California's Grid is Broken. CARB's 2022 Scoping Plan Would Make Matters Worse.

CARB and its consultants, Energy + Environmental Economics (E3), have prepared a prescription to fix California's grid – but whether it will be cost-effective, or work at all, is questionable.

Analysis by Californians for Green Nuclear Power.
April 3, 2022

On March 15 the California Air Resources Board (CARB) released a 2022 update of its *CARB Draft Scoping Plan - AB32 Source Emissions Initial Modeling Results*. The Plan, which must be updated every five years, is required by California's Global Warming Solutions Act (AB 32) "to adopt regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions."[1]

To create the Plan, CARB and consultants Energy + Environmental Economics (E3) used the company's PATHWAYS software model to propose various hypothetical policy scenarios going forward. Besides a BAU (Business as Usual) Reference scenario, the model offers four alternative Scoping Plan scenarios. The goal of two (Alternative 1 and 2) is to permit California to achieve carbon-neutral emission status by 2035; the goal of the remaining alternatives (3 and 4) would be to achieve the same goal by 2045.

Before legislation to enact provisions of the Plan is introduced, California policymakers should be demanding hard answers to these questions:

1) Why do three of four alternatives rely on "engineered carbon removal", a technology which has yet to prove effective at lowering carbon emissions?

More commonly known as Carbon Capture and Sequestration (CCS), engineered carbon removal includes any one of several proposed technologies designed to trap carbon dioxide (CO_2) emitted from large industrial plants before it can enter the atmosphere. CO_2 would then be transmitted by pipeline to locations where it would be injected into deep underground rock formations for permanent storage. As of Feb. 2021, one coal plant and about two dozen other CCS facilities were in operation worldwide.[2]

- At the 90% efficiency targeted by current CCS projects, a natural gas plant would still emit exhaust at 15 times the concentration of CO_2 in the atmosphere.[3]

- The single existing coal plant with CCS capability, Saskatchewan Power's Boundary Dam **3** plant, has achieved only 33% efficiency during seven years of operation.[4] Boundary Dam's carbon capture costs an exorbitant $348.97 CAD per tonne - and only about half of the CO2 is retained in the underground petroleum reservoir.
- Meeting climate targets with CCS would thus require a leap forward in efficiency before it could serve as an effective carbon mitigation strategy.
- Risks include the possibility of catastrophic leaks from sequestration, with the resulting risk premium on the cost of capital further impairing the soundness of investments in CCS projects.[5] In recognition of this issue, PacifiCorp, operator of one of the largest fossil - fired generation fleets in the West declined to pursue any CCS projects. [6]
- California has yet to develop a suitable Monitoring, Verification, and Accounting (MVA) protocol to ensure the effectiveness of in-state sequestration.[7]

2) E3 claims its PATHWAYS model is transparent. Then why doesn't the company provide inputs for the model, or any record of past results?

PATHWAYS is a black-box software model that prevents independent verification of what data was input, or the methodology used to obtain results. Regulators are left with only the assurances of E3 to believe they offer "the maximum technologically feasible and cost-effective GHG emission reductions," as required by AB-32.

3) Why does PATHWAYS ignore the possibility of re-licensing Diablo Canyon Nuclear Power Plant – the carbon-free source of 9% of California's electricity – after recommending Washington re-license Columbia Nuclear Generating Station, in nearly identical circumstances, two years ago?

From E3's March 9, 2020 press release "E3 Examines Role of Nuclear Power in a Deeply Decarbonized Pacific Northwest":

> "As in past studies, E3 found that achieving deep emissions reductions from the electric sector is achievable at manageable cost, provided that firm capacity is available to avoid the infrequent but large electricity shortages that can occur on highly renewable grids.
>
> E3's study finds that the Columbia Generating Station – the Northwest's only nuclear generator and Washington's third-largest generating resource – **is relicensed in all scenarios in which it is available**."[8]

4) Despite a lack of evidence batteries can reduce carbon emissions (and substantial evidence they're increased instead[9]), why does PATHWAYS recommend California electricity customers be forced to absorb capital costs of up to $29.5 billion to buy battery capacity in all of its scenarios?[10]

Notwithstanding growing excitement over the possibility batteries might be able to compensate for the problematic intermittency of solar and wind generation on an electricity grid, it has yet to be achieved anywhere in the world.

The reason is simple: cost. At today's prices, sufficient capacity to power California for a average day of cloudy, windless weather with batteries would cost $1.07 trillion - approximately four times California's annual budget. They would need to be replaced every 7-10 years.

Conclusion

Whether E3's analysis is deficient or designed to enrich special interests is irrelevant. For electricity customers, California's economy, and the environment, accepting CARB's Scoping Plan based on E3's PATHWAYS model would be a huge, **risky** step backwards.

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Californians for green nuclear power

Pacific Northwest Zero-Emitting Resources Study

Executive Summary

January 29, 2020

Energy+Environmental Economics

1.1 Study purpose

The Northwest energy system is undergoing a transition. In 2019, Washington state adopted the Clean Energy Transformation Act, which sets the state on a path to serve 100 percent of retail electric loads with carbon-free electricity. In that context, Energy Northwest retained E3 to investigate the role of zero-emitting resources in meeting the region's future energy needs in a carbon constrained future.

Energy Northwest is a public power joint operating agency created by the Washington state legislature in 1957 and its membership includes 27 public utility districts and municipalities. Energy Northwest's portfolio is comprised solely of carbon-free generating resources, including wind, solar, hydropower and nuclear. The agency owns and operates the Columbia Generating Station (CGS), the only nuclear generator in the Northwest and third largest generating resource in the state of Washington. CGS is licensed to operate through 2043, with the potential for a second 20-year license extension through 2063. Energy Northwest, leveraging its expertise in the nuclear industry, is also exploring a potential role developing small modular nuclear reactors (SMRs) in the region. SMRs are an emerging, technology – with domestic commercial operation planned for the mid-to-late 2020s – that offer potential cost, performance and safety advantages over conventional nuclear generation.

This research focuses on two key questions of interest to Energy Northwest:

- What are optimal electricity resource portfolios to achieve deep carbon emissions reductions in the Pacific Northwest?

- How does the availability of firm zero-emitting generation, including both CGS and SMRs, affect the cost of achieving carbon reduction goals while maintaining a reliable electric system?

The study builds on previous analyses done by E3 in the Northwest, including:

- *Pacific Northwest Low Carbon Scenario Analysis (2017):* This study found that a portfolio of hydro, renewables and natural gas is the least cost strategy to achieve an 80% reduction in electricity sector emissions in the Northwest and that policies that directly target GHG reductions are lower cost than those that rely on renewable-only mandates or bans on gas generation.
- *Pacific Northwest Low Carbon Scenario Analysis: 2018 Scenarios and Sensitivities (2018)*: This study found that the cost of achieving 100% decarbonized electricity in the Northwest is greatly reduced if firm-zero GHG resources like SMRs or biomethane powered gas generators are available.
- *Resource Adequacy in the Pacific Northwest (2019):* This study found that firm generation is required to ensure a reliable system under deep decarbonization. That generation is needed because the marginal capacity contributions of wind, solar and storage decline as their penetrations increase. The study also found that gas is the least cost option to provide firm capacity given existing technologies.

1.2 Approach

This study uses E3's RESOLVE model to optimize the portfolio of resources serving loads in the "Core NW" region (Figure 1). RESOLVE co-optimizes investments and

operations to minimize total NPV of electric system costs over the study time horizon.

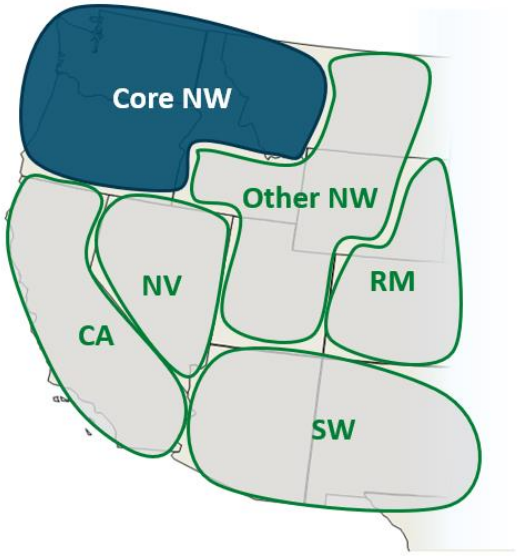


Figure 1: The Core NW Region. RESOLVE simulates electric sector operations across the west and optimizes investments in the Core NW region.

Scenarios in this study are designed to evaluate the implications of resource options for the cost and infrastructure requirements of achieving deep electricity emissions reductions in the Northwest. These resources include energy limited, variable and "firm" zero-emitting resources (Figure 2). Past work by E3 suggests that deep electric sector emissions reductions are possible using largely energy limited or variable resources, provided those resources are backed by firm capacity.

Key resource option scenarios include:

+ Renewables and Gas Available
+ Renewables, CGS Relicensing and Gas Available
+ Renewables, CGS, Gas and Zero-Emitting Firm Available
+ Renewables, CGS and Zero-Emitting Firm Available (No New Gas)

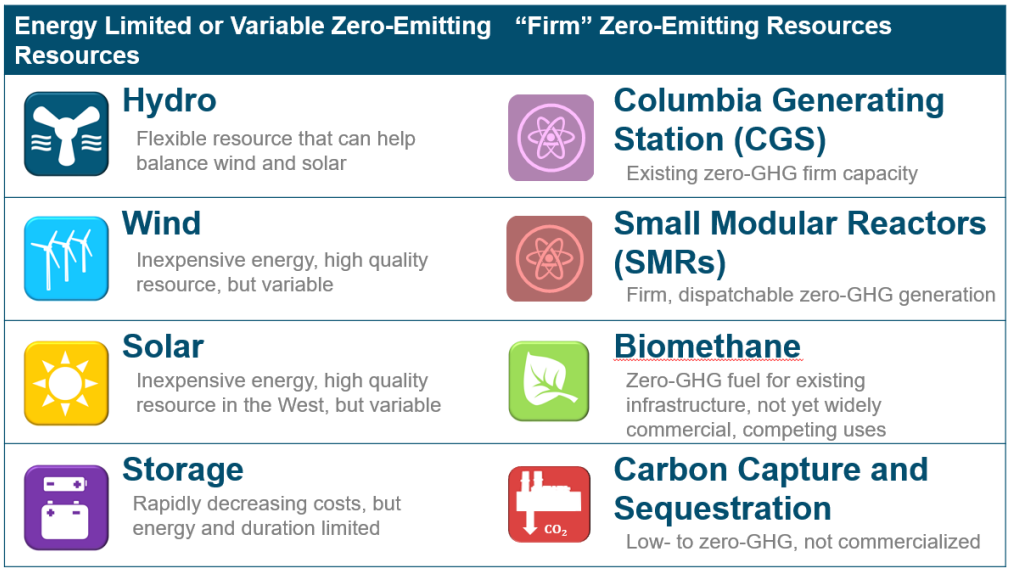


Figure 2: Zero-Emitting Resources available in RESOLVE. RESOLVE also has the option to select fossil generation.

Resource option scenarios are compared against different electric sector emissions reduction scenarios, including 80%, 90%, 95% and 100% below 1990 levels (Figure 3). These scenarios represent different levels of GHG emissions policy ambition for the NW electricity system.

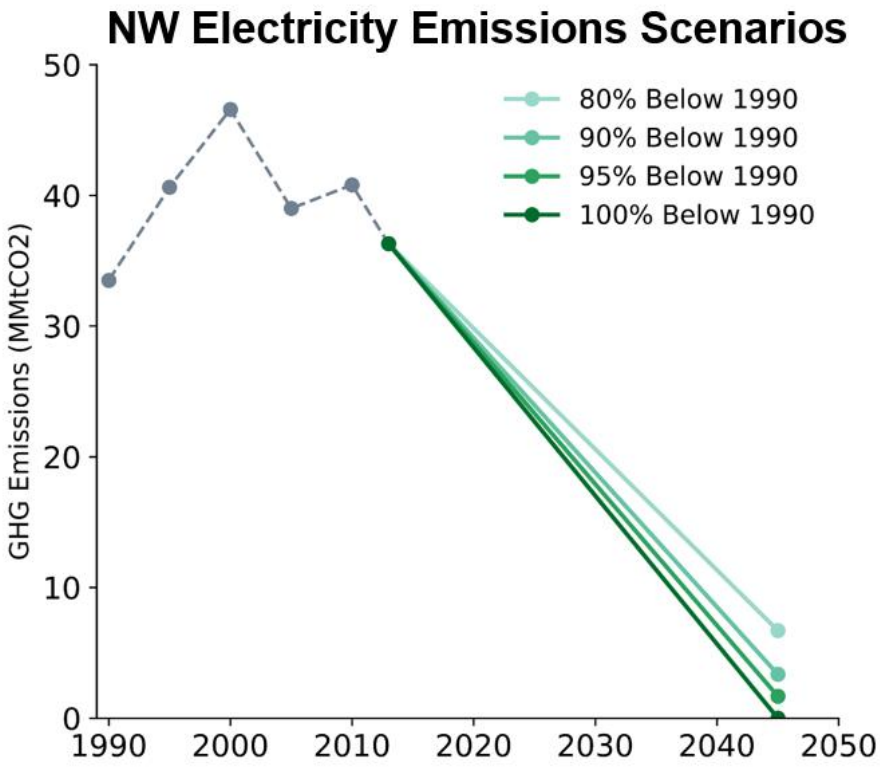


Figure 3: Electric GHG Emissions Scenarios. Past work by E3 suggests that a GHG cap of between 3 and 5 MMtCO2 is needed to achieve an 80% economy-wide emission reduction in Washington and Oregon.

1.3 Key Assumptions

This study updates several resource cost assumptions incorporated in past NW RESOLVE analyses.

1.3.1 RENEWABLES AND STORAGE COSTS

Wind and solar resource costs have been updated to NREL 2019 ATB Mid case assumptions. Battery storage costs are derived from the Lazard LCOS 4.0 report[1].

1.3.2 NUCLEAR COSTS

E3 worked with Energy Northwest to develop resource costs for both the cost of relicensing CGS and building SMRs. E3 used two sources for SMR costs, the NREL ATB Nuclear resource and "nth of a kind" estimates from NuScale, a vendor that designs and markets SMR technologies.

E3 also considered the cost of SMRs after receiving a production tax credit (PTC) as an additional cost sensitivity. Today, an $18/MWh PTC is available for up to 6,000 MW of new nuclear capacity. After accounting for nuclear projects that are under construction or announced, E3 assumed that 3,000 MW of PTC capacity is available to the Northwest region.

1.4 Findings

A key finding of this analysis is that very deep electric emissions reductions in the region can be achieved at manageable costs, provided firm capacity is available. However, the costs of achieving 100% GHG reductions exhibit a marked increase when new firm capacity cannot be built in the region (Figure 4).

[1] The bulk of the analysis done in this report was completed before LCOS 5.0 was released.

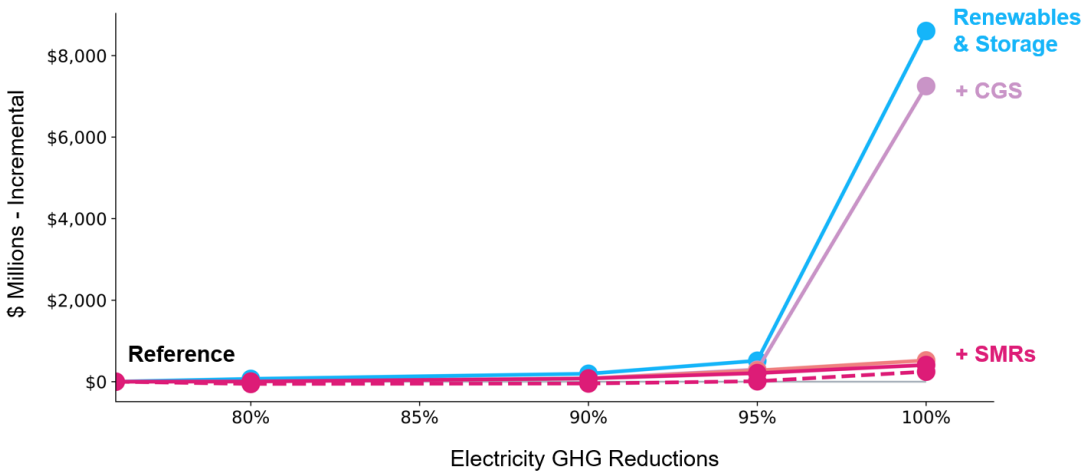


Figure 4: GHG abatement costs. The y-axis represents the incremental cost of each scenario compared to a Reference case that does not apply an emissions constraint.

1.4.1 COLUMBIA GENERATING STATION

CGS is relicensed in all the resource and emissions target scenarios in which it is available. The value of CGS stems from its ability to provide both energy and firm capacity without emitting carbon. The value of CGS ranges from $75 million per year in the 80% GHG reduction scenario to $1.35 billion in the 100% GHG reduction scenario.

1.4.2 SMALL MODULAR REACTORS

The role of SMRs in the Northwest's future electricity system depends on their cost, the stringency of regional emissions limits and the availability of gas generators to provide firm capacity.

- **Base Costs:** At NREL ATB and NuScale costs, SMRs are selected in the 95% and 100% emissions reduction scenarios. In all but one case, the first

SMRs are built in 2045. By 2045, the amount of SMR generation selected by the model under the NuScale cost scenario is about twice that of the amount selected under the NREL cost scenario due to the lower costs projected by NuScale.

- **Production Tax Credit:** When a nuclear production tax credit is available, SMRs are selected in all emissions reduction scenarios and are built earlier, with the first units coming online in 2040.
- **No New Gas**: SMRs have their largest build out in cases where gas generators—powered by either natural gas or biomethane—cannot be built. In these cases, the first SMRs are built by 2030, with at least 6.3 GW of SMRs built by 2045.
- **100% GHG Reduction:** At NuScale costs, SMRs reduce the cost of achieving a 100% electric sector GHG reduction by nearly $8 billion per year). That value stems from those resources' ability to provide firm capacity, thereby avoiding a large overbuild of renewables.

1.5 Scenario Cost Comparison

Scenario costs are summarized in terms of average retail rates in Figure 5. The cost of the scenarios considered in this analysis are similar when natural gas generation capacity can be built. Those scenarios exhibit similar portfolio builds, largely relying on renewables that are backed by rarely used gas generation. If new gas capacity is not available, the costs of decarbonizing the Northwest electricity system increase markedly when only renewables, hydro and storage are available. If zero-GHG firm resources—including CGS, SMRs and biomethane—are available then the services provided by gas generators can be

replaced at reasonable cost. That same finding holds in cases where zero-GHG emissions are allowed in the Northwest electricity system.

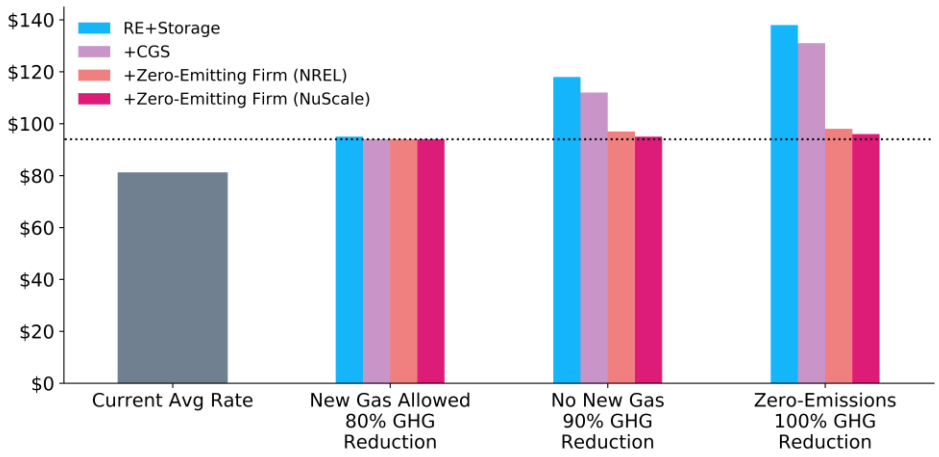


Figure 5: 2045 electricity rates under different scenarios. The y-axis shows the average retail rates for different resource and emissions scenarios. The x-axis shows the current average retail rate in the Northwest and the future rates under scenarios where new gas is allowed, where no new gas is allowed, and where the region achieves 0 GHG emissions.

1.6 Conclusions

Achieving deep decarbonization of the Northwest electricity system can be accomplished at reasonable cost if firm capacity can be built in the region. Columbia Generating Station is relicensed in all scenarios while zero-emitting firm resources like SMRs are most valuable under very tight emissions reductions regimes. In those cases, zero-emitting firm resources provide important reliability services that reduce the cost of achieving deep emissions reductions relative to

scenarios that only rely on renewables and storage. SMRs have their largest role when new gas generators cannot be built or when they are able to receive a nuclear production tax credit. In those cases, SMRs are built in all emissions reduction scenarios.

ALJ/JF2/avs **Date of Issuance 6/30/2021**

https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M389/K603/389603637.PDF Archived by CGNP 07 06 21. **" Unspecified Imports" appears twice on page 16 of 107. Neither "NEPA" nor "Environmental Impact Statement" appear.**

Decision 21-06-035 June 24, 2021

32 instances of "Diablo." 2 instances of "CGNP" that we filed opening comments and reply comments.

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes.	Rulemaking 20-05-003

5,000 MW of Unspecified imports will be required in 2025 as the 4,000 MW is based on slow-to-implement in-state Salton Sea geothermal production by a Berkshire Hathaway subsidiary.

DECISION REQUIRING PROCUREMENT TO ADDRESS MID-TERM RELIABILITY (2023-2026)

15 percent instead of 20.7 percent, and also removed project viability discounts on the resource additions to the IRP baseline. For the high-need scenario, approximately 815 MW of additional thermal plant retirements by 2026 were assumed. This was based on an estimate of the portion of the thermal generation fleet that will reach 40 years of operating life by 2026, which is an indication of the risk of plants being retired beyond those already announced. Also, for the high-need scenario, unspecified imports were reduced from 5 GW to 4 GW. Finally, the PRM was effectively increased further to reflect an assumed effect of a one-degree Celsius temperature increase due to climate impacts over the next decade, with the impacts of the changed assumption applied beginning in 2024.

Table 1 below shows the key metrics and NQC need outputs for each scenario.

Table 1. Assumptions and Outputs of Need Scenarios Analyzed (NQC MW unless otherwise specified)

Item	Mid Need	Low Need	High Need
Assumptions (by 2026)			
PRM	20.7%	14.9%	22.5%
Operating Reserves (subset of PRM)	6%	4.5%	6%
Unspecified imports	5,000	5,000	4,000
OTC unit retirements	3,733	3,733	3,733
Diablo Canyon retirement	2,280	2,280	2,280
Additional thermal retirements	479	479	1,294
Outputs			
2024 NQC shortfall	4,146	1,520	6,571
2025 NQC shortfall (cumulative)	7,097	4,424	9,892
2026 NQC shortfall (cumulative)	7,410	4,715	10,432

https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M451/K412/451412947.PDF Archived 02 20 22 by CGNP **CGNP mentioned six (6) times.**

On Page 107 of 199: Criteria pollutants were counted from generation within California only, and not from unspecified imports.

ALJ/JF2/jnf **Date of Issuance 2/15/2022**

Decision 22-02-004 February 10, 2022

See counterfactual results from the above page 107 assumption at the top of page 108

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes.	Rulemaking 20-05-003

DECISION ADOPTING 2021 PREFERRED SYSTEM PLAN

compared to its equivalent RESOLVE result in prior IRP analyses. The differences between RESOLVE and SERVM modeled GHG emissions in 2026 and 2030 also within this range of difference. Two model differences that contribute to the GHG emissions results difference between the models are:

> SERVM's 20-year historical year average wind capacity factor is lower than RESOLVE's three-year historical year average, so wind generation in SERVM is less than in RESOLVE for the same installed capacity;
>
> SERVM imposed a storage discharge cap that tends to limit the amount of solar generation that can be stored for use during the evening peak. With the cap in place, curtailment, imports, and exports increased while storage round-trip losses decreased. In-state gas generation stayed about the same. The net effect is increased emissions from higher imports.

Commission staff also estimated criteria pollutant emission using the proposed PSP portfolio. Staff estimated total nitrous oxide, sulfur dioxide, and particulate matter emissions. Staff used fuel burn, number and type of starts, and generation output from SERVM and applied appropriate emissions factors to calculate emissions. Emissions were counted from all emitting generation in California by CARB air basin for more locational granularity, and where available, using plant-specific criteria pollutant emissions factors. Criteria pollutants were counted from generation within California only, and not from unspecified imports. Then, emissions were grouped into two simplified categories: those from generating units located in disadvantaged communities, as defined by the California Environmental Protection Agency and in D.18-02-018 (even if emissions may migrate beyond the disadvantaged community) and those from generators not located in disadvantaged communities (even if emissions may migrate into such communities).

- And significantly, the bureaucratic gimmick on the previous page.

SERVM results indicate a downward trend for criteria pollutants, with total pollutants decreasing about 7 percent between 2026 and 2032 due to a shift from fossil generation to geothermal and other renewable resources. More detailed information about the SERVM analysis conducted to support this decision is available on the Commission's web site.[8]

Also posted is the RESOLVE analysis package developed by Commission staff that includes more detailed inputs and results for the 38 MMT Core with 2020 IEPR Demand and High EV Penetration scenario. The package also contains a sensitivity scenario based on the 30 MMT Core portfolio, updated with the 2020 IEPR assumptions and using the 2020 IEPR High EV penetration assumptions. All scenario assumptions in the sensitivity align with the 38 MMT Core with the 2020 IEPR High EV scenario assumptions, except that it has a lower GHG target. This sensitivity was developed to better understand the incremental buildout that would be needed if the GHG target was lowered below 38 MMT in a subsequent cycle.

On the basis of these results, we conclude that the portfolio described in Table 6 and Table 7 above meets the reliability standards we have set, with a LOLE result of under 0.1 in all study years.

We will adopt this portfolio as the PSP portfolio, and its associated 38 MMT GHG target by 2030 (and 35 MMT by 2032) as the state's electric sector planning target, for several important reasons. First, the portfolio starts with an aggregation of the actual procurement plans of the LSEs subject to our IRP requirements, and is then augmented with the MTR requirements adopted in D.21-06-035. Thus, it should reflect a realistic representation of the actual

[8] https://www.cpuc.ca.gov/industries-and-topics/electric-energy/electric-power-procurement/long-term-procurement-planning/2019-20-irp-events-and-materials

The Failure of California Electricity Policy in One Image

Veteran energy watchers know that a time-graph of electricity consumption on an electrical grid tells a story

By Carl Wurtz, April 2, 2022 7:50 am

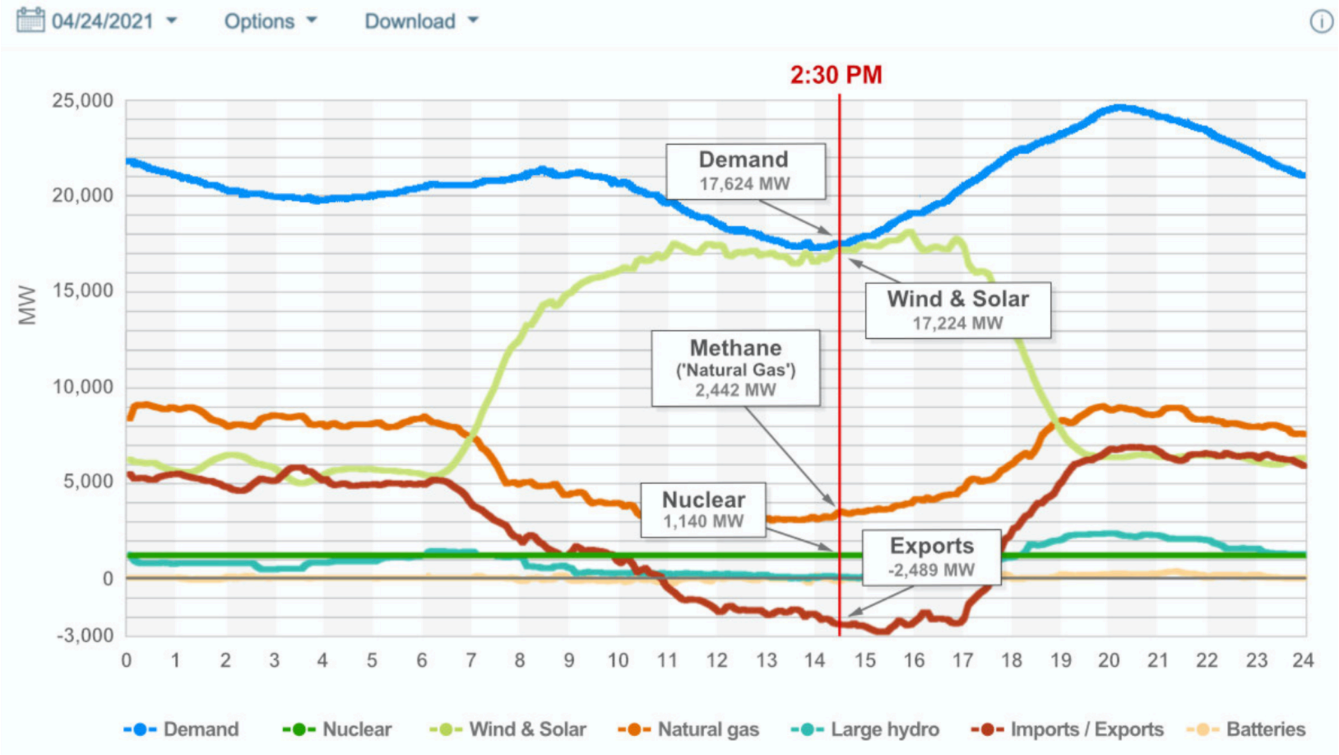
In a few weeks it will be one year since the article "California just hit 95% renewable energy. Will other states come along for the ride?" appeared in the Los Angeles Times. Its author, reporter Sammy Roth, had learned that California briefly generated 95% of the electricity consumers were using from renewable sources a few days earlier, and he was elated. Either he believed, or he wanted us to believe, that it was only a matter of generating 5% more of our energy from wind turbines and solar panels and California would cease emitting greenhouse gases into the atmosphere. We would achieve something no other country, city, or community worldwide had achieved before.

Like the rings of a tree, veteran energy watchers know that a time-graph of electricity consumption on an electrical grid tells a story. All of its curved lines, from one moment to the next, are interrelated – when one goes down, it might cause another to go up; two others might appear to be linked – but every shape has a part to play. Though I knew Roth's claim wasn't true, I had to know *why* it wasn't it true – why it couldn't have happened, even for four seconds.

I started by downloading graphs of what happened on Saturday, April 24, 2021 – precise figures for supply (generation) and demand (consumption), available at the website of the California Independent System Operator (CAISO). As you'll see, it didn't require much investigation before the monument to solar and wind energy Roth had erected would start to crumble.

The graph below was cobbled together from several others. Some explanation:

- Time moves from left to right. The left side corresponds to 12:00 AM on April 24, the right corresponds to 12:00 AM the next morning.
- The blue line at the top shows electrical demand, measured in megawatts (MW) – the amount of power California consumers were using at each moment of the 24-hour day.
- The other lines below it show supply – how CAISO is meeting demand (at any time, the heights of all the other lines combined is equal to the height of the blue one).
- For four seconds at about 2:30 PM (red vertical line), California solar and wind generated 94% as much electricity as customers were consuming.
- At the same moment, however, natural gas plants were generating 3,442 MW and Diablo Canyon Power Plant was generating 1,144 MW – together with renewables, there was too much supply.
- If supply doesn't precisely match demand on an electric grid, it can cause a system-wide outage. Thus California had to to export 2,489 MW to keep the grid from going down (dark red line).
- Because Arizona, Nevada, and Oregon didn't need or want our electricity, we had to pay them to take it (euphemistically labeled "negative pricing"). It's an expense borne by California electricity customers.
- During peak consumption (8 PM), wind and hydro are the only significant renewable resources available. Solar is providing no electricity at all.
- At that time, when electricity is most expensive, California is forced to import more than 1/4 of its electricity from other states.



Q: Why are natural gas plants running at all, if there's too much renewable electricity?

A: Because solar and wind are unpredictable, fast-starting gas turbines must operate in "spinning reserve" to smooth their output. If a cloud covers the sun over a solar farm gas turbines must ramp up to fill in the gap in generation. Or, if the wind suddenly picks up at a large wind farm, they must ramp down to prevent overloading the grid.

Q: Then we can't just power the grid with solar and wind?

A: That's correct. Powering a grid with either requires natural gas to be at the ready, to smooth out any abrupt changes that may occur.

Q: Why does solar energy flatten out in the middle of the day, when the sun is high in the sky?

A: Because solar would produce too much electricity at mid-day, system operators are forced to curtail solar – to request operators shut their farms down. And solar farms are paid to turn off their output – another expense borne by California electricity customers for which they receive nothing of value.

Q: So, having "free" solar and wind is more expensive than without it? And having renewables on the grid actually forces us to burn more fossil-fuel gas?

A: Yes, and yes.

Q: What about batteries? Can't they fill in the blanks for solar and wind?

A: No. Electricity produced by all grid-scale batteries in California is shown by the yellow line (it's hiding behind the graph's x-axis). For the purpose of making any significant contribution to grid electricity, batteries are useless.

California's nuclear plant, Diablo Canyon, is scheduled to permanently close in November 2025, to allow investors to build other more profitable ways to generate electricity. Now, when they tell you their ways will lower carbon emissions and you tell them they're wrong, you'll be able to tell them why.

Carl Wurtz

Carl Wurtz, President of non-profit Californians for Green Nuclear Power, grew up within a strong pro-nuclear culture not far from Argonne National Laboratory and FERMILAB in Chicago. Carl is a lifelong environmentalist and clean-energy advocate, and credits his pro-nuclear leanings to spending his youth in a state which generates more than half of its electricity with nuclear energy.

NuclearNewswire POWER & OPERATIONS

Op-ed asserts that coal power will replace Diablo Canyon's output

Mon, Aug 23, 2021, 1:00PMANS Nuclear Cafe

Diablo Canyon nuclear power plant

With California's electricity rates the highest in the continental United States, and with rolling blackouts last summer and more blackouts likely this year, now is not the time to shut down the emission-free, reliable energy source that is the Diablo Canyon nuclear power plant, according to Gene Nelson, the legal assistant for Californians for Green Nuclear Power.

The two-unit Diablo Canyon nuclear power plant is scheduled to be shut down in 2025.

Dueling viewpoints: In his August 22 op-ed in the *San Luis Obispo Tribune* titled "Is California on track to meet clean energy goals without Diablo Canyon? It's doubtful," Nelson rebuts a July 26 editorial titled "Ready or not, Diablo Canyon is closing—and California will just have to adjust," authored by the *Tribune*'s editorial board. The editorial board's piece says, in part, that the California Public Utilities Commission (CPUC) has "finally ordered utilities to acquire 11,500 megawatts of additional clean energy between 2023 and 2026—more than enough to replace the 2,256 megawatts generated by Diablo Canyon. Companies that fail to comply with the order will face hefty fines."

More coal? Nelson questions, however, how the CPUC's ambitious goal will be possible, given the short time frame. "Clearly, there must be an out-of-state electricity supplier," he says, noting that a CPUC document references "unspecified imports" as a

source for electric power, which Nelson claims is “a California legal euphemism mostly applied to out-of-state coal-fired generation.”

Nelson adds that a likely candidate to provide imports to California is PacifiCorp, a subsidiary of Berkshire Hathaway Energy, which owns several coal and natural gas plants in the West and is constructing an electric power transmission project that will link several states. (There already is a transmission line in southern Nevada that links to a Southern California Edison substation, providing access to the California grid.)

State law: Despite a 2006 California law (S.B. 1368 (Perata)) that sets an emissions standard for power provided to California, PacifiCorp has obtained an exemption due to its “small footprint” in California, according to Nelson. PacifiCorp operates 5,234 megawatts of coal-fired power and 3,013 megawatts of natural gas power, he notes.

“Californians for Green Nuclear Power wants [San Luis Obispo] County to follow California environmental laws when they review possible plant closure,” Nelson concludes. “We believe Californians can’t afford to lose this fight.”

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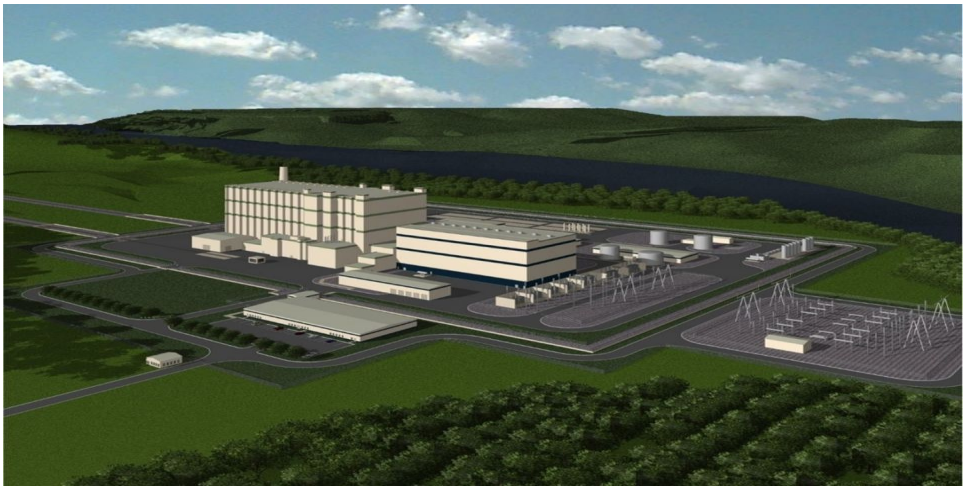

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The Shutdown of Nuclear Power Plants Is a Threat to National Security, Says Tesla CEO Elon Musk

by Eva Fox March 27, 2022

https://www.tesmanian.com/blogs/tesmanian-blog/closing-nuclear-power-plants-now-is-crazy-says-tesla-ceo-elon-musk

Image: AP Photo

Nuclear power plants are a powerful source of energy, which is an alternative to energy sources that pollute the environment. Their relevance has grown even more, against the backdrop of Russia's attack on Ukraine. The shutdown of nuclear power plants is a threat to national security, says Tesla CEO Elon Musk. He calls not only to continue the operation of nuclear power plants, but also to restart those that have already been closed.

In order to continue to work and develop, humanity needs a significant amount of energy. Today, energy generation from coal/peat and natural gas dominates, while energy generation from renewable energy sources continues to gain momentum. However, some countries are already facing problems, as they cannot access the energy sources they used to have, so an urgent solution is needed.

Because of the war that Russia unleashed by invading Ukraine, many countries around the world imposed harsh sanctions on the aggressor. Countries in Europe that have

been receiving gas from Russia for years are in a delicate position. Previously, they had driven themselves into dependence on Russia, as they used its energy sources, neglecting the urgency of solving the problem of energy supply to their countries on their own in order to maintain their independence.

Parallel to becoming ever more dependent on Russia, countries have begun phasing out nuclear power and have begun to shut down their nuclear power plants. Tesla CEO Elon Musk has repeatedly raised the issue of nuclear energy. In early March, he *called* for increased nuclear power production in Europe amid concerns about gas shortages due to Russia's invasion of Ukraine. Musk stressed that "this is *critical* to national and international security," which he was obviously right about.

In a recent *interview* with German journalist Mathias Döpfner, the head of Tesla again pointed out the importance of this step. Döpfner asked if more nuclear power is the key to freeing the world from dictators and autocrats like Putin? Musk said that for this the world must not only stop shutting down nuclear power plants, but also start restarting those that are already closed.

The bottom line is that nuclear power plants can supply energy again the fastest. Of course, Musk encourages to do this only in places that are not prone to natural disasters. "Closing nuclear power plants now is crazy. Especially in a place where there are no natural disasters," he said. The head of the company also explained that in places where strong earthquakes or tsunamis occur, this issue will have a different solution. However, as long as there is no great risk of natural disasters, such as in Germany, there is really no danger from nuclear power.

Musk also said that in the long term, solar energy will be the largest source of energy for civilization, and it will have to be stored in batteries. **This will be a clear necessity because the sun only shines during the day and sometimes there are very cloudy days**. The sun will become "the most important form of energy supply for our civilization in the long term. But until then, we must keep nuclear power. I cannot stress this enough. It's absolute madness to turn them off now. To put it bluntly, this is complete madness," said Mask. "I would even say that the shutdown is a threat to national security," he stressed.

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Article edited by @SmokeyShorts, you can follow him on Twitter

ABOUT THE AUTHOR

Eva Fox

Eva Fox joined Tesmanian in 2019 to cover breaking news as an automotive journalist. The main topics that she covers are clean energy and electric vehicles. As a journalist, Eva is specialized in Tesla and topics related to the work and development of the company.

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POLITICS

GERMANY ABROAD

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ELON MUSK

"Crazy that Germany is shutting down its nuclear power plants"

| Reading time: 22 minutes

By **Mathias Döpfner**
CEO of Axel Springer SE

Elon Musk (right) and Mathias Döpfner in Musk's plant in Fremont (California)

Source: Jason Henry

At the beginning of March, the multi-entrepreneur Elon Musk made his satellite-based Internet available to Ukraine. In an interview with Mathias Döpfner, Musk says what made him do it, how he sees German politics - and what he intends to do with humanoid robots.

At the beginning of March 2022, after Russia's war against Ukraine was only a few days old, something extraordinary happened. The visionary and serial entrepreneur Elon Musk intervened. At

the request of Ukraine's digital minister, Musk made his Starlink space internet available to Ukraine. It is based on more than 2000 satellites that Musk's space company SpaceX has put into orbit. As later emerged, Musk's internet arguably kept the country online.

Springer CEO Mathias Döpfner met Musk for an in-depth discussion. In it, Musk tells, among other things, how the Internet thing came about for Ukraine. (Remainder of article behind paywall.)