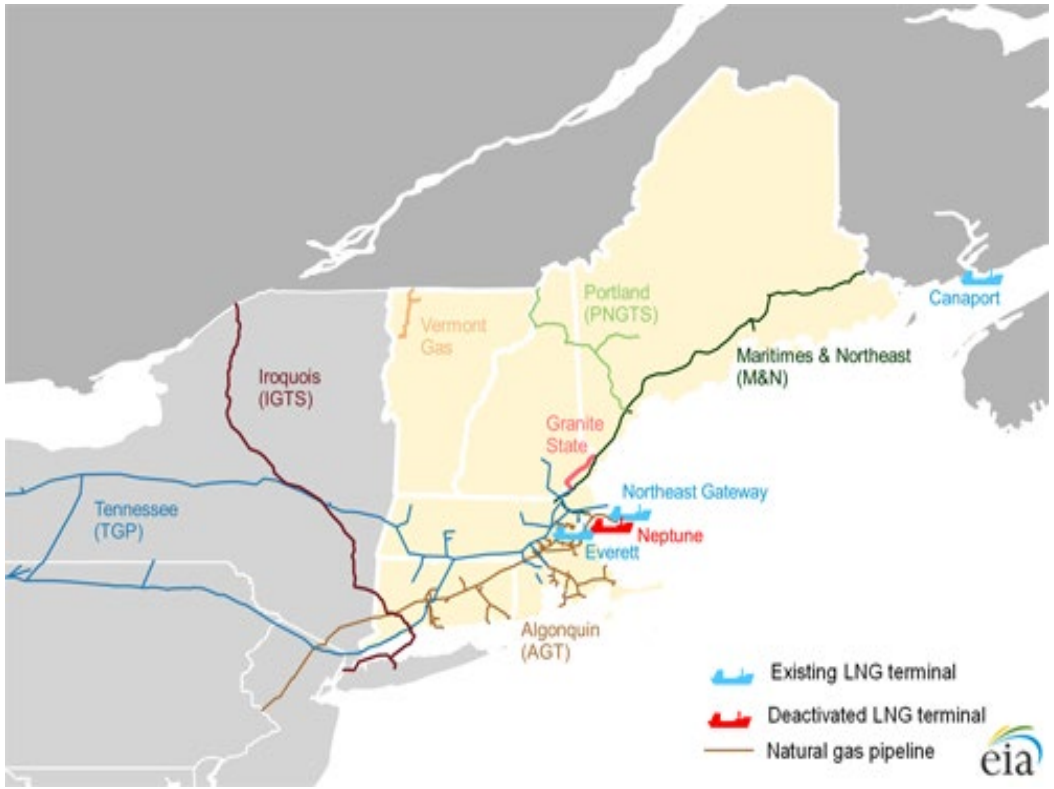
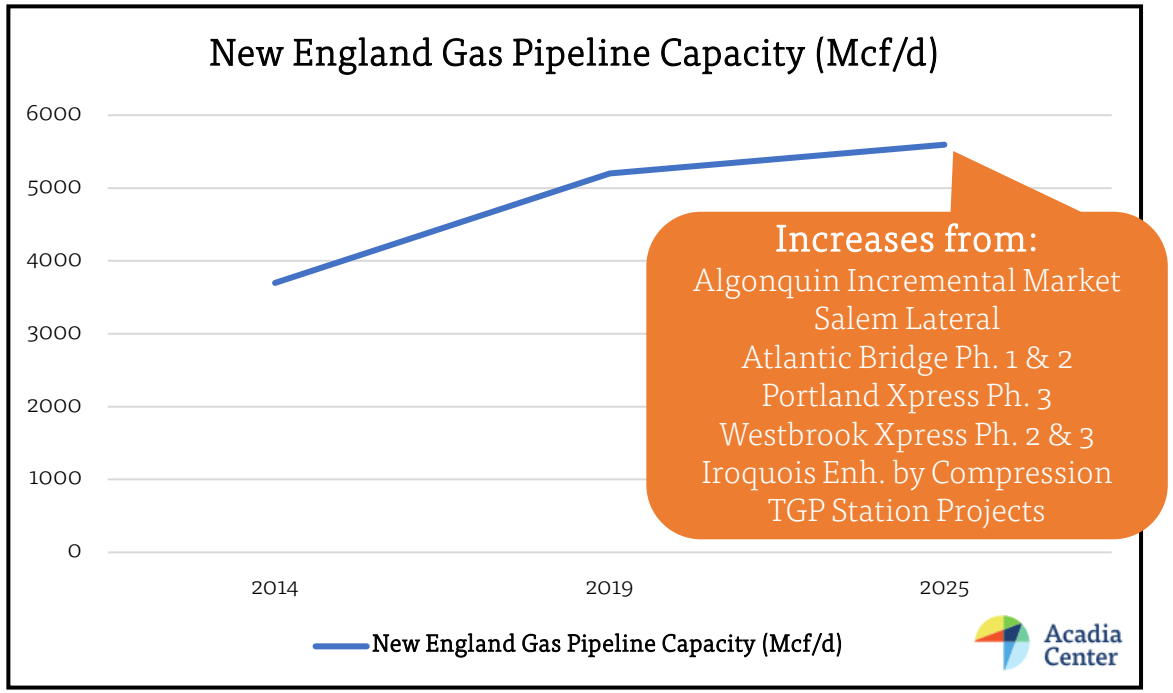
Gas pipeline capacity up >50% since 2013; costs have not moderated





Regional pipeline capacity now at ~5,600 Mcf/d, up 51% since 2014.

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Sources: DOE, EIA, Daily Energy Insider – Acadia Center analysis

Let's keep building two clean energy pipelines

Clean Supply/Generation Resources

- NECEC transmission line and hydro: 1.2 GW
- Vineyard Wind & Revolution Wind: 1.5 GW
- Large-Scale Solar: 5.4 GW*
- LTTP: Unbottling 3 GW of new renewables
- Mature Northern Maine onshore wind: 1 GW+
- Bulk Energy Storage: 5.7+ GW
- Interregional Transfers: 5-7 GW "low regrets"

Clean Demand/Distributed Resources

- BTM solar: 9 GW (incl. 400 MW winter peak reduction)*
- Energy Efficiency, Demand Capacity Resources: 2.5 GW*
- Flexible EV charging/V2X: ~3.3m LDEVs, ~195 GWh
- BTM Energy Storage (electric, thermal)
- Advanced Meters and Dynamic Rate Design
- Other DR and Grid Flexibility Measures

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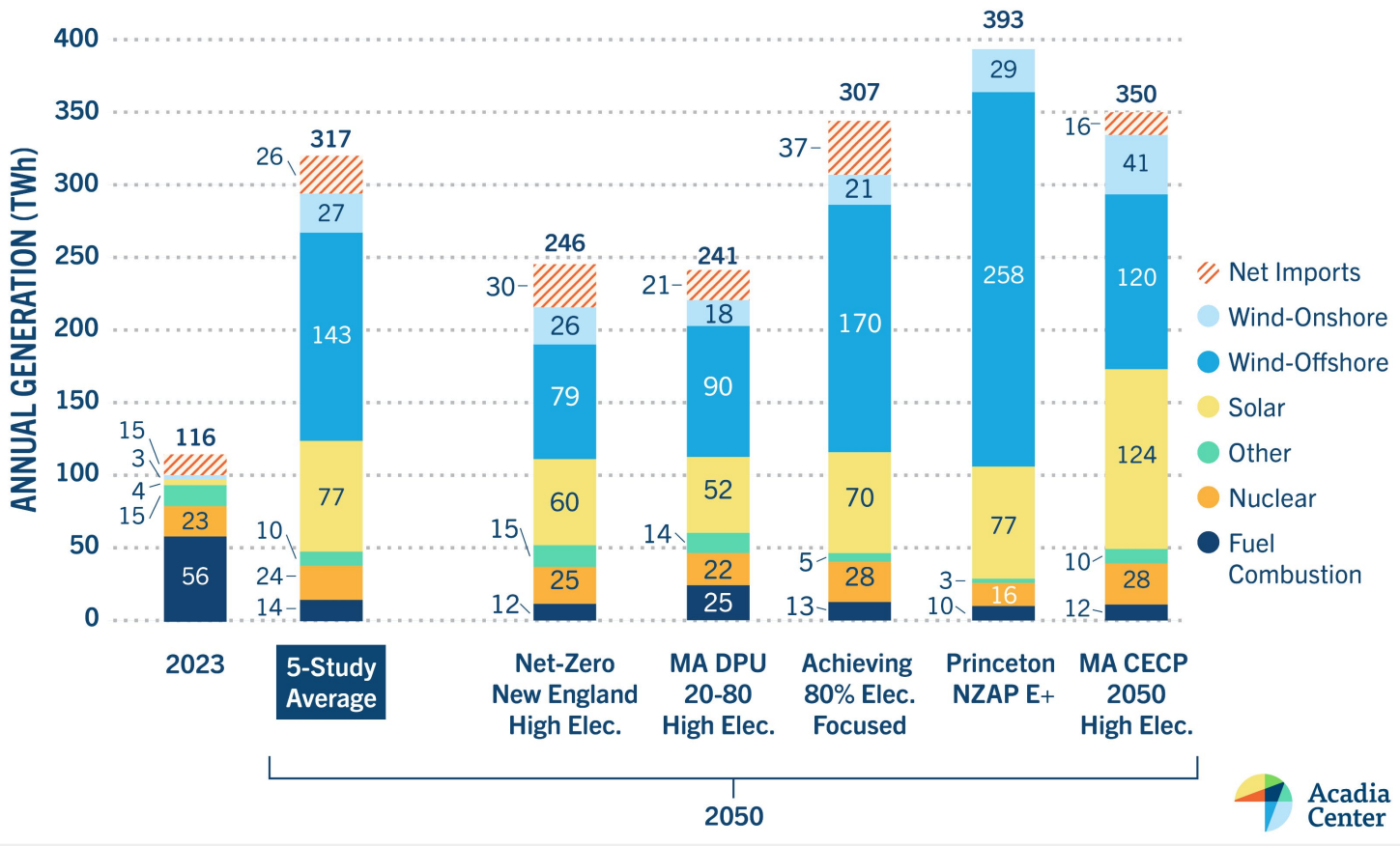
** Totals from 2025 CELT Report for 2034/2035*

2050: Pathways to a Clean Electricity Future in New England

FIGURE 9

New England Annual Generation by Resource Type: 2023 vs. 2050 5-Study Comparison



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