

Date of Hearing: June 19, 2024

ASSEMBLY COMMITTEE ON UTILITIES AND ENERGY

Cottie Petrie-Norris, Chair

SB 1006 (Padilla) – As Amended May 29, 2024

SENATE VOTE: 39-0

SUBJECT: Electricity: transmission capacity: reconductoring and grid-enhancing technologies

SUMMARY: Requires transmission utilities to jointly prepare a grid-enhancing technologies (GETs) strategic plan that is designed to cost-effectively increase transmission capacity to support the connection of new renewable energy and zero-carbon resources, as well as for each transmission utility to evaluate reconductoring of its transmission and distribution lines, as specified.

Specifically, **this bill:**

- 1) Requires each transmission utility, as defined, on or before January 1, 2026, and at least every 4 years thereafter, to complete an evaluation of which of its transmission and distribution lines can be reconductored with advanced conductors in a cost-effective manner to increase transmission or distribution capacity to support the connection of new renewable energy and zero-carbon resources.
- 2) Requires the transmission utilities to submit a GETs strategic plan and evaluation to the California Public Utilities Commission (CPUC) and to make the plan and evaluation publicly available.
- 3) Requires the plan and evaluation to include a timeline for implementation, as specified.
- 4) Requires each transmission utility to report the progress in implementing the plan in its integrated resource plan.

EXISTING LAW:

- 1) Vests the CPUC with jurisdiction over public utilities, including electrical corporations. (Article XII of the California Constitution)
- 2) Requires the CPUC to consider in its Certificate of Public Convenience and Necessity review cost-effective alternatives to a transmission facility, including targeted energy efficiency, ultraclean distributed generation, and other demand reduction resources. (Public Utilities Code § 1002.3)
- 3) Prohibits an electrical corporation from beginning the construction of a line, plant, system, or any extension without having first obtained from the CPUC a certificate that the present or future public convenience and necessity require or will require its construction. (Public Utilities Code § 1001(a))
- 4) Provides that the extension, expansion, upgrade, or other modification of an existing electrical transmission facility, including transmission lines and substations, does not

require a certificate that the present or future public convenience and necessity requires or will require its construction. (Public Utilities Code § 1001(b))

- 5) Requires the CPUC, by January 1, 2024, to update General Order (GO)131-D to authorize each public utility electrical corporation to use the permit-to-construct process or claim an exemption under Section III(B) of that general order to seek approval to construct an extension, expansion, upgrade, or other modification to its existing electrical transmission facilities, including electric transmission lines and substations within existing transmission easements, rights of way, or franchise agreements, irrespective of whether the electrical transmission facility is above a 200-kilovolt voltage (kV) level. (Public Utilities Code § 564)
- 6) Establishes the policy (100% Clean Energy Policy, or SB 100 Policy) of the state that eligible renewable energy resources and zero-carbon resources supply 90% of all retail sales of electricity to California end-use customers by December 31, 2035, 95% of all retail sales of electricity to California end-use customers by December 31, 2040, 100% of all retail sales of electricity to California end-use customers by December 31, 2045, and 100% of electricity procured to serve all state agencies by December 31, 2035. (Public Utilities Code § 454.53)
- 7) Establishes the California Independent System Operator (CAISO) as a nonprofit public benefit corporation and requires the CAISO to ensure efficient use and reliable operation of the electrical transmission grid consistent with achieving planning and operating reserve criteria. (Public Utilities Code § 345.5)

FISCAL EFFECT: According to the Senate Appropriations Committee, the CPUC estimates ongoing costs of approximately \$255,000 annually in ratepayer funds to make recommendations based on its evaluation of the strategic plans and evaluations submitted as this bill provides. The CPUC would need to request the CAISO consider the results of the strategic plans and each evaluation as part of its transmission planning process (TPP). According to CPUC, this would require additional analysis – a highly technical engineering review – of those reports and additional coordination with the CAISO to make recommendations as part of its TPP transmittals.

BACKGROUND:

Integrated Resource Planning (IRP) Framework – CPUC – To achieve procurement targets for the Renewables Portfolio Standard and statewide emission reduction policies, the CPUC, has adopted an Integrated Resource Plan (IRP) planning process that runs on a two-year cycle. In this process, the CPUC oversees long-term procurement for its regulated load-serving entities (electrical corporations, community choice aggregators, and electric service providers), which serve approximately 75% of the state.¹ The first year of the IRP cycle develops the Reference System Plan by evaluating the appropriate greenhouse gas (GHG) emission planning goal for the electric sector and load-serving entities (LSEs), and identifies the optimal mix of electricity resources to meet state GHG emissions and reliability goals in a cost-effective manner. Simply put, the Reference System Plan produces an estimate of what LSEs should be procuring. The

¹ Public Utilities Code § 454.51-454.53

second year of the IRP cycle develops the Preferred System Plan by aggregating the generation resources proposed by LSEs into a single system-wide portfolio to meet the state's GHG emissions and reliability goals cost-effectively. The Preferred System Plan that is produced by the IRP process is the basis for a number of additional planning processes, including the TPP by the CAISO.

In February 2024, the CPUC adopted its latest Preferred System Plan by setting a statewide 25 million metric ton (MMT) GHG goal for the electric sector by 2035.² The decision represents the most aggressive *end of the range identified by CARB, and has identified 56 gigawatts (GW)* of new clean resources needed by 2035. Delivering on these ambitious targets will require corresponding new transmission build outs and upgrades.

Transmission Planning Process (TPP) – Each year, the CAISO conducts its TPP to identify potential system limitations as well as transmission projects in need of upgrades or new transmission infrastructure in need of construction to improve reliability and efficiency.³ The TPP fulfills the CAISO's core responsibility to identify and develop solutions to meet the future needs of the electricity grid. The TPP relies on the CPUC's IRP to identify the optimal mix of system-wide resources. CAISO receives the IRP results as inputs into its TPP.

California's Transmission Delays – In April 2024, CAISO issued its Draft 2023-2024 Transmission Plan targeting a goal of 85 GW of new clean generating capacity by 2035 reflecting the state's goals and load growth including the potential for increased electrification. The plan also identifies 26 new projects, including the first wave of transmission infrastructure needed to deliver clean North Coast wind energy to the CAISO grid. As demonstrated earlier, the state's transmission system must expand to match the unprecedented build out of renewables. However, California's transmission development process can be lengthy and complicated taking over a decade from concept to construction.

GETs – According to the U.S. Department of Energy (DOE), an estimated 70% of transmission and distribution lines in the U.S. are well into the second half of their 50-year life expectancy.⁴ As transmission lines age, they become more inefficient, increasing the likelihood of congested power lines, which can force operators to reroute power through less optimal paths and rely on more expensive or less clean power generation.⁵ Extreme cases of transmission constraints may even overload transmission systems, forcing utilities to employ periodic load shedding tactics (i.e., rolling blackouts).

To facilitate the clean energy transition, GETs have been posed by researchers and industry leaders as an interim, cost-effective solution to unlock transmission capacity in the near term and buy time for long-term transmission planning. GETs encompass a suite of technologies – such as advanced conductors,⁶ dynamic line ratings,⁷ advanced power flow control devices,⁸ and

² Proposed Decision issued 2/15/2021 in IRP Proceeding, Rulemaking 20-05-003

³ There are other transmission planning efforts, including local capacity requirements, special studies, interregional transmission project, and others that are not mentioned here for sake of clarity.

⁴ DOE; "What does it take to modernize the U.S. electric grid?"; <https://www.energy.gov/gdo/articles/what-does-it-take-modernize-us-electric-grid>; October 2023.

⁵ DOE; *Grid-Enhancing Technologies: A Case Study on Ratepayer Impact*; February 2022.

⁶ Advanced conductors enable higher operating temperatures, higher capacity for electrical current, and reduced line sag.

analytical tools – that can be used to maximize the transmission of electricity across existing lines. According to the Federal Energy Regulatory Commission (FERC), GETs can cost less than 10% of the cost of investing in new transmission lines, and can save millions in annual congestion costs.⁹ As a result, FERC has recently taken steps to push for consideration and adoption of GETs, through incentive programs supported by the federal Bipartisan Infrastructure Law.¹⁰

GETs Deployment in California – According to the 2023- 2024 Transmission Plan, CAISO supports the deployment of GETs, and has considered them on a case by case basis in past annual transmission planning processes.¹¹ For instance, advanced conductors and power flow controllers are considered as planning tools and provide alternatives to capital expenditures. Dynamic thermal line ratings, and topology optimizations provide operational benefits through additional capacity. Southern California Edison (SCE) has deployed more than two dozen reconducting projects, including the Big Creek-Ventura 220kV network. In addition, CAISO approved a phase shifting transformer flow controller installation at the Imperial Valley Substation. More recently, there are two projects under development in San Jose with flow controls.

Recent FERC Orders – Relatively recent orders issued by FERC also reflect the importance that the agency ascribes to GETs in achieving US renewable energy goals—and that their use is required to ensure just and reasonable rates for ratepayers:

- In May 2023, FERC Order issued *Order 2023* requiring transmission owners to incorporate specific alternative transmission technologies into the interconnection study process. According to FERC, these technologies “can provide substantial benefits to optimize the transmission system in specific scenarios because they can be deployed both more quickly and at lower costs.”¹²
- In May 2024, FERC issued *Order 1920* with requirements addressing how transmission providers must conduct long-term planning for regional transmission facilities. Specifically, the order requires transmission providers in each transmission planning region to consider dynamic line ratings, advanced power flow control devices, advanced conductors, and transmission switching in their long-term regional transmission planning processes. The requirement refers to both new facilities and upgrades for existing facilities.

Federal-State Modern Grid Deployment Initiative – In May 2024, the Biden-Harris Administration launched the Federal-State Modern Grid Deployment Initiative (“the Initiative”)

⁷ Dynamic line ratings adjust thermal line ratings based on actual weather conditions, including ambient air temperature and wind speed/direction.

⁸ Advanced power-flow control devices swiftly control the impedance, or opposition to current, in real time to ensure that power is delivered on lines that have the capacity to carry it.

⁹ Utility Dive; “Regulators need to require utilities to use grid-enhancing technologies: FERC’s Clements”; <https://www.utilitydive.com/news/transmission-grid-enhancing-technologies-gets-utilities-naruc-ferc-clements/699686/>; November 2023.

¹⁰ DOE; “Grid Resilience and Innovation Partnerships (GRIP) Program”; <https://www.energy.gov/gdo/grid-resilience-and-innovation-partnerships-grip-program>.

¹¹ California ISO; PG 24, “2023-2024 Transmission Plan”; May 23, 2024

¹² FERC. Docket No. RM22-14-000; Order No. 2023 (July 2023).

to accelerate improvements to the transmission and distribution system, to support the country's objectives for affordable, clean, and reliable power.¹³ Twenty-one states including California, Arizona, Kentucky, New York, Massachusetts, and Washington committed to the following initiative among others:

- Facilitate pathways to spur adoption of high-performance conductors and GETs;
- Maximize the use of available Federal financial and technical assistance;
- Share successes, challenges, lessons learned, and best practices with other states.

The Federal government has committed to various initiatives including providing technical assistance support and ensuring states have access to financial assistance resources. However, the Federal government and the states mutually also recognize that there will not be a “one-size-fits-all” approach to maximizing the opportunities and overcoming the challenges each state may be facing with grid technology deployment.¹⁴

GRIP Program. The Grid Resilience and Innovation Partnerships (GRIP) Program is a Department of Energy (DOE) program under the 2021 Bipartisan Infrastructure Law that provides up to \$10.5 billion in funding for projects to improve the reliability and resilience of the electric grid. In October 2023, DOE announced \$ 3.5 billion for projects including those that incorporate GETs.¹⁵

COMMENTS:

- 1) *Author's Statement.* According to the author, “CAISO estimates 7,000 megawatts of new transmission capacity is needed each year for the next decade, but California is nowhere near achieving it. Two new studies demonstrate that reconductoring and GETs can nearly double grid capacity in a cost effective manner. To add transmission capacity in a cost effective and timely way, California must advance reconductoring and grid-enhancing technologies to modernize the grid and meet clean energy goals. We simply cannot rely on the grid of our grandparents to power our grandchildren's future.”
- 2) *Complimentary Solutions.* California has established ambitious clean energy and climate change goals. Energy planners are increasingly looking for opportunities to meet these goals, while facing a myriad of challenges arising from projected growth on the demand-side, line congestion, interconnection delays, siting and permitting, reliability risks due to extreme weather and climate events. All these challenges intersect with transmission capacity. While progress has been made to address challenges, complimentary solutions like GETs can rapidly and affordably be deployed to improve transmission capacity, performance, and resilience.

The author and supporters of the bill contend that GETs are under-deployed in the U.S as compared to other regions like Europe. As such, transmission owners may need guidance,

¹³ The White House; Pg. 3, “Federal-State Modern Grid Deployment Initiative.” May 2024

¹⁴ The White House; Pg. 5, “Federal-State Modern Grid Deployment Initiative.” May 2024

¹⁵ DOE, “Biden-Harris Administration Announces \$3.5 Billion for Largest Ever Investment in America's Electric Grid, Deploying More Clean Energy, Lowering Costs, and Creating Union Jobs;” <https://www.energy.gov/articles/biden-harris-administration-announces-35-billion-largest-ever-investment-americas-electric>

as provided by this bill that encourages them to take proactive steps to incorporate GETs into their system planning and operations.

- 3) *Definitions.* This bill defines, “grid-enhancing technologies” to mean hardware and software that dynamically increase the capacity of electrical lines and improve the efficiency, reliability, and safety of the grid.” According to the Department of Energy, a formal definition of GETs is yet to be adopted.¹⁶ Similarly, no formal definition exists for reconductoring with advanced conductors, which this bill also defines. It is unclear whether the definitions provided in this measure may be too prescriptive or may require further modification as technology and innovation evolves in this field to incorporate new technologies, and new industry perspectives.
- 4) *Strategic Plan vs. Feasibility Study.* This bill requires transmission utilities to jointly prepare a GETs strategic plan that is designed to cost-effectively increase transmission capacity to support the integration of clean energy resources. However, application of GETs depends on specific local/regional needs, resource availability, and cost/benefit considerations and there's no "one-size-fits-all" solution. As such, requiring transmission utilities to develop a strategic plan for GETs may be challenging. *Instead, the author and committee recommend amending the bill such that each transmission utility prepare a study of the feasibility of projects using grid-enhancing technologies, and a study of which transmission lines can be reconducted with advanced conductors. The author and committee also recommend changing the involvement of the CAISO in the studies in the bill, from having them participate directly in the evaluations to having the utility request CAISO review the studies.*
- 5) *Integrated Resource Plan Vs Transmission Planning Process.* As eluded earlier, the IRP is a biennial process developed to implement California’s clean energy policies. In this process, the CPUC examines a utility’s current and planned electricity generation to ensure that California’s electric sector meets its GHG reduction goals while maintaining reliability at the lowest possible costs. Whereas, the CAISO’s TPP involves systematically assessing current and future transmission needs to improve reliability, decarbonization goals and efficiency. This bill requires transmission utilities, upon completion of the GETs strategic plan to submit the plan to the CPUC as part of the IRP. *Given the IRP process focuses on generation and procurement of energy resources, not optimizing transmission and distribution infrastructure, the author and committee recommends striking language of the bill relating to the IRP and rather submit their findings to the CAISO and have them considered in the TPP.*
- 6) *Clarification for Studies - Transmission Line Vs Distribution Line.* Transmission lines are connected to substations that "step-down" the power to a lower-voltage so that it can be delivered to customers through distribution lines, although some large industrial customers receive their electricity at transmission or sub-transmission voltage. The distinction in voltage level between the transmission and distribution grid differ across the utilities, and are set at the discretion of the utility. Nevertheless, the transmission system carries the electric energy at relatively high voltages, usually above 69 kilovolts

¹⁶ Department of Energy; Pg. 4, “Grid-Enhancing Technologies”; February 2022

(kV).¹⁷ As illustrated in the background, *GETs*, are hardware and software that are mainly and currently deployed to increase the capacity, efficiency and resiliency of the current *transmission* system. *As such, the author and committee recommend narrowing the study of the implementation of conductors to only transmission lines and not both transmission lines and distribution lines.*

- 7) *Recent Actions.* As previously discussed, in May 2024, FERC issued *Order 1920* which requires transmission providers in each transmission planning region to consider specific GETs – dynamic line ratings, advanced power flow control devices, advanced conductors, and transmission switching – in their long-term regional transmission planning processes. FERC declined to require consideration of topology optimization because it is technically much more challenging to implement. This bill, however, defines GETs inclusive of topology optimization software. Given this difference, it is unclear how the GETs strategic plans, as put forward under this bill, would interact with these federal policies.

Related Legislation

SB 1165 (Padilla) authorizes an electrical corporation that applies to the CPUC to authorize construction of a high voltage electrical transmission line, rated at 138kV or greater, to apply to the CEC for certification of the facility pursuant to the CEQA, instead of the CPUC conducting the CEQA review. This bill provides that the CEC certification authorizes the project to be eligible for the CEQA judicial streamlining afforded to Environmental Leadership Development Projects and the CEC’s “Opt-in” permitting process. Status: Held in Senate Committee on Appropriations

AB 2779 (Petrie-Norris) would require the CAISO, upon approval of each transmission plan, to report to the CPUC and the Legislature any new use of grid-enhancing technology in the plan and the associated cost or efficiency savings of that deployment. Status: *pending hearing* in the Assembly Committee on Utilities and Energy. Status: *pending hearing* in the Senate Committee on Energy, Utilities, and Communications.

AB 2292 (Petrie-Norris) repeals the requirement that the California Public Utilities Commission (CPUC) should consider alternatives to prospective transmission projects before issuing an approval. Repealing this requirement will remove a duplicative process that currently slows down transmission development in the state. Status: *pending referral* in the Senate Committee on Rules.

AB 3246 (Garcia) would require by January 1, 2026, the CPUC to update General Order 131-D to provide an electrical corporation with an exemption from the requirement to receive a Permit to Construct (PTC) and instead authorize the approval of advanced reconductoring of transmission projects through the informal Tier 2 advice letter process, regardless of whether the voltage of the facility being modified exceeds 200 kilovolts (kV). Status: *pending hearing* in the Senate Committee on Energy, Utilities, and Communications.

¹⁷ Though this is not a hard-and-fast rule, some utilities designate circuits >60kV “transmission.” >69kV is NERC’s definition, as provided by the U.S. Energy Information Administration glossary of terms. <https://www.eia.gov/tools/glossary/index.php?id=T>

AB 3238 (Garcia) among other requirements, exempts projects that would require a certificate of public necessity and convenience (CPCN) from the California Public Utilities Commission (CPUC) and any other electrical infrastructure projects, as defined, from existing requirements to compare prospective projects with cost-effective alternatives such as energy efficiency, distributed generation, and demand response resources. Status: *pending hearing* in the Senate Committee on Energy, Utilities, and Communications.

Prior Legislation

SB 619 (Padilla, 2023) would have authorized an electrical corporation that applies to the CPUC to authorize construction of a high voltage electrical transmission line, rated at 138 kV or greater, to apply to the CEC for certification of the facility pursuant to the CEQA, instead of the CPUC conducting the CEQA review. The bill provides that the CEC certification authorizes the project to be eligible for the CEQA judicial streamlining afforded to Environmental Leadership Development Projects (ELDPs) and the CEC's "Opt-in" permitting process. Status: The bill was vetoed by the Governor.

SB 420 (Becker, 2023) would have exempted construction of certain low-voltage electrical lines and associated equipment from the need to receive a discretionary permit from the CPUC. Status: The bill was vetoed by the Governor.

SB 149 (Caballero) among its provisions, revised the procedures regarding CEQA administrative records and expedited administrative and judicial review procedures for ELDPs for specified projects, including transmission projects, that required the courts to resolve CEQA litigation within 270 days to the extent feasible and extends the ELDP sunset to January 1, 2034. Status: Chapter 60, Statutes of 2023.

SB 319 (McGuire) required the CEC and the CPUC, in coordination with the CAISO, to better and regularly coordinate planning and permitting of energy transmission infrastructure to ensure the state meets its clean energy goals and to evaluate and report on that planning and related infrastructure development. The bill also required these state energy agencies to jointly develop an electrical transmission infrastructure development guidebook. Status: Chapter 390, Statutes of 2023.

SB 529 (Hertzberg) exempted an extension, expansion, upgrade, or other modification of an existing transmission line or substations from the requirement of a CPCN and directed the CPUC to revise its GO, by January 1, 2024, to instead use its permit to construct process for these approvals. Status: Chapter 357, Statutes of 2022.

SB 887 (Becker) requires 15-year projections of energy resource portfolios and energy demand to inform transmission planning to achieve the state's clean energy goals, and requires the CAISO to consider approval for specified transmission projects as part of the 2022-23 transmission planning process. Status: Chapter 358, Statutes of 2022.

AB 205 (Committee on Budget) allowed certain energy projects, including electric transmission lines between certain non-fossil fuel energy generation facilities to become certified leadership projects under the Jobs and Economic Improvement Through Environmental Leadership Act of 2021 through a certification process through the CEC. With this certification, actions or

proceedings related to the certification of an environmental impact report need to be resolved within 270 days to the extent feasible. Status: Chapter 21, Statutes of 2022.

REGISTERED SUPPORT / OPPOSITION:

Support

Advanced Energy United
California Energy Storage Alliance
California Farm Bureau Federation
California State Association of Electrical Workers
California Wind Energy Association
Center for Energy Efficiency and Renewable Technologies
Clean Power Campaign
Climate Reality San Francisco Bay Area Chapter
Environment California
Environmental Defense Fund
Environmental Protection Information Center
Independent Energy Producers Association
Junior Philanthropists Foundation
Large-scale Solar Association
Los Angeles Business Council
Natural Resources Defense Council (NRDC)
San Diego Community Power
Sierra Club of California
Solano County Democratic Central Committee
Solar Energy Industries Association
Sonoma Clean Power
The California Wind Energy Association (CALWEA)
Union of Concerned Scientists
Watt Coalition

Opposition

None on file.

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