



VERMONT LEGISLATIVE
Joint Fiscal Office

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Fiscal Note

April 23, 2024

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H.289 – An act relating to the Renewable Energy Standard

As recommended by the Senate Committee on Natural Resources and Energy

Bill Summary

The bill would make numerous changes to the Renewable Energy Standard (RES). It would require that most retail electricity providers' annual load be comprised of 100 percent renewable energy by January 1, 2030. For GlobalFoundries and municipal providers, the deadline would be January 1, 2035. The bill would also increase the required amounts of distributed renewable generation, new renewable energy, and load growth renewable energy. Some exceptions are spelled out in the bill.

The updated cost of implementing the bill over the 2025 to 2035 period is now \$150 million to \$450 million.

Providers that cannot meet the requirements could instead make alternative compliance payments at rates specified in the bill. Unless it meets strict efficiency and greenhouse gas reduction standards, wood biomass electricity generation coming into service after January 1, 2023 would not count toward a provider's renewable energy total. Under certain conditions, electricity generated by hydropower plants would count toward the distributed renewable generation or energy transformation requirement.

Fiscal Impact

The bill would have direct and indirect fiscal impacts on Vermont. After investigating the overall costs of implementing the bill more thoroughly, the Joint Fiscal Office (JFO) has revised downward its February 22, 2024 estimates of those impacts, which were based on a Department of Public Service (PSD) memo.¹ JFO now estimates the overall costs to be between \$150 million and \$450 million, down from the original \$1 billion estimate from the PSD.² However, due to various unknowns – potential technological advances, changes in demand for electricity, adaptations in the ISO-New England grid, actions of Vermont's utilities in future years, etc. – considerable uncertainty regarding the overall cost and impact on the State budget remains.

JFO's updated estimates of the direct cost to the State budget, including the General Fund and other sources for appropriation, are somewhat different than prior estimates. Direct costs would be between \$5,600 and \$16,900 in fiscal year 2025 and would grow to between \$198,500 and \$595,500 in fiscal year

¹ JFO's Feb 22nd Fiscal Note is available at https://jfo.vermont.gov/assets/Publications/2023-2024-House-Bills/43d3a32437/H_289_Fiscal_Note_RES_Reform_OUTDATED.pdf

² Following their February 6 estimate, the Public Service Department issued a revised estimate in a March 10, 2024, memo to chairs and vice-chairs of three House committees. The new estimate is \$857 million.

2035. Electricity rate increases applied to electricity used by the State beyond those already expected in the absence of the bill account for the cost increases.

The bill would increase three revenue streams. The Low-Income Home Weatherization Assistance Fund would receive increased revenue from the gross receipts tax on retail sales of electricity – between \$2,800 and \$8,300 in fiscal year 2025. Increased revenue would rise to between \$116,200 and \$349,000 by fiscal year 2035. PSD would receive additional revenue, to be used for maintenance expenses, from the tax on the gross operating revenues of providers of electric energy. Starting in fiscal year 2026, that revenue would amount to between \$4,200 and \$13,000. It would rise to between \$73,400 and \$220,000 by fiscal year 2035. The Public Utility Commission (PUC) would receive funds, also to be used for maintenance expenses, from that revenue source as well; between \$2,700 and \$8,100 in fiscal year 2026 and between \$47,000 and \$141,000 by fiscal year 2035. At this time, neither PSD nor PUC has requested additional State personnel to administer the new RES.

The overall effect of indirect fiscal impacts is unclear. Indirect fiscal impacts would arise from increased resource investment in Vermont, possibly a minor decline in consumption growth by households, and perhaps a slight slowing in the growth rate of the State's gross domestic product (GDP). Illustrative modeling by The Brattle Group suggests those macroeconomic effects are minimal; they could result in slightly higher growth in tax revenues in future years. It is possible, but not certain, that State expenses such as health care costs or climate change-related investments in adaptation and resilience measures could grow less rapidly if lower greenhouse gas emissions led to better health and less environmental damage.

To the extent that the higher RES requirements lead to faster electrification in the buildings and transportation sectors, households would experience savings on total energy costs (electricity, heating fuels, and transportation fuels) over time. Upfront investments in heat pumps and electric vehicles would offset those savings initially, but households would be better off financially in the longer term.

To derive the updated costs of implementing the bill over the 2025 to 2035 period, JFO used both statewide weighted averages for the bill's renewable energy requirements in the model developed for the PSD's Stakeholder Advisory Group and associated adjustments as well as revised estimates for the bill's impact on costs to upgrade the state's transmission network. A range of estimates is provided to reflect the uncertainty of potential costs. The range of estimates is composed of two parts as follows:

- Updated estimated costs related to utilities implementing the new RES
 - \$150 million to \$250 million – down from \$500 million
- Updated estimated costs to upgrade the state's transmission grid to accommodate the higher levels of distributed generation in the bill above already-planned upgrades; much uncertainty exists here
 - \$0 to \$200 million – down from \$500 million³

The current updated estimates differ in important ways from JFO's prior estimates. The updated estimates reflect a better understanding of the bill's requirements relative to what was modeled for the 2023 working groups; more careful modeling of the bill's RES requirements applied to the various utilities; and insightful discussions with the Vermont Electric Power Company (VELCO) – the statewide transmission organization for Vermont; Sustainable Energy Advantage LLC (SEA) – the contractor who developed the technical model for the fall Working Groups; and energy experts at the Regulatory Assistance Project (RAP).

³ PSD in its estimate of the Governor's proposal and Renewable Energy Vermont in its estimate of H.289 assume no additional transmission upgrade costs from RES reform. JFO believes some additional costs are likely because distributed generation will not be optimally sited and will occur more rapidly, thereby requiring upgrades, and supply chain and workforce issues could arise.

Background and Details

Only Section 4 has a fiscal impact.

Section 4

Section 4 would require that the amount of total renewable energy for GlobalFoundries and municipal retail electricity providers reach 100 percent by 2035. All other retail electricity providers would have to reach 100 percent by 2030. Section 4 would also establish required amounts of distributed renewable generation, new renewable energy, and load growth renewable energy for electricity providers of different sizes and types. It would also create a new regional renewable energy category for the RES. Finally, it provides alternative compliance payment rates for utilities that cannot reach the new targets for the RES.

To estimate the direct fiscal impacts that are based on the overall cost to ratepayers of implementing the bill, JFO used the SEA technical model with adjusted requirements for utilities along with guidance from knowledgeable entities. JFO participated in conversations with a Senior Director at SEA; officials at VELCO, and energy experts at RAP. More information about why JFO updated the cost estimates is available below. For indirect fiscal impacts, JFO relied on the macroeconomic analysis conducted by The Brattle Group for the 2023 Legislative Working Group on Renewable Energy Standard Reform.

Direct fiscal impacts

Increased State costs stem from an anticipated rise in electricity rates beyond those increases assumed in the absence of the bill. JFO assumed all increased costs associated with the bill would be reflected in rates paid for electricity and that the amount of electricity used by State government would stay relatively constant over time, about 35,500 Megawatt hours. The incremental impact on rates would be between 0.5 cents and 2 cents per kilowatt hour by 2035 (see Appendix 1).⁴

Estimate for H.289: Additional Cost to State Government for Electricity		
Fiscal Year	If cost is \$150 million	If cost is \$450 million
FY 2025	\$5,600	\$16,900
FY 2026	\$37,700	\$129,900
-	-	-
FY 2030	\$87,400	\$262,200
-	-	-
FY 2035	\$198,500	\$595,500

Sources: JFO estimates using SEA model with H.289 requirements and statewide weighted averages, and Vermont Department of Buildings and Grounds data on annual MWh used by State government.

Additional revenues would come from three tax streams.⁵

- A monthly gross receipts tax of 0.5 percent levied on the retail sale of electricity. Funds would go to the Low-Income Home Weatherization Program.
- A tax on gross operating revenue of providers of electricity levied on the prior calendar year's gross operating revenue to be paid on April 15.
 - For maintenance costs at PSD, the tax is 0.00320 of gross operating revenue.
 - For maintenance costs at PUC, the tax is 0.00205 of gross operating revenue.

⁴ According to EIA, a household in the Northeast typically used about 800 kilowatt hours per month in 2020, implying an incremental increase between \$4 and \$16 per month in 2035 (in today's dollars).

⁵ See 33 V.S.A. § 2503 for the gross receipts tax and 30 V.S.A. § 22(a) for the taxes on gross operating revenues.

Estimate for H.289: Additional Revenues to State Government from Three Tax Streams						
Fiscal Year	If \$150 million			If \$450 million		
	Gross Receipts Tax	Tax on Gross Operating Revenues		Gross Receipts Tax	Tax on Gross Operating Revenues	
		PSD	PUC		PSD	PUC
FY 2025	\$2,800	-	-	\$8,300	-	-
FY 2026	\$22,300	\$4,200	\$2,700	\$66,900	\$12,700	\$8,100
-	-	-	-	-	-	-
FY 2030	\$49,600	\$26,100	\$16,800	\$148,700	\$78,400	\$50,300
-	-	-	-	-	-	-
FY 2035	\$116,200	\$73,400	\$47,000	\$348,700	\$220,100	\$141,000

Source: JFO estimates using SEA model with H.289 requirements and statewide weighted averages. The gross receipts tax rate is 0.5 percent. The tax rate on gross operating expenses to support PSD is 0.320 percent, and PUC receives 0.205 percent.

PSD and PUC both say no additional staff positions would be needed. PSD would reallocate existing staff capacity and PUC has not requested any new positions.

Indirect fiscal impacts

The indirect fiscal impacts described below, relative to “Business as Usual,” would occur under H.289. JFO relied on modeling conducted by The Brattle Group for the 2023 Legislative Working Group on Renewable Energy Standard Reform, who in turn used inputs from modeling by SEA. Of course, modeling results are not precise and should be considered within confidence intervals (also see Appendix 2 for additional considerations).

- Slightly higher state revenues
 - The Brattle Group’s modeling using a stylistic tax structure showed minimal effects: higher State revenues but lower GDP growth, particularly after 2030, than in the absence of H.289
 - The slower growth rate of Vermont’s GDP is based on two effects: economic activity would increase a bit faster due to renewable energy investments and new jobs, but at the same time growth in consumption by Vermonters would slow as electricity rates rise and household spending power on other goods and services grows less rapidly
- Possibly a slightly lower rate of growth in State spending for Medicaid and other health care programs
 - If a decline in greenhouse gas emissions leads to better health for Vermonters, State spending for Medicaid and other health care programs might grow slightly less rapidly
- Possibly a slightly lower rate of growth in State spending in response to climate change
 - If climate change accelerates a bit more slowly, State spending on climate change mitigation, adaptation, and resilience might grow at a slightly slower rate

How JFO derived its estimates

To obtain overall costs of implementing H.289 over the 2025 to 2035 period, JFO used statewide weighted averages for the bill’s renewable energy requirements in the SEA model and associated adjustments. It also used revised cost estimates for upgrades to the state’s transmission network. In net present value, those preliminary estimated costs would be between \$150 million and \$450 million. A range of overall costs reinforces the uncertainty surrounding the estimates. The preliminary estimates are composed of two parts:

- Estimated costs directly related to utilities implementing the new RES
 - \$150 million to \$250 million
- Estimated costs to upgrade the state’s transmission grid above currently projected system upgrades to accommodate the higher levels of distributed generation in the bill
 - \$0 to \$200 million

Why are the updated estimates for the renewable energy cost of H.289 lower than those in the February 22, 2024, fiscal note?

- JFO ran the SEA model using the renewable energy requirements of the current bill for different groups of utilities rather than one statewide utility as was originally modeled. However, JFO was unable to change assumptions inside the model, such as effects on future pricing of distributed solar generation
 - Under H.289, requirements for Tier II (distributed energy generation such as small solar) would be lower than what was modeled for the Working Group. Tier II requirements are the most expensive to implement
 - H.289: Tier II requirements would rise to 20 percent by 2032 for some utilities and by 2035 for others. 100 percent renewable energy utilities and GlobalFoundries can comply in other ways – they accounted for 15 percent of retail sales in 2023
 - SEA model, Scenario 2: Tier II requirements would rise to 30 percent in 2035
 - SEA modelers explained the cost of Tier II resources under H.289 would be lower than under Scenario 2 because less new solar power would have to be generated in Vermont, leading to lower distribution interconnection costs
 - To the extent the projected price of natural gas in the model does not fully reflect U.S. natural gas as a global commodity, projected prices may be too low. Global prices are higher and more volatile, making Renewable Energy Certificate prices lower than in the SEA model
 - Some benefits would accrue to ratepayers, such as reduced line losses across the grid
 - Reduced need to install large solar arrays would reduce overall costs somewhat
 - GlobalFoundries owns the land on which renewable energy generation would be built, reducing the cost of renewable energy for them. However, costs of installation, maintenance, and distribution interconnectedness remain
 - The bill allows utilities, especially municipal utilities, to use hydro power to satisfy some distributed generation or energy transformation requirements, saving some compliance costs

Why are the updated estimates for the incremental transmission upgrade costs of H.289 lower than in the February 22, 2024, fiscal note?

- The current draft of the 2024 Vermont Long-Range Transmission Plan asks if the State’s transmission system can reliably withstand worst case scenarios over the next 20 years. The draft plan’s \$1.4 billion cost doesn’t incorporate several adaptations expected to happen or already underway
 - Business as usual for Vermont transmission will require substantial upgrades even without the bill. VELCO’s draft 2024 Long-Range Transmission Plan as presented to the Vermont System Planning Committee⁶ listed several projects expected to cost about \$600 million with “need dates” ranging from 2029 through 2034
 - Upgrade costs for H.289 include only incremental costs above the business-as-usual case; some costs would likely occur sooner than currently expected because the ramp-up of the Tier II requirements is faster than anticipated under business as usual
- H.289 would require less new distributed generation than modeled in Scenario 2
- Officials at VELCO could not offer an informed opinion about the size of incremental transmission

⁶ VELCO, January 24, 2024, slide 15; https://www.vermontspc.com/sites/default/files/2024-01/2024%20LRP_results_VSPC_rev1.pdf

upgrade costs associated with H.289 but provided the following information:⁷

- Storage, load management, optimized generation siting, and generation curtailment could help to avoid transmission upgrades
- Federal funding for transmission upgrades could be available for some projects through the Infrastructure Investment and Jobs Act (IIJA)
- Two proposed transmission projects, i.e., New England Clean Power Link and especially the emerging Alliance Transmission project, if implemented, would likely increase transmission reliability and reduce the cost pressures associated with load growth and hosting additional distributed generation on the grid
- The New England regional transmission organization, ISO-New England, might share some of the transmission upgrade costs if projects qualify. In that case, Vermont would pay just 4 percent of project costs
- Where transmission upgrades do qualify for regional cost support and thus Vermont utilities would fund approximately four percent of said transmission upgrades, a portion of the capital investment returns on those upgrades would flow back through Vermont utilities to the benefit of ratepayers
- JFO talked with experts at RAP regarding likely effects of the bill on needed transmission upgrades
 - RAP pointed out that VELCO's 2021 Long-Range Transmission Plan explicitly states that no mechanism or entity exists to coordinate optimal siting of new solar installations in Vermont.⁸ More distributed solar generation in less-than-optimal locations across the state would require additional transmission upgrades
 - The likely cost of those incremental upgrades is uncertain but probably greater than zero. At least some of the new distributed generation would not be located optimally⁹
 - Increased requirements for Tier II generation would likely expose bottlenecks for both equipment and the skilled workforce needed to perform upgrades

⁷ The VELCO memo by Shana Louiselle of February 27, 2024, was also helpful.

⁸ VELCO 2021 Long-Range Transmission Plan, page 8.

⁹ VELCO 2021 Long-Range Transmission Plan, page 43.

Resources

The Brattle Group, “Economic Impacts of Expanding Vermont’s Renewable Energy Standards,” December 13, 2023.

https://ljfo.vermont.gov/assets/Meetings/Renewable-Energy-Standard-Reform-Working-Group/2023-12-13/07d799fec2/Brattle-Presentation-12132023_Presented.pdf

Legislative Working Group on Renewable Energy Standard Reform, Act 33 of 2023.

<https://ljfo.vermont.gov/committees-and-studies/renewable-energy-standard-working-group>

Shana Louiselle, VELCO, Memo on VELCO’s 2024 Vermont Long-Range Transmission Plan analysis, February 27, 2024.

<https://legislature.vermont.gov/Documents/2024/WorkGroups/House%20Environment/Energy/Electricity/W~Shana%20Louiselle~VELCO%20-%20VLRTP%20Clarification%20Memo~2-27-2024.pdf>

State of Vermont General Assembly, “Report of the Legislative Working Group on Renewable Energy Standard Reform,” December 20, 2023.

https://ljfo.vermont.gov/assets/Uploads/5f88e10ecc/RESWG_final_report.pdf

Sustainable Energy Advantage, LLC for the Vermont Public Service Department, “Technical Analysis of a 100% Renewable or Clean Energy Standard: Final Results,” November 27, 2023.

<https://publicservice.vermont.gov/sites/dps/files/documents/VT%20RES%20Technical%20Analysis%20Final%20Report%2011.27.23.pdf>

Vermont Department of Public Service, “Follow up from January 30 Testimony regarding costs of Renewable Energy Standard proposals,” February 6, 2024.

<https://legislature.vermont.gov/Documents/2024/WorkGroups/House%20Environment/Bills/H.289/Witness%20Testimony/H.289~TJ%20Poor~PSD%20Renewable%20Energy%20Standard%20Costs%20Memo~2-6-2024.pdf>

Vermont Electric Power Company (VELCO), 2021 Long-Range Transmission Plan.

https://www.velco.com/assets/documents/2021%20VLRTP%20to%20PUC_FINAL.pdf

Appendix 1: Impact on Rates

Estimates for H.289: Incremental Impact on Rates Paid per kilowatt hour					
Calendar Year	Baseline	If \$150 million		If \$450 million	
		\$/kWh	Percent change	\$/kWh	Percent change
2025	\$0.1785	\$0.0003	0.30%	\$0.00100	0.50%
2026	\$0.1867	\$0.0021	1.90%	\$0.00640	3.40%
-	-	-	-	-	-
2030	\$0.2143	\$0.0030	2.30%	\$0.00890	4.20%
-	-	-	-	-	-
2035	\$0.2551	\$0.0057	3.80%	\$0.01700	6.90%

Source: JFO estimates using SEA model with H.289 requirements and statewide weighted averages. According to the EIA, a household in the Northeast typically used about 800 kWh per month in 2020. <https://www.eia.gov/energyexplained/use-of-energy/electricity-use-in-homes.php>

Appendix 2: Issues for Further Study

The following topics are worthy of consideration but require more time to study:

- Comparison of the expected cost of implementing H.289 over the 2025 to 2035 period to the expected total value of electricity consumed over that same period
- The costs and benefits of requiring in-state renewable generation relative to finding the lowest-cost sources out of state
- Impacts of the bill on the electric sector only versus impacts on decarbonization generally
 - Renewable energy allows electrification of vehicles and buildings, thereby avoiding expensive fossil fuels and reducing greenhouse gas emissions in the transportation and building sectors
- Trade-offs between impacts on Vermont only and impacts on the New England region
- Trade-offs between achieving decarbonization at the lowest reasonable cost and achieving maximum decarbonization