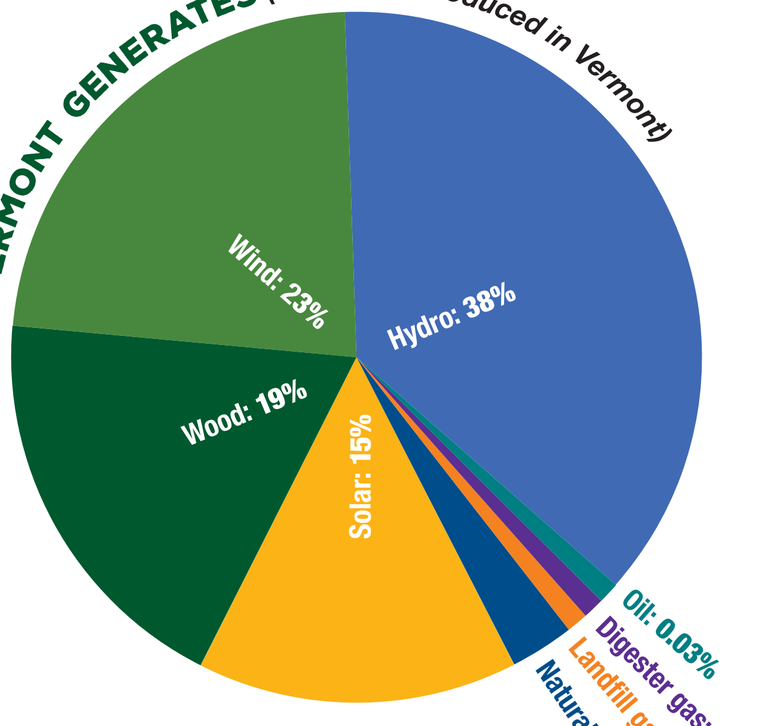
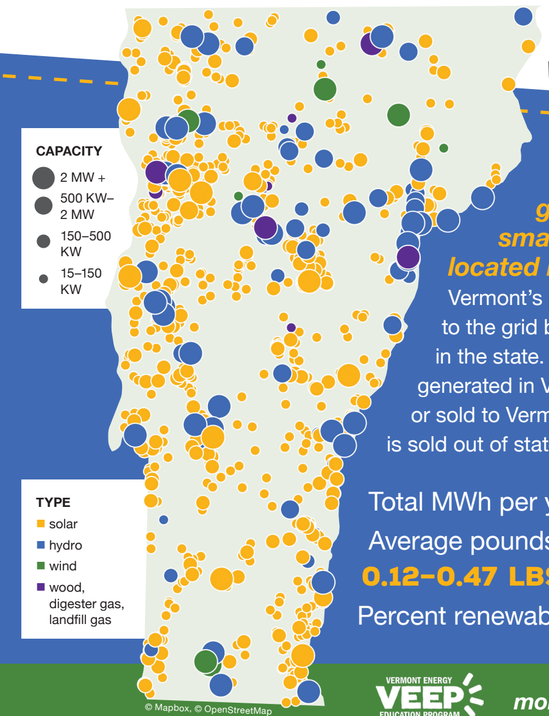
SLICING THE ELECTRICITY PIE

There are many ways to answer the question "Where does our electricity come from?"

UPDATED FOR 2019

WHAT VERMONT GENERATES (electricity produced in Vermont)





Vermont generators

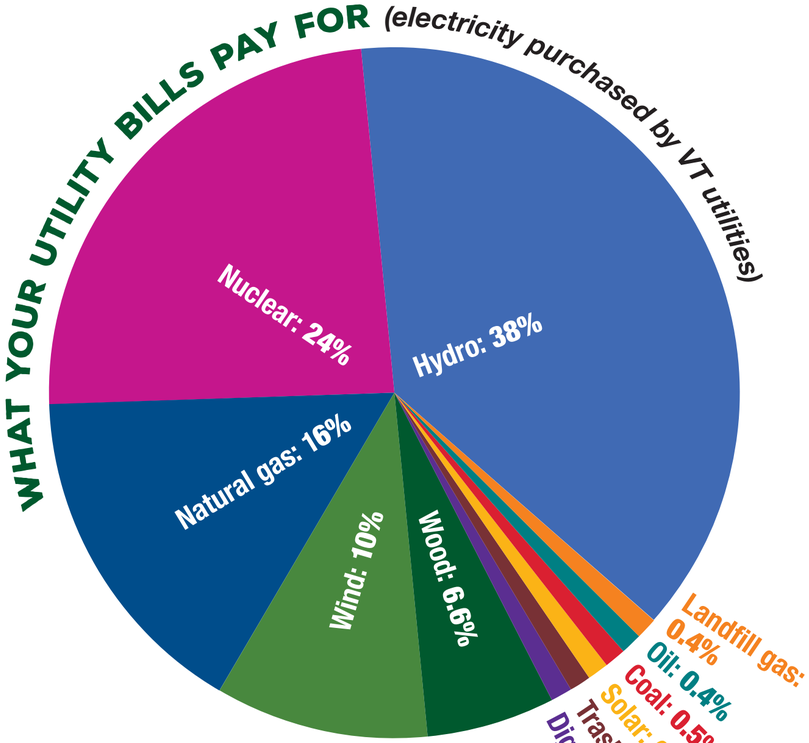
There are many generators — mostly small and very small — located in Vermont. This is Vermont's part in supplying electricity to the grid by hosting these generators in the state. Not all of the electricity generated in Vermont is used directly by or sold to Vermont electric utilities; some is sold out of state.

Total MWh per year: **1,941,000**

Average pounds CO2e per kWH: **0.12–0.47 LBS**

Percent renewable: **99.97%**

WHAT YOUR UTILITY BILLS PAY FOR (electricity purchased by VT utilities)

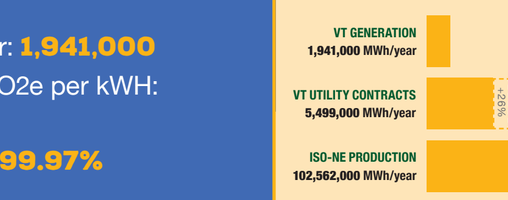


This is what Vermont utilities purchase or generate to put onto the grid. Vermont utilities own some of their own generators and they also purchase power from others. When you pay your electric bill in Vermont, it goes to pay for the electricity generated by these sources. Your bill also pays for the electric lines and all the labor and parts required to make the system stay running reliably.

Total MWh per year: **5,499,000**

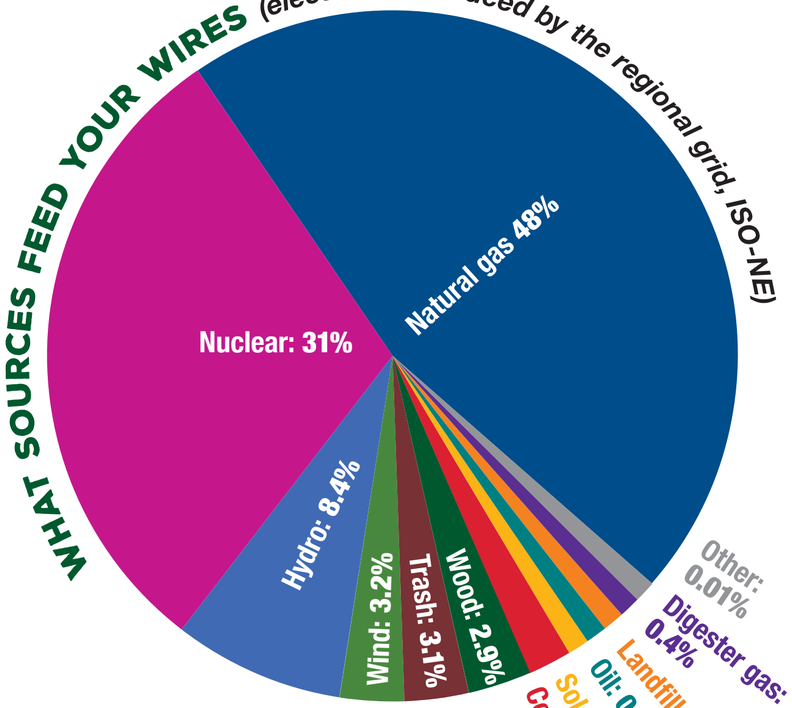
Average pounds CO2e per kWH: **0.45–0.57 LBS**

Percent renewable: **58%**



Efficiency savings play a big role in Vermont and New England. Without efficiency measures from Efficiency Vermont and Burlington Electric, Vermont utilities would have to supply an additional 1,400,000 MWh. New England–wide efficiency savings are 23,500,000 MWh. Note that the total electricity that Vermont generates and the amount our utilities buy is a small fraction of the amount of electricity used on the regional grid, ISO-NE.

WHAT SOURCES FEED YOUR WIRES (electricity produced by the regional grid, ISO-NE)



ISO-NE region

What is ISO-NE? The Independent System Operator of New England operates the New England electricity grid, coordinating and directing the flow of electricity over the region's high-voltage transmission system. ISO-NE also oversees the selling of electricity by companies that generate electricity and the buying of electricity by electric utilities who in turn sell it to individual users.

This is the average mix of sources you get when you use electricity anywhere in New England. Some of it comes from Hydro Quebec in Canada, but most of it comes from generators in New York and New England. Since you can't decide which electrons to use when you plug something in, we consider the ISO-NE mix to be an average representation of the sources you are using.

Total MWh per year: **102,562,000**

Average pounds CO2e per kWH: **1.1 LBS**

Percent renewable: **19%**

Without efficiency measures, ISO generation would have been 23% greater.

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NOTES: 1. **Electricity source data** comes from the Vermont Department of Public Service and ISO-NE. Efficiency data from Efficiency VT 2017 filings with Public Utilities Commission; ISO-NE values from 2016 data from ISO-NE.

2. Students can learn more about electric generation in Vermont using the Community Energy Dashboard, vtenergydashboard.org. Data in pie charts available in spreadsheet form on request from VEEP.

3. CO2 emissions per kWh are based on a weighted average of the mix of sources using Energy Information Agency (EIA) data on CO2 per kWh for each fuel type, with the exception of nuclear and wood fuels. Data on nuclear electricity CO2 emissions come from "Nuclear Power, a Critical Analysis, the CO2 Emissions of the nuclear life cycle," Jan Willem Storm van Leeuwen and Philip Smith, 2003. CO2 emissions are from fuel extraction, processing and transport, and for decommissioning beyond that required for other generator types. CO2 emissions estimated here at one-quarter that of a natural gas–fired plant, though values are controversial.

4. CO2e adds to CO2 emitted from burning natural gas the 20-year CO2 equivalent global warming potential of methane leakage, which occurs during exploration, drilling, extracting, refining and transporting the fuel.

5. The average CO2e per kWH values for the two Vermont pies include a range of CO2 emissions from burning wood. Wood is such a small percent of ISO-NE generation that the range is too small to notice. The larger value represents total emissions from harvesting, processing, transporting and burning the wood. The lower figure, from the Biomass Energy Resource Center (Summary of Carbon Emission Impacts of Modern Wood Heating in the NE US, February 2016) assumes almost all the wood is harvested sustainably. The BERC analysis counts only 10% of the CO2 emissions from burning the wood, with the rest being taken up and held in the mass of the rest of the trees growing in the forest over a 100-year period. We include a range of emissions here because 1) Burning wood releases more carbon dioxide per unit of energy than burning oil, 2) We don't know whether the trees are harvested sustainably, 3) We are concerned about short-term emissions accelerating climate change tipping points, 4) Perhaps most importantly, to engage you in this important conversation about wood burning.

6. Trash-fired power plants and landfill methane are included as renewable here, but as we recycle more plastics and divert food waste from landfills, these energy sources will decrease over time. Should these two sources be called "short-term renewables"?