

Breaking Down Electricity Cost Drivers in New Hampshire Henry Herndon | October 2020

“New Hampshire has some of the highest electricity rates in the country!”

We’ve all heard some version of this battle cry, and it is a true statement. New Hampshire is the sixth most expensive state for electricity, with average retail rates coming in at \$0.17 per kilowatt-hour (kWh) (or \$170 per megawatt-hour, if you are dealing with larger quantities of electricity). Only Hawaii, Alaska, Massachusetts, Connecticut, and Rhode Island have pricier power per unit.¹

However, Granite Stater’s are actually about average in terms of overall electricity cost. The average New Hampshire household spends \$120/month on their electric bills, while the national average is \$115/month. Twenty other U.S. state spend more per month on electricity than New Hampshire per household, on average. In particular, southern states tend to spend closer to \$130/month on electricity, presumably due to higher air conditioning loads and less efficient buildings.² Based on a median household income of \$74,991, New Hampshire residents spend a little less than 2% of our income on electricity.

So why all the shouting over high electricity rates?

What is the source of those high rates?

What can we do about it as a state?

This article breaks down and explains electricity cost drivers in New Hampshire. It is meant as an educational document so that as a state, we can make informed decisions towards better managing electric costs.

Electricity Supply vs. Electricity Delivery: Market Vs. Monopoly

Electric costs can be sorted into two big buckets: Supply and Delivery. The former is a testament to America’s free market spirit. The latter remains a tightly controlled monopoly, subject to state central planning and regulation. Supply and delivery each make up about half of the retail rate of \$0.17/kWh. (We will go on to parse each of these buckets into sub-categories, but first thing’s first.)

In New England, we get to pick and choose where our electricity **supply** comes from, and which of the many competitive energy suppliers we want to shop around for. Energy supply is the land

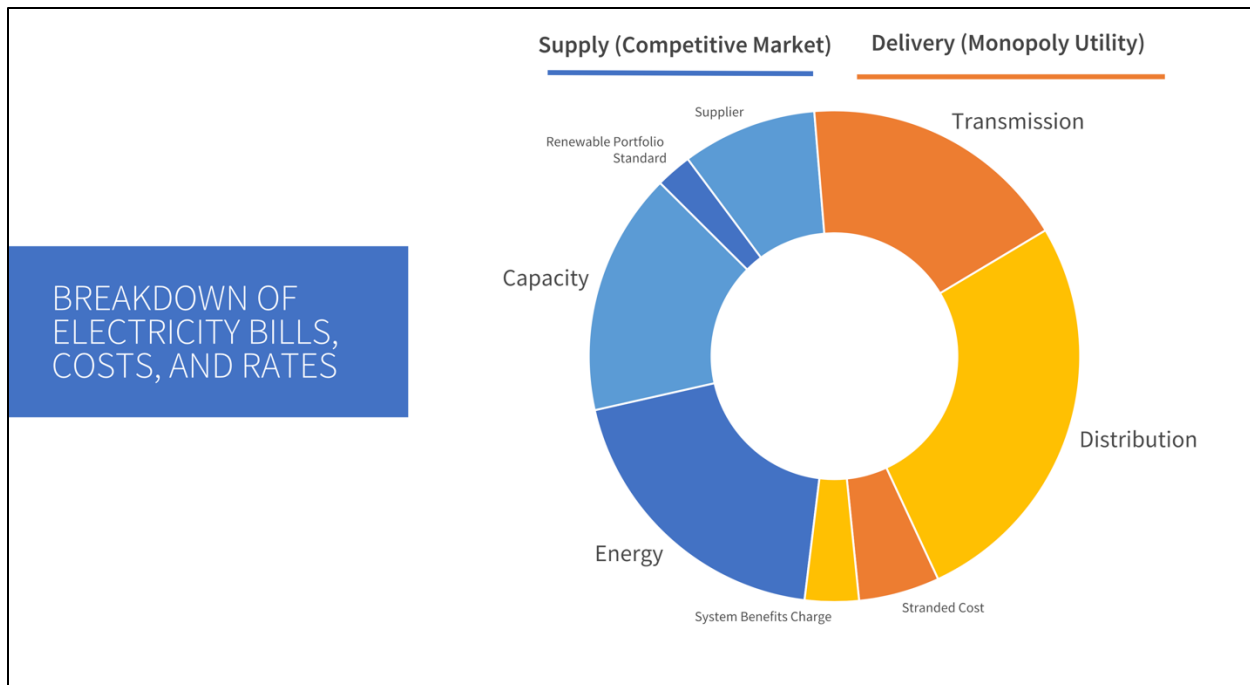
¹ U.S. Energy Information Agency. <https://www.eia.gov/electricity/state/>

² U.S. Energy Information Agency. https://www.eia.gov/electricity/sales_revenue_price/pdf/table5_a.pdf

of markets, supply and demand, consumer choice, and competition. Different energy generators, power plants, and energy supply companies compete against one another to offer cheaper prices, or cater to other consumer preferences such as green power. Prices constantly respond to market forces of supply and demand. When demand for electricity is high, prices go up. When demand for electricity is low, prices go down.

Delivery of electricity, the poles and wires that carry electrons from generators and suppliers to residents and businesses, is a monopoly enterprise. One company owns the delivery infrastructure serving any given customer. As a mechanism to protect that consumer from the threat of unrestrained monopoly power (e.g., jacking up rates because the customer has nowhere else to go), those monopoly utility companies are subjected to regulation by the state.

In the next section, we will unpack the various cost components contributing to both electricity supply and delivery.



Supply Costs: Energy, Capacity, Renewables, Suppliers

The first bucket of costs, energy supply, can be sub-divided into four components: energy, capacity, renewables, and suppliers. Together these costs add up to a little less than half of the retail electricity rate. Call it \$0.08/kWh for simplicity's sake, or \$80 per megawatt-hour (MWh). That \$80 energy supply cost can be roughly broken down as follows:

- Energy Costs: Average \$33/MWh in 2019 (fluctuate in real time)
- Capacity Costs: \$27/MWh in 2019
- Renewable Portfolio Standard Compliance: ~\$4/MWh

- Energy Suppliers: \$10-\$20/MWh
- **Total: ~\$80/MWh (\$0.08/kWh)**

Energy costs are just what they sound like: the cost to produce one unit of electricity at any given moment, based upon the supply and demand for electricity at that time. Energy costs fluctuate in real time in the ISO New England wholesale market, representing markets at their finest. The average cost per unit of electricity generated in 2019 in New England was \$33/MWh, or \$0.033/kWh.³

Capacity costs are less intuitive. In addition to the market for actual electrons generated, ISO New England also administers a marketplace for capacity, or, the ability to generate electricity when needed. This can also be thought of as a reliability market. The capacity market pays power plants year-round for the maximum amount of power they are able to generate at a given moment. The bigger the power plant, the more money it makes in the capacity market. Capacity

Understanding Electricity Markets & Costs

Retail electricity **rates** average \$0.17 per kilowatt-hour (kWh) in NH, some of the highest in the nation

<p><u>SUPPLY (COMPETITIVE MARKET) (~\$0.08/KWH)</u></p> <ul style="list-style-type: none"> • Energy costs, avg. \$0.033/kWh Fluctuate in real time in ISO New England wholesale markets • Capacity cost \$0.027/kWh in 2019 Fixed annually based on the single hour of annual peak load • Renewable Portfolio Standard ~\$0.004/kWh Cost of compliance with state renewable energy policy targets • Energy Suppliers ~\$0.01-\$0.02/kWh Intermediaries between wholesale markets and customers Can be thought of as insurance / risk management 	<p><u>DELIVERY (UTILITY MONOPOLY) (~\$0.092/KWH)</u></p> <ul style="list-style-type: none"> • Transmission ~\$0.03/kWh Based on monthly peak loads; fastest growing bucket of costs • Distribution ~\$0.045/kWh Your local utility; prices set by the Public Utilities Commission • Stranded Costs ~\$0.01/kWh Bad investments socialized across all rate payers • System Benefits Charge ~\$0.007/kWh Funding for NH Saves energy efficiency programs
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While NH has high rates, **bills** are on par with the rest of the nation

prices are set by the single hour of annual peak demand for electricity, generally in the midst of the hottest summer heatwave when air conditioners are cranking away at full blast. In 2019, the capacity market cost ratepayers about \$27/MWh, or, \$0.027/kWh.

³ ISO New England Overview and Regional Update. <https://www.puc.nh.gov/EESE%20Board/Meetings/2020/20200417Mtg/20200417-EESE-Board-ISO-NE-Overview-And-Regional-Update.pdf>

Renewable Portfolio Standards are state policies that require utilities and energy suppliers to acquire a certain portion of their power from renewable sources. The cost of compliance with New Hampshire's legislated renewable energy targets is about \$4/MWh, or, \$0.004/kWh.⁴

Finally, there are the **energy suppliers**. Energy suppliers are financial intermediaries that sit in between ISO New England's wholesale markets and customers. Suppliers play in those real-time wholesale markets where prices are in constant flux, purchasing energy and capacity, and making sure to comply with renewable energy policies. They then package the energy, capacity, and renewables together, apply a *risk premium* and a profit mark-up, and pass along a nice even electricity supply rate to the customers. The name of the game for energy suppliers is *commodity risk management*. Think of a Wall Street hedge fund manager, sitting at a bank of computer screens, monitoring prices, weather, supply & demand, headlines and other market fundamentals, poised to unload this option, or execute a purchase order on that one as circumstances change. Only in this case, the portfolio is comprised of different contracts and options on electricity purchases instead of stocks and bonds. The cost of the energy supplier's services could be anywhere between \$10/MWh and \$20/MWh (\$0.01/kWh - \$0.02/kWh).

Altogether, our New Hampshire electricity supply rates are mostly made up of *energy* and *capacity* costs, with a dash of *renewables*, and a light insurance risk premium and service fee paid to the *energy suppliers* who package it all together behind the scenes.

Delivery Costs: Transmission, Distribution, Stranded Costs, and the System Benefits Charge

The second bucket of costs, energy delivery, can also be sorted into four sub-buckets: transmission, distribution, stranded costs, and the System Benefits Charge (SBC). Delivery costs add up to about \$92/MWh (\$0.092/kWh), a little more than half of the full retail rate. Delivery costs breakdown as follows:

- Transmission: ~\$30/MWh (\$0.03/kWh)
- Distribution: ~\$45/MWh (\$0.045/kWh)
- Stranded Costs: ~10/MWh (\$0.01/kWh)
- System Benefits Charge: ~\$7/MWh (\$0.007/kWh)
- **Total: ~\$92/MWh (\$0.092/kWh)**

Transmission costs come from the high-voltage inter-state electric transmission network that forms the backbone of New England's six-state wholesale electricity system. For you electrical engineers, we're talking the 345s and 115s, kilovolts (KV) that is. These are the big steel towers carrying power lines from the power plants along the highways and across the mountains to the lower-voltage distribution networks running through our streets and neighborhoods. Electricity

⁴ NH Renewable Energy Fund Annual Report, 2020. <https://www.puc.nh.gov/sustainable%20energy/Renewable%20Energy%20Fund/20201001-PUC-SE-2020-REF-Report-to-Legislature.pdf>

transmission is monopoly business, and it is regulated by the Federal Energy Regulatory Commission (FERC) as per its inter-state commerce nature. Transmission costs for each utility company are calculated based on that utility's share of the monthly peak load across the New England system. In 2019, New England-wide, the average transmission cost was \$17/MWh (\$0.017/kWh). In New Hampshire, it's as much as \$30/MWh (\$0.03/kWh).⁵ While the other five New England states are seeing declining monthly peak loads, and thus declining transmission costs, New Hampshire is experiencing the opposite. Transmission costs are the fast growing of all the electricity cost components for New Hampshire residents.

If energy costs are a perfect market, **distribution** costs are the opposite. Distribution costs, the largest batch of all costs coming in at more than \$45/MWh (\$0.045/kWh), are a function of centralized state planning and regulation. Imagine accountants and bureaucrats sitting in Concord's drab state office park that was once the hospital campus for New Hampshire's mentally disabled. They get together with their monopoly utility counter-parts every few years and haggle over the cost of distribution. These costs pay for our electric meters, poles and wires, substations, and other local (intra-state) delivery infrastructure.

Stranded costs, stranded costs... How to explain? Ummm, the utility company made a bad investment and now ratepayers are stuck paying over \$10/MWh (\$0.01/kWh) for... For what? I really don't get this one actually, apologies!

The **System Benefits Charge (SBC)**: a charge that benefits the system! The SBC accrues money to be reinvested into building energy efficiency improvements administered under the banner of NHSaves. Residents, businesses, cities, and towns all have access to funding to contribute to the cost of LED lighting upgrades, building energy audits and weatherization jobs (air-sealing, insulation), energy efficient heating systems like air-source heat pumps, and more. All for the cost of \$7/MWh (\$0.07/kWh). More efficient use of energy (i.e., wasting less energy) is a good way to mitigate other system costs.

So, *distribution* makes up half of the delivery charge with the next biggest chunk coming from *transmission*. *Stranded costs* (whatever those are) add another penny per kilowatt-hour, and the *SBC* tacks on a little extra to fund investments into energy improvements for residents and businesses.

Conclusion

So, how can we use this information to make informed decisions from the local level on up to setting state policy?

⁵ Eversource 2020 Summary of Electric Rates. https://www.eversource.com/content/docs/default-source/rates-tariffs/nh-summary-rates.pdf?sfvrsn=2947c862_6