Review of Cleco Power's 2021 Draft IRP Report

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CONTENTS

1. INTRODUCTION

Sierra Club engaged Synapse Energy Economics ("Synapse") to participate in Cleco Power LLC's ("Cleco" or "the Company") integrated resource planning (IRP) process. The following report outlines Synapse's assessment of the Company's Draft IRP based on the filed reports and information provided at the Stakeholder Workshops held as part of the IRP process.

Synapse 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 and natural gas sectors for public interest and governmental clients. Synapse's staff of 40+ includes experts in energy and environmental economics, resource planning, electricity dispatch and economic modeling, all-sector emissions modeling, energy efficiency, renewable energy, transmission and distribution, rate design and cost allocation, risk management, cost-benefit analysis, environmental compliance, and both regulated and competitive electricity and natural gas markets. Synapse's clients include state consumer advocates, public utilities commission staff, attorneys general, environmental organizations, federal government agencies, and utilities.

After reviewing the Draft IRP, Synapse is concerned by a number of Cleco's assumptions, including:

- Cleco's proposal to retrofit Madison 3 with carbon capture and sequestration (CCS)—a project known as "Diamond Vault"—without any evidence that the CCS project is part of a least-cost portfolio of resources for ratepayers or that it is the best low-carbon option for the Company. Cleco included the Diamond Vault project in all scenarios, meaning it did not model any scenarios without the CCS project. The assumption that CCS is part of the baseline future is premature and concerning given that the project needs to receive approval from the Commission and likely many other regulatory bodies. Furthermore, the Diamond Vault project is likely to face many regulatory, technological, and financial challenges that make it a risky investment for the Company.

- Cleco did not conduct any capacity expansion modeling to evaluate reasonable alternative resource options to CCS; it has not evaluated alternative financial mechanisms for addressing the remaining book value at Madison 3; it failed to consider the environmental compliance risks associated with the continued operation of Madison 3; and the Company has not evaluated whether there are other cost-effective resources that can achieve the utility's greenhouse gas reduction goals.

- Cleco's cost assumptions for renewable resources, particularly offshore wind, are unreasonably high and likely do not reflect the market or the impact of the Inflation Reduction Act ("IRA").

- Finally, Cleco's RFP process appears to be structured to result in an excessive amount of new gas generation and fewer solar facilities relative to what the model suggests is most economical.

In light of these risks, we urge Cleco to robustly evaluate alternatives to the Diamond Vault project, such as retirement of Madison 3. If Cleco decides to move forward with the CCS project regardless of the risks we outline in these comments, the Company must provide transparent documentation of projected costs and emissions to the Commission and stakeholders to allow for a thorough review process.

2. CLECO WILL IMPOSE UNNECESSARY RISKS ON RATEPAYERS IF IT INSTALLS CCS AT MADISON UNIT 3

Cleco has stated in its Draft IRP Action Plan that it will build a CCS project at Madison 3 that will begin operation by 2028 (the Diamond Vault project). This tax-credit-driven CCS project is expensive in both absolute terms and when measured in dollars per ton of carbon dioxide (CO_2) abated, but Cleco has not evaluated how the cost of the CCS project compares to the cost of alternatives. The project also carries substantial risks and uncertainty, which will be imposed on Cleco's ratepayers. In this section, we highlight the key risks associated with the Diamond Vault project. These include (1) long, uncertain timelines for state and federal approval of the injection well needed for the project; (2) the mis-match between high, up-front costs and delayed and uncertain benefits; (3) the project's continued reliance on aging fossil fuel infrastructure that will continue to emit high levels of conventional, criteria pollutants, subject to volatile fuel prices, and exposed to future environmental regulation; (4) the burdensome site requirements of CCS projects; and (5) the need for commission pre-approval before proceeding with the project.

2.1. The Diamond Vault CCS project requires construction and permitting of a costly and relatively uncertain Class VI injection well to permanently store CO_2 underground

Cleco plans to permanently store captured CO_2 from the Diamond Vault project underground. Permanent underground storage is required for Cleco to qualify for the $85-per-ton tax credit available through section 45(q) of the Internal Revenue Code. A well that is permitted for permanent storage is called a Class VI injection well. This type of well is rare in the United States today and carries a high degree of uncertainty in both costs and timeline for regulatory approval. To date, there are only two active Class VI wells in the United States, both in Illinois.[1] One was a pre-existing well that was converted to a Class VI well; the other took almost six years from the time of its initial permit application to

[1] U.S. Environmental Protection Agency. Accessed January 19, 2023. "Class VI Wells Permitted by EPA." Available at https://www.epa.gov/uic/class-vi-wells-permitted-epa.

authorization to inject CO_2.[2] Given the uncertainty surrounding the required injection well, we believe it is premature to include the Diamond Vault project in Cleco's IRP.

A Class VI well is essential for Cleco to earn CCS tax credits. If the injection well underperforms and does not securely dispose of the CO_2 from Madison 3, the U.S. Treasury can also claw back tax credit revenues earned through CCS.[3] The performance of a Class VI well is therefore a critical driver of the economic viability of the Madison 3 CCS project. Cleco has provided no details, however, about which well the project will rely on, or the costs to dig, maintain, or close the well at the end of its useful life, or the costs and risks associated with obtaining and maintaining the required bonding for the project.[4] A private Company, CapturePoint, has a proposed Class VI well nearby in Rapides County, but that well appears intended for a different CCS project.[5] According to the U.S. Environmental Protection Agency's (EPA) website, the timeline for regulatory approval of the proposed Rapides County injection well is also unknown.[6]

Louisiana is seeking Class VI primacy. This would give the state, rather than EPA, the power to approve Class VI wells. This ultimately should make it easier for Louisiana to approve Class VI wells, but the process of obtaining primacy can take years. North Dakota and Wyoming have already been granted primacy—but in each case, the approval process took between 1 and 4 years.[7] The approval process can be broken into two basic steps: (1) EPA's determination that the application is complete, and (2) EPA's approval and granting or denial of primacy to the state applicant. In both North Dakota and Wyoming, step (1) took approximately three months. Step (2) took much longer—nearly four years for North Dakota and about 250 days for Wyoming. It has been more than 500 days since Louisiana submitted its application, but EPA has not yet completed step (1) to determine whether the application is complete.[8] It is unclear if the EPA has provided information on when it is likely to complete step (1), and the timeline for completing step (2). Given the many steps of approval required and the uncertainty in timelines for approval, Cleco is imposing an unnecessary level of risk and cost on ratepayers in planning around CCS investment.[9]

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[2] Van Voorhees, B., Greenberg, S., Whittaker, S. 2021. "Observations on Class VI Permitting: Lessons Learned and Guidance Available." *Illinois State Geological Survey.* Prairie Research Institute, University of Illinois at Urbana-Champaign. Available at https://www.ideals.illinois.edu/items/117640.

[3] 26 U.S. Code § 45Q - Credit for carbon oxide sequestration. Available at https://www.law.cornell.edu/uscode/text/26/45Q.

[4] Cleco response to request for information Sierra Club 1-10.

[5] Hampton, L. 2022. "Capturepoint proposes new carbon capture facility for Louisiana." *Reuters*. July 29. Available at https://www.reuters.com/business/energy/capturepoint-proposes-new-carbon-capture-facility-louisiana-2022-07-29/.

[6] U.S. Environmental Protection Agency. Accessed January 19, 2023. "Class VI Wells Permitted by EPA." Available at https://www.epa.gov/uic/class-vi-wells-permitted-epa; Cleco response to request for information Sierra Club 1-10.

[7] Wildeman & Ross. 2022. "EPA UIC Class VI Program Administration Creates Potential Weak Link in Climate Adaptation Strategy." *Environmental Law and Policy*. Available at https://www.environmentallawandpolicy.com/2022/09/epa-uic-class-vi-program-administration-creates-potential-weak-link-in-climate-adaptation-strategy/#_ftn5.

[8] Ibid.

[9] Cleco. Accessed January 24, 2023. "Project Diamond Vault FAQs." Available at https://www.cleco.com/diamondvaultfaq.

Recommendation

Prior to seeking approval for the Madison 3 CCS project, Cleco should be required to provide the following information to the Commission: (1) which well it intends to rely on; (2) how much it will cost to complete the regulatory approval process, dig the well, maintain it, and close it at the end of its useful life; and (3) the extent to which it expects ratepayers to bear the associated cost and risk—including costs relating to Class VI bonding requirements and ongoing post-injection monitoring as required by EPA.[10]

2.2. CCS projects in general have burdensome site constraints

An important consideration when retrofitting a power unit with CCS is the physical space required. One of the most space-consuming aspects of retrofitting a coal plant with CCS is the large amount of cooling capacity it requires. As Sargent and Lundy notes in its pre-feasibility study for retrofitting the San Juan coal plant in New Mexico, the cooling water demand for the prospective CO_2 capture system was equivalent to the water needs of multiple coal units at the plant. At Petra Nova, one of the few other CCS projects undertaken in the United States, cooling capacity also posed a space issue. Site size constraints were so severe that the area set aside for CCS equipment was not large enough for the cooling tower, water treatment equipment, and other balance-of-unit operations. Petra Nova had to construct a secondary location for CCS equipment elsewhere on the property to accommodate all the infrastructure needs, which increased the cost and timeline of the project.[11]

At Madison 3, Cleco's IRP states that room for growth and a cooling impoundment onsite are part of what make the unit a candidate for CCS. However, Cleco says that it does not know whether the use of this cooling capacity is contingent on the retirement of Rodemacher 2 or whether additional cooling capacity will need to be built. Cleco is waiting on the results of the Front-End Engineering Design (FEED) study in 2024 to answer these questions, which are essential to the feasibility of the project; yet Cleco has still chosen to include the CCS project in every scenario within its IRP.[12]

Recommendation

Cleco should share the results of the FEED study publicly and provide clarity on the footprint required for the CCS project.

[10] U.S. EPA. Accessed January 19, 2023. "Underground Injection Control (UIC) Program Requirements for Geologic Sequestration of Carbon Dioxide Final Rule." Available at https://www.epa.gov/sites/default/files/2015-07/documents/uicprogramrequirementsforgsofco2factsheet_1.pdf.

[11] Knight, P., Smith, J. 2022. "Clearing the Air on Coal CCS." *Synapse Energy Economics.* Available at https://www.synapse-energy.com/sites/default/files/Clearing-the-air-on-coal-CCS-22-100.pdf.

[12] Cleco's Response to Request for Information Sierra Club 1-15.

2.3. The CCS project requires high, up-front capital spending from Cleco and relies on uncertain benefits materializing in the future

With CCS projects, there is a mismatch between the timing and certainty of when project costs are incurred and when the tax benefits are realized. The projects require a financial commitment up front, while tax credits are paid out once tons of CO_2 are captured and successfully sequestered. As discussed, if Cleco improperly or insecurely disposes of its captured CO_2, the Treasury can take back any tax credit revenues earned through CCS.[13] Given that the tax credits are performance-dependent, at a minimum, the Commission should require performance guarantees or protections be put in place so that if the Madison 3 project underperforms, ratepayers are made whole.

While this upfront-payment, future-benefit arrangement may not seem so different from the arrangement with renewable projects that earn production tax credits (PTC), the key difference is that renewable projects rely on much more certain and established technology and utilities and developers have been successfully collecting PTC and investment tax credit (ITC) tax credits for years. In contrast, historical experience with CCS equipment shows it is difficult to maintain, prone to underperformance, and that capital costs can balloon beyond initial expectations. Of the four commercial power unit CCS projects undertaken in North America, two never captured any CO_2 and ultimately had their CCS components abandoned due to cost overruns (Edwardsport and Kemper County's Ratcliffe unit, often called Kemper).[14] Petra Nova was shuttered due to unfavorable economics.[15] The one project that remains, Boundary Dam, has a track record of mechanical failure and underperformance.[16]

Another concern is that the availability of the tax credits does not align with a reasonable lifetime for a generation asset of this magnitude. In the absence of the new 45Q tax credits to help offset the enormous capital expenditure and increased operating costs required for CCS conversion, this project would likely not be economically viable enough for Cleco to consider. However, the tax credits are set to expire after 12 years. Given the cost to run CCS equipment, it is unlikely that any unit will continue to operate CCS equipment after the tax-crediting period expires. This expiration risks turning the CCS retrofit into a stranded asset, yet Cleco has indicated that it plans to continue CCS operations at

[13] 26 U.S. Code § 45Q - Credit for carbon oxide sequestration. Available at https://www.law.cornell.edu/uscode/text/26/45Q

[14] See "Can Duke's Edwardsport turn tide for clean coal post-Kemper?" *EnergyWire E&E News*. July 20, 2017. Available at https://www.eenews.net/articles/can-dukes-edwardsport-turn-tide-for-clean-coal-post-kemper/.

[15] This unit, Peta Nova in Texas, was designed to be the largest post-combustion CCS project in the world, but ceased capturing carbon in 2020 when the COVID-19 pandemic and other factors reduced the profitability of injecting CO2 into a nearby oilfield for enhanced oil recovery. See "Petra Nova is closed: What it means for carbon capture." *EnergyWire E&E News.* September 22, 2020. Available at https://www.eenews.net/articles/petra-nova-is-closed-what-it-means-for-carbon-capture/

[16] This plant, the Saskpower Boundary Dam facility in Canada, has only occasionally reached its daily goal of capturing 3,200 metric tons and as of 2021, had never done so over an extended period of time. See Schlissel, David. *Boundary Dam 3 Coal Unit Achieves Goal of Capturing 4 Million Metric Tons of CO2 But Reaches the Goal Two Years Late*. Institute for Energy Economics and Financial Analysis. April, 2022. Available at https://ieefa.org/wp-content/uploads/2021/04/Boundary-Dam-3-Coal-Unit-Achieves-CO2-Capture-Goal-Two-Years-Late_April-2021.pdf

Madison 3 even after expiration of the tax credits without providing any analysis to demonstrate the economics of this decision.[17]

Recommendation

Given that the tax credits are performance dependent, at a minimum, the Commission should require protections be put in place so that if the Madison 3 project underperforms, ratepayers are made whole.

2.4. Investing in CCS at Madison 3 will continue Cleco's reliance on legacy fossil plants and sustain its exposure to volatile fuel prices and future environmental regulations

Installing CCS at Madison 3 does not alleviate many of the financial and environmental risks associated with running a fossil-fired power unit like Madison 3. Instead, it may exacerbate some of them by incentivizing the unit to run more than it would otherwise. Given the size of the 45Q tax credit for permanent storage relative to the average marginal operating cost of a coal-fired generating unit, the tax credit may act as a generation subsidy that encourages a CCS-retrofit unit to run as often as possible, without consideration for relevant market signals.[18] Cleco's Draft IRP Appendices indicate that the Company expects this to happen at Madison 3, with Cleco projecting the capacity factor at Madison 3 to increase from [redacted] percent in 2027 (prior to the CCS conversion) to [redacted] percent in 2028 (after the CCS conversion) (See Figure 1).[19]

[17] See Confidential response to Sierra Club 1-16, excel attachment "Appendix 5 – Portfolio Costs."

[18] Knight, P., Smith, J. 2022. "Clearing the Air on Coal CCS." Synapse Energy Economics. Available at https://www.synapse-energy.com/sites/default/files/Clearing-the-air-on-coal-CCS-22-100.pdf.

[19] See Draft IRP, Confidential Appendix 5 – Portfolio Costs.

Figure 1. Projected capacity factor for Madison 3 in Cleco's Reference Case (CONFIDENTIAL)

A higher capacity factor not only increases wear-and-tear, potentially leading to additional repair costs or outages; it can also increase Cleco's exposure to fuel price volatility. This may be a particularly large risk for a unit like Madison 3 which runs primarily on petroleum coke, a by-product of oil refining produced by many refineries in the gulf region. As the last two years have shown, oil production and prices are volatile. In Louisiana specifically, petroleum coke prices are volatile and have been increasing since 1990.[20] Renewable alternatives, on the other hand, have been decreasing in price and have minimal forward-going variable costs.

Not only will Cleco and its ratepayers be subject to fuel and equipment costs if Madison 3 is retrofitted, but future regulations could impose additional non-CO_2 environmental compliance costs on the unit. Even if Madison 3 is retrofitted with CCS, it will still continue to emit particulate matter and NO_x, and we would expect these pollutant levels to increase as the unit's utilization increases.[21] Specifically, given that Cleco expects the capacity factor of Madison 3 to increase dramatically after the proposed retrofit, $PM_{2.5}$ emissions and other criteria air pollutant emissions will likely increase in step with the additional fuel that is burned.[22] If the capacity factor, and therefore net emissions, of the unit increases after the CCS retrofit, this could trigger a Prevention of Significant Deterioration (PSD) review under the Clean Air Act. According to the EPA, PSD applies to major modifications at existing sources for pollutants and would require installation of the best available control technology, an air quality analysis, an additional impacts analysis, and public involvement, if triggered. Significant deterioration is said to occur when the

[20] U.S. Energy Information Administration. Accessed January 2023 . "Petroleum coke average price, all sectors, Louisiana." Available at https://www.eia.gov/opendata/v1/qb.php?category=40699&sdid=SEDS.PCTCD.LA.A.

[21] Knight, P., Smith, J. 2022. "Clearing the Air on Coal CCS." *Synapse Energy Economics.*

[22] See Draft IRP, Confidential Appendix 5 – Portfolio Costs.

amount of new pollution would exceed the applicable PSD increment compared to the baseline.[23] If PSD is triggered at Madison 3, these additional compliance costs risk making the unit more costly (and therefore less uneconomic) which could result in the unit becoming a stranded asset.

Another factor that Cleco should consider is Madison 3's reliance on petroleum coke as a primary fuel source to produce energy, and the potential environmental compliance risks associated with the continued burning of solid fuels. According to the U.S. EPA, petroleum coke has a higher emissions rate for pollutants including CO_2, mercury, sulfur dioxide (SO_2), and other pollutants relative to other commonly used types of coal.[24] Market-ready CCS systems are extremely sensitive to the presence of SO_2 and sulfur trioxide (SO_3) in flue gas streams, which may necessitate additional investment in pollution control equipment to make CCS economic.[25] While Madison 3 already removes more than 99 percent of the SO_2 from its flue gas stream, Cleco stated that it is uncertain whether that is an adequate amount of removal to enable efficient CCS or if additional scrubbing capacity will be necessary.[26] If additional SO_2 and SO_3 scrubbing capacity is necessary, Cleco should study and publish the additional costs for review by the PSC.

Even setting aside the sensitivity of CCS to excess SO2 pollution, the IRP does not evaluate or disclose the potential environmental compliance risks associated with the continued reliance on coal and petroleum coke at Madison 3. Specifically, under the Clean Air Act's Regional Haze Rule, Madison 3 is potentially subject to installing expensive technology to reduce sulfur dioxide or nitrogen oxide emissions to protect visibility in national parks.[27] And under EPA's recently-proposed Good Neighbor Rule, designed to protect against harmful ground-level smog pollution, Madison 3 could be required to install selective catalytic reduction pollution controls by 2026, or procure pollution credits commensurate with the pollution reductions achievable with those controls.[28] Finally, EPA has announced that it is reevaluating its Clean Water Act and Resource Conservation and Recovery Act regulations designed to eliminate coal ash pollution from sources like Madison 3.[29] In short, retrofitting Madison 3 and continuing to burn coal or petroleum coke would expose customers to additional

[23] U.S. Environmental Protection Agency. 2022. "Prevention of Significant Deterioration Basic Information." Available at: https://www.epa.gov/nsr/prevention-significant-deterioration-basic-information.

[24] U.S. Environmental Protection Agency. 2013. "Documentation for EPA Base Case v.5.13 Using the Integrated Planning Model." Available at: https://www.epa.gov/sites/default/files/2015-07/documents/documentation_for_epa_base_case_v.5.13_using_the_integrated_planning_model.pdf.

[25] SO_2 and SO_3, two combustion byproducts common in coal unit flue gas, react with the amine solvent alongside CO_2, increasing the energy needed to regenerate it and decreasing the efficiency of the CO_2 capture system. This increase in required energy and decrease in efficiency may, in some circumstances, make an amine system prohibitively expensive to run.

[26] Cleco response to Sierra Club request for information 1-12 and 1-13.

[27] *See* 42 U.S.C. § 7491(b)(2), (g); 40 C.F.R. § 51.308.

[28] 87 Fed. Reg. 20,036 (Apr. 6, 2022).

[29] https://www.epa.gov/coalash/coal-ash-rule; https://www.epa.gov/eg/2021-supplemental-steam-electric-rulemaking.

environmental compliance costs, yet the IRP does not meaningfully address, let alone disclose, those risks.

Perhaps the biggest unknown is the likelihood of a zero-emissions standard, which would be necessary for the power sector to comply with President Biden's executive order to achieve net zero power sector emissions by 2035.[30] Even if Madison 3 captures the majority of its CO_2, complying with a zero-carbon standard by paying for direct air capture or through other means may add large costs.

Recommendation

Cleco should outline the potential for future likely environmental controls at Madison 3, evaluate the cost of these controls and regulations, and assess their impact on plant operations. Cleco should then factor these costs into its future analysis.

2.5. Cleco must obtain Commission approval before proceeding with the proposed Diamond Vault CCS Project

Under the Commission's 1983 General Order, "no electric utility subject to the jurisdiction of the Commission shall commence any on site construction activity or enter into any contract for construction or conversion of electric generating facilities . . . without first having applied to the Commission for a certification that the public convenience and necessity." The Commission's 1983 and earlier 1982 General Orders explicitly recognize the financial risks associated with "plant expansion[s]," the potential for significant additional capital expenditures "once these projects are commenced," and the need for the Commission to take a more dominant role in major capital decisions that could have severe rate impacts. Because Cleco's $1 billion CCS proposal would constitute the conversion of, and life-extension project for, an existing generation facility, the Company has an obligation—as both a matter of prudent utility management and as a matter of law—to explicitly seek Commission approval ***before*** moving forward with its Madison 3 retrofit.

Recommendation

If Cleco decides to move forward with the Diamond Vault project despite the associated risks and uncertainties, we recommend that Cleco commit to seeking preapproval for the project and provide the Commission and stakeholders with a timeline for seeking that preapproval.

[30] White House Briefing Room. 2021. FACT SHEET: *President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies*. Available at https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/.

3. CLECO SHOULD CONSIDER ALTERNATIVES TO INSTALLING CCS AT MADISON 3

The Diamond Vault CCS project is extremely time and capital intensive and, as discussed above, comes with many risks and uncertainties that Cleco has yet to address in its Draft IRP. Despite these risks, Cleco has failed to consider alternatives to the CCS project. Specifically, as part of its IRP, Cleco has conducted no capacity expansion modeling to evaluate alternative resource options, it has not evaluated alternative financial mechanisms for addressing the remaining book value at Madison 3, and it has not evaluated whether there are other cost-effective resources that can achieve the utility's greenhouse gas reduction goals.

3.1. Cleco has performed no capacity expansion or other optimization modeling to show that retrofitting Madison 3 is part of a least-cost, reliable, low-carbon portfolio

Multiple stakeholders requested during the IRP process that Cleco evaluate scenarios where CCS is not added at Madison 3. Despite these requests, Cleco did not conduct any modeling analysis that considered a future without the Diamond Vault project (i.e., where Madison 3 either retires, is converted to gas, or continues to operate on coal without CCS). This is a major flaw in the Draft IRP, as it limits Cleco, the Commission, and other stakeholders' ability to understand the cost and risk tradeoffs associated with this project relative to alternatives. At a minimum, Cleco should allow the model to select between retirement and replacement with alternatives, conversion to gas, and CCS retrofit at Madison 3 instead of locking in the CCS investment, especially given the high project cost.

Furthermore, the Company has provided no quantitative analysis that shows that adding CCS to Madison 3 has economic benefits relative to alternative resource options or that otherwise justifies inclusion of CCS in all IRP scenarios. Cleco explicitly stated that it has not performed any cost-benefit analysis that compares the proposed CCS project versus clean energy alternatives.[31] Without quantitative analysis that demonstrates the value of the Diamond Vault project, it is premature for Cleco to assume its approval is a foregone conclusion and include Madison 3 in every scenario and in its Action Plan.

Recommendation

Cleco should model scenarios in its final IRP that allow the model to select between retirement (and replacement with alternatives), conversion to gas, and CCS retrofit at Madison 3.

[31] Cleco's Response to Request for Information Sierra Club 1-19.

3.2. Cleco should evaluate whether securitization can make retirement of Madison 3 the most economic option

Section contributed by Sierra Club

As discussed elsewhere in these comments, the Inflation Reduction Act (IRA) contains billions in tax credits, grants, and incentives meant to drive investment in new clean energy technology over the next decade. Instead of planning to invest potentially billions of dollars in risky CCS technology for a power plant that will be increasingly uneconomic, Cleco should focus on harnessing the IRA's incentives in building new clean energy resources, modernizing its energy infrastructure, and revitalizing communities where aging fossil infrastructure sits.

We recognize, however, that relatively new resources like Madison 3 carry a sizable undepreciated plant balance that Cleco would wish to recover even if the plant retires early. Retirement in advance of the planned depreciate date generally results in requests for an accelerated timeframe for cost recovery, which could therefore result in short-term rate increases. Moreover, the early retirement of a large generating asset can also result in substantial impacts to the local workforce and surrounding communities in the form of potential job losses and lost tax revenue. But those impacts can be mitigated with Louisiana's recently enacted securitization legislation. As discussed below, securitization can reduce costs to ratepayers and provide worker and community transition assistance. It can also create an opportunity for Cleco to recycle securitization bond proceeds into renewable, rate-based assets on its balance sheet: a fuel-for-steel swap.

Cleco's IRP should include an evaluation of retiring and securitizing any remaining undepreciated capital in Madison 3 as an alternative to retrofitting the unit with expensive CCS technology. Under the recently enacted Louisiana Electric Utility Energy Transition Securitization Act ("Securitization Act"), La. R.S. 45:1271 *et seq.*, Cleco may seek securitization financing to recover the costs associated with the retirement of any coal-burning power plant, including any unrecovered capitalized costs, the costs of financing energy transition resources, the costs of employee transition training or severance, and "[a]ny other costs determined by the commission to be reasonably associated with the retirement" of an eligible electric generating facility.[32] The law is specifically designed to allow Louisiana electric utilities to take full advantage of tax benefits (like the IRA) and opportunities to transition to new, more affordable energy generation assets while also ensuring that owners of stranded, non-economic generation are made "whole" and minimizing adverse ratepayer and community impacts. As part of its final IRP, Cleco can and should fully evaluate the option of securitizing any sunk or undepreciated costs at Madison 3 instead of sinking potentially hundreds of millions of dollars or more in risky CCS retrofits that could be obsolete in a few short years.

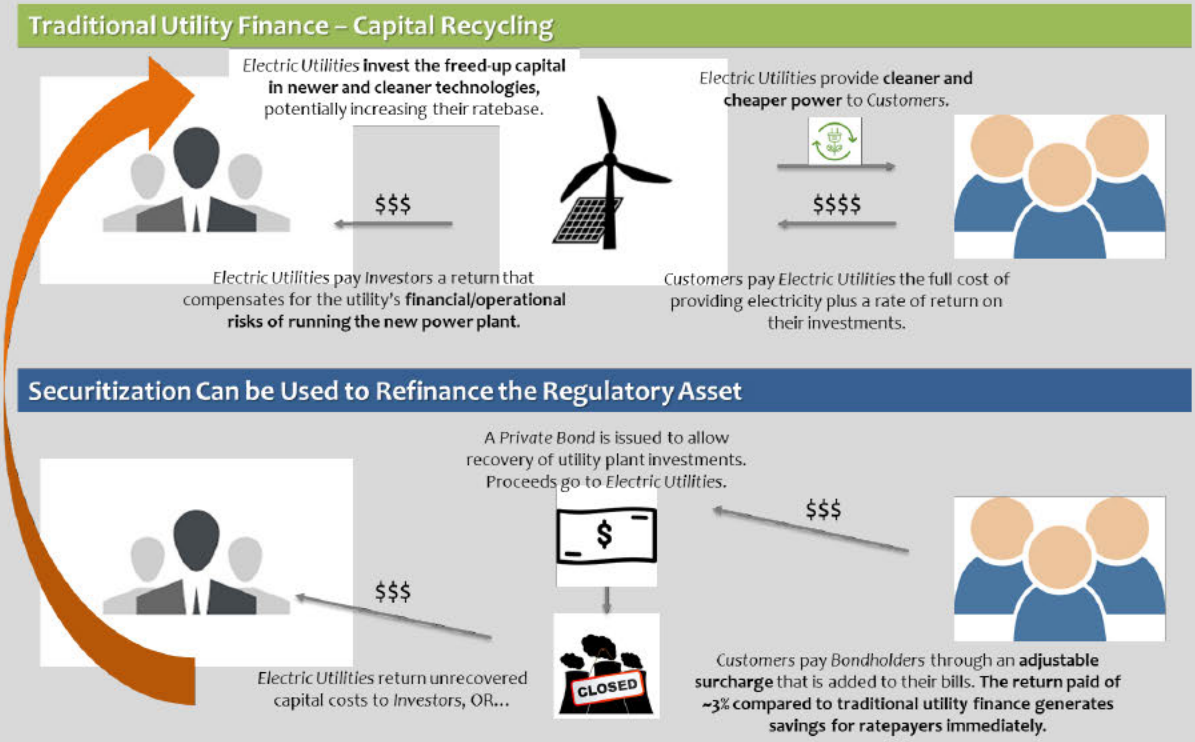
Moreover, when used as part of a comprehensive transition package, securitization can free up funds for clean energy projects while keeping Cleco financially viable and reducing ratepayer costs. Although

[32] La. R.S. 45:1272(9).

renewable generation can be more capital intensive than fossil plants capable of equal output, it requires far less annual expense for fuel and operations. When we compare new renewable projects to substantially depreciated fossil plants, the potential to increase capital return is substantial. A utility that is able to offer renewable energy and storage in place of existing fossil generation redirects dollars from pass-through fuel purchases towards capital projects. This swap aligns utility and ratepayer interests: ratepayers see lower energy costs, while utilities increase earnings potentials. The expected phase-out of federal tax incentives for renewable energy justifies urgency in laying the foundations for securitization and subsequent capital recycling.

Figure 2 below provides a summary of how capital recycling can be paired with securitization to refinance regulatory assets associated with the early retirement of uneconomic assets and use the proceeds from that transaction to help finance the deployment of clean, cheap replacement power.

Figure 2. Capital recycling and securitization refinancing



Source: Varadarajan, Uday, David Posner, Jeremy Fisher. Harnessing Financial Tools to Transform the Electric Sector. Sierra Club, 2018.

By way of example, suppose that a utility owns and operates a soon-to-be retired coal plant with $433 million remaining undepreciated plant balance. Also assume that the utility wants to invest in a new $870 million wind asset is financed entirely through traditional utility financing mechanisms, and that it plans to earn a return equal to the allowed rate of return for the utility. Under a traditional financing approach, the early retirement of the coal plant could result in a $433 loss to the utility's rate base, and the associated earnings on that investment. But with early retirement and securitization, the utility is

able to immediately recover the remaining $433 million plant balance plus decommissioning and worker transition costs in cash from the proceeds of the securitization bond issuance. The utility is able to use that capital to help finance the new wind asset, effectively "recycling" its capital from the older fossil asset into a new, clean asset—and more. That is, the utility has been able to grow its rate base by nearly $440 million with securitization and capital recycling. In doing so, the utility grows its future earnings relative to all the other cases, and ratepayers actually save more as a result. Moreover, by taking advantage of the IRA's investment or production tax credits, Cleco can improve the value proposition associated with any investment in low-cost renewable energy.

Finally, as noted, Cleco should fully evaluate wrapping into any securitization bonds community transition and other costs. While the early retirement of a large generating asset can result in impacts to the local workforce and surrounding communities in the form of potential job losses and lost tax revenue, Louisiana's securitization law is specifically designed to ameliorate those impacts. Indeed, Louisiana law explicitly allows for the inclusion of worker and community transition and retraining costs in any securitization financing.

Recommendation

We recommend Cleco fully evaluate in its final IRP the securitization of any remaining plant balance at Madison 3 as an alternative to retrofitting Madison 3 with CCS, and then recycle the bond proceeds into renewable assets on its balance sheet: a fuel-for-steel swap. As part of that analysis, Cleco should fully evaluate securitization options that can help ameliorate community impacts associated with early retirement.

3.3. CCS is not the most cost-effective generating resource or CO_2-abatement technology relative to available alternatives

Cleco has stated that installing CCS at Madison 3 is driven by the Company's greenhouse gas reduction goals. However, there are likely more cost-effective ways to reduce Cleco's emissions, such as relying on alternative clean energy sources. At a capital cost of approximately $1,800 per kW,[33] the Diamond Vault project appears substantially more expensive than clean energy alternatives like solar and wind (with respective pre-tax credit capital costs of $1,134 and $1,234 per kW in 2025, when CCS construction is expected to begin).[34] Since solar and wind tend to have low fixed operating and maintenance costs and

[33] According to Cleco, Project Diamond Vault will provide the equivalent of 500 MW of clean energy at a capital cost of approximately 900 million. ($900 million / 500 MW) = $1,800 per kW. See "Diamond Vault, A Cleco Project" available at https://www.cleco.com/diamondvault.

[34] National Renewable Energy Laboratory (NREL). 2021. *Annual Technology Baseline*. Available at https://atb.nrel.gov/electricity/2021/data.

near zero variable operating and maintenance costs, the cost spread can be expected to further disfavor CCS after factoring in full unit costs.[35]

Solar and wind are also well-established technologies with predictably low long-term costs that have been successfully implemented across the country for almost two decades. In contrast, as discussed, CCS is a new technology that has no functioning examples in the United States. The Petra Nova project in Texas, as well as other failed CCS projects, have infamously incurred much higher than expected costs of construction and operation. For example, the Kemper Project was supposed to cost Mississippi Power $2.4 billion, but the cost ballooned by 212.5 percent to $7.5 billion, and was eventually abandoned without capturing any CO_2.[36]

From a CO_2-emissions-mitigation standpoint, retrofitting Madison 3 with CCS also does not look cost-effective. Cleco estimates that retrofitting Madison 3 with CCS will cost about $900 million and capture 95 percent of its CO_2.[37] Table 1 shows how expensive this type of CO_2-reduction strategy is on a per-ton-of-CO_2 basis. If the capacity factor of Madison 3 increases, the cost per ton may decrease; but even if Madison 3 were to run 100 percent of the time, the cost to abate CO_2 by retrofitting the unit with CCS is $164 per ton. At a lower capacity factor of 60 percent, close to Madison 3's actual operations in 2021, the cost is even higher on a per-ton basis; this highlights how CCS may not be a cost-effective CO_2 abatement strategy. If the CCS equipment underperforms, the cost per ton could be dramatically higher. For example, at a capture rate of 75 percent and a capacity factor of 60 percent, the cost would be around $350 per metric ton.

[35] It should be noted that even "near firm" solar and wind that is augmented with battery storage is far less costly than other available generation resource types. See Next Era Energy's November 2022 presentation to the Edison Electric Institute Conference, available at https://www.investor.nexteraenergy.com/~/media/Files/N/NEE-IR/news-and-events/events-and-presentations/2022/11-11-22/EEI%202022%20Investor%20Presentation_vF.pdf

[36] Wilson, S. 2019. "Two years since Kemper clean coal project ended." *Mississippi Center for Public Policy.* Available at https://mspolicy.org/two-years-since-kemper-clean-coal-project-ended/

[37] Cleco. *FAQ's*. Accessed January 2023. Available at: https://www.Cleco.com/diamondvault.

Table 1. Estimated CO_2 capture cost at Madison 3

Capacity factor	CO_2 produced (million metric tons)	CO_2 captured at 95% capture rate (million metric tons)	Capture cost ($/metric ton CO_2)
60%	3.5	3.3	273
100%	5.8	5.5	164

4. CLECO'S COST ASSUMPTIONS FOR RENEWABLE RESOURCES ARE UNREASONABLY HIGH AND LIKELY DO NOT REFLECT THE MARKET OR THE IMPACT OF THE IRA

In August 2022, Congress passed the IRA. This legislation expanded the tax credits available to clean energy resources, further improving their economic competitiveness relative to fossil-based alternatives. In its Draft IRP, Cleco incorporated a 30 percent ITC into its renewable cost assumptions throughout the IRP study period. While this is a good start, it is not a comprehensive modeling approach. Not only did the IRA extend the ITC, but it also made the PTC and ITC technology-neutral and created tax credit increases for projects that meet eligible criteria. This means that solar and wind can now take advantage of the PTC or the ITC. These are factors that Cleco did not consider in its modeling assumptions. By artificially limiting all projects to the ITC, Cleco may not be representing the full tax benefits potentially available. For some resource types, it is more financially beneficial to claim the PTC, which is credited in dollars per MWh of generation. This is often the case for renewables with high capacity factors that produce lots of energy, such as onshore and offshore wind. By way of example, some utilities are projecting as much as a 50 to 60 percent reduction in wind costs after applying the PTC.[38] Cleco should update its model to include renewable resources with both ITC and PTC cost assumptions and allow it to select the most economic tax-credit option for a given project.

Furthermore, projects can earn an additional 10 percent tax credit increase if the facility is sited in an energy community, like the communities surrounding Brame Energy Center or even the former Dolet Hills power plant.[39] Moreover, projects that are constructed with domestically-sourced materials are

[38] *See, e.g.*, Xcel Energy, Third Quarter 2022 Earnings Report Presentation at slide 7 (Oct. 27, 2022), *available at* https://s25.q4cdn.com/680186029/files/doc_financials/2022/q4/Xcel-Energy-Earnings-Presentation-2022-Q4-Final.pdf.

[39] An energy community is defined as being (1) a brownfield site under CERLCA; (2) an area which has or had certain amounts of direct employment or local tax revenue related to oil, gas, or coal activities and has an unemployment rate at or above the national average; or (3) a census tract or any adjoining tract in which a coal mine closed after December 31, 1999, or in which a coal-fired electric power unit was retired after December 31, 2009. *See* Inflation Reduction Act, Section 13101, 13102, 13701, and 13702.

eligible for another 10 percent tax credit. This is significant for the Company, because it could claim a 30 percent investment tax credit or a $26/MWh production tax credit, and up to a 20 percent tax credit adder under either the ITC or PTC, if it retires Madison 3 and redevelops the site with solar, storage, or onshore wind, using domestic materials and sited in an energy community. Cleco should take advantage of this opportunity and include a more comprehensive analysis of IRA tax credit options in its final IRP modeling.

Secondly, the cost and capacity factor assumptions that Cleco has proposed to use for offshore wind are much more conservative than those used by other Louisiana utilities. Cleco's offshore wind cost assumptions are 200 to 300 percent higher than those used by other utilities in Louisiana, even after applying the 30 percent ITC. Cleco should re-evaluate the offshore wind cost assumptions it is using in this Draft IRP and should ideally use actual RFP responses from offshore wind developers to inform its cost assumptions for future resource planning exercises.

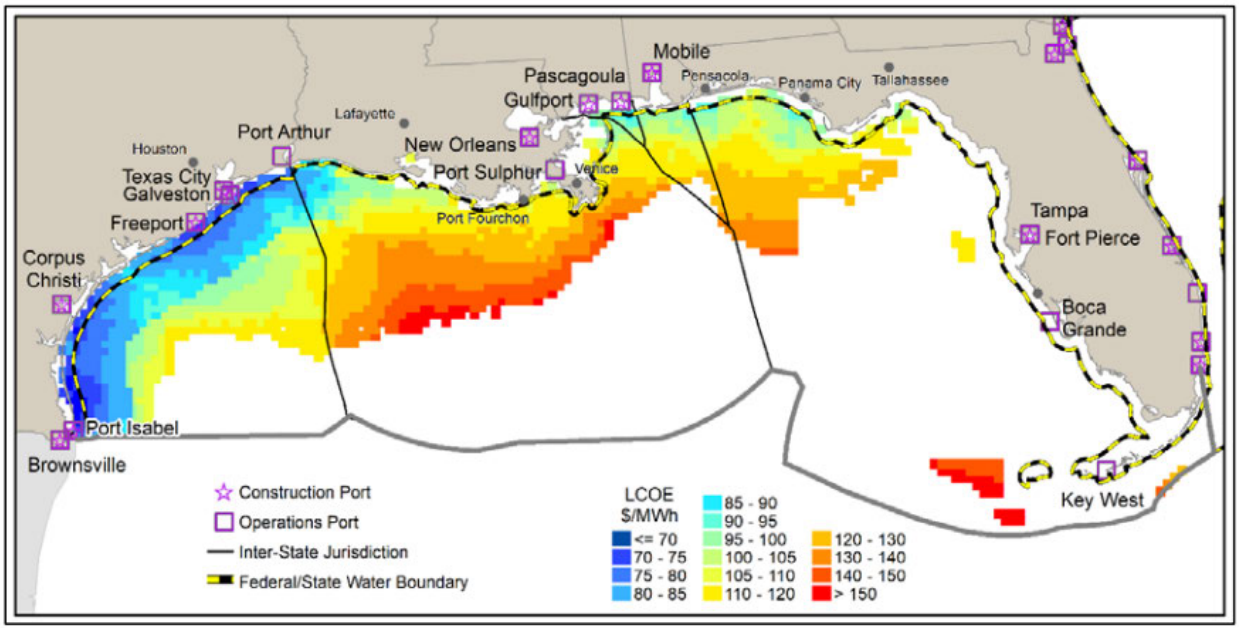
For the Western Gulf specifically, 1803 Electric Cooperative provided a figure in a recent slide deck that shows levelized cost-of-energy (LCOE) values are estimated to drop to between $70/MWh–$80/MWh for a project with an online date of 2030 (See Figure 2 below). Cleco's LCOE estimates for offshore wind are significantly higher, at a value of $208/MWh. This high cost is driven by Cleco's high capital cost assumptions, as well as its conservative capacity factor assumption of 30 percent.[40] 1803 Electric Cooperative and Entergy Louisiana both determined that an average capacity factor of 38 percent would be appropriate for offshore wind in Louisiana.[41] [42]

[40] Cleco Response to Sierra Club Request 1-1. See "Sierra Club 1-1 Attachment A.xlsx."

[41] 1803 Electric Cooperative. January 12, 2023. Slides from 2023 Integrated Resource Plan Public Stakeholder Meeting. Slide 21.

[42] Entergy Louisiana, LLC. 2023 Integrated Resource Plan. Page 61.

Figure 3. Offshore wind levelized cost of energy in 2030 ($/MWh)



Source: Musial W, Beiter P, Stefek J, Scott G, Heimiller D, Stehly T, Tegen S, Roberts O, Greco T, Keyser D (National Renewable Energy Laboratory and the Alliance for Sustainable Energy, LLC, Golden, CO). 2020. Offshore wind in the US Gulf of Mexico: regional economic modeling and site-specific analyses. New Orleans (LA): Bureau of Ocean Energy Management. 94 p. Contract No.: M17PG00012. Report No.: OCS Study BOEM 2020-018

Recommendation

Cleco should model renewable resources assuming that they can benefit from either the ITC or the PTC and should consider the additional tax credits available for energy communities. Cleco should also re-evaluate its cost assumptions, particularly for offshore wind, and benchmark its costs against similar utilities and recent RFP responses.

5. CLECO SHOULD NOT RELY ON GAS RESOURCES IN THE FUTURE

In the Draft IRP, Cleco states "the IRP results indicate solar capacity and gas-fired combustion turbines as the most economic options over the next 5-7 years."[43] However, Cleco's modeling results show that its model selected only small amounts of gas over other renewable options. Upon reviewing these results, we find that solar and storage are consistently selected by the model in all scenarios to fill generation and capacity needs in larger quantities than gas. Other utilities have also found that the combination of solar or wind with storage can provide both generation and firm capacity at almost half

[43] Draft IRP, page 11

the price of gas resources on an LCOE basis.[44] In Cleco's reference case, the model selected one 56 MW gas plant, 800 MW of additional solar, and 150 MW of storage. Despite this clear preference for solar and storage, Cleco's Draft IRP Action Plan states the Company's intention to issue an RFP for up to 500 MW of renewable energy and 500 MW of dispatchable capacity. This RFP process could lead Cleco to build an excess amount of new gas generation and fewer solar facilities relative to what the model suggests is necessary. This will further lock ratepayers into reliance on fossil fuels that have experienced price volatility and supply shortages in the recent past.[45]

Recommendation

Cleco should conduct its resource planning efforts and future procurement processes in a way that does not systematically favor gas and disfavor clean energy resources.

6. RECOMMENDATIONS

Based on our review of the Draft IRP, we recommend the following:

- Cleco should provide the following information to the Commission: (1) which injection well it intends to rely on, (2) how much it will cost to complete the regulatory approval process, dig the well, maintain it, and close it at the end of its useful life, and (3) the extent to which it expects ratepayers to bear the associated cost and risk—including costs relating to Class VI bonding requirements and ongoing post-injection monitoring as required by EPA.
- Cleco should share the results of the FEED study publicly and provide clarity on the footprint required for the CCS project.
- The Commission should require protections be put in place so that if the Madison 3 project underperforms, ratepayers are made whole.
- Cleco should outline the potential for future likely environmental controls at Madison 3, evaluate the cost of these controls and regulations and their impact on plant operations. Cleco should then factor these costs into its future analysis.
- If Cleco decides to move forward with the Diamond Vault project despite the associated risks and uncertainties, Cleco should commit to seeking preapproval for the project and provide the Commission and stakeholders with a timeline for seeking that preapproval.

[44] NextEra Energy, 2022. Available at: https://www.investor.nexteraenergy.com/~/media/Files/N/NEE-IR/news-and-events/events-and-presentations/2022/11-11-22/EEI%202022%20Investor%20Presentation_vF.pdf

[45] Reimann, N. "Critical Fuel Shortage Hits Louisiana, Further Threatening Power Supply." 2021. *Forbes.* Available at: https://www.forbes.com/sites/nicholasreimann/2021/09/02/critical-fuel-shortage-hits-louisiana-further-threatening-power-supply/?sh=74cb1dfd6977

- Cleco should model scenarios in its final IRP that allows the model to select between retirement (and replacement with alternatives), conversion to gas, and CCS retrofit at Madison 3.
- Cleco should fully evaluate in its final IRP the securitization of any remaining plant balance at Madison 3 as an alternative to retrofitting Madison 3 with CCS.
- Cleco should model renewable resources assuming that they can benefit from either the ITC or the PTC and should consider the additional tax credits available for energy communities.
- Cleco should also re-evaluate its cost assumptions, particularly for offshore wind, and benchmark its costs against similar utilities and recent RFP responses.
- Cleco should conduct its resource planning efforts and future procurement processes in a way that does not systematically favor gas and disfavor clean energy resources.

Incorporating the recommendations discussed above into Cleco's final IRP will help ensure that ratepayers of Louisiana enjoy reliable and affordable service. Revising the Company's Draft IRP will aid the Company in accounting for the increased risk and variability that currently exists in the utility planning landscape.