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BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of Southern California Edison Company (U 338-E) For Authority to Increase Its Authorized Revenues for Electric Service In 2025, Among Other Things, and to Reflect That Increase in Rates.	Application 23-05-010 (Filed May 12, 2023)

OPENING BRIEF OF THE NATURAL RESOURCES DEFENSE COUNCIL

July 15, 2024

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The Natural Resources Defense Council (NRDC) recommends that the Commission take the following actions:

(1) Approve Southern California Edison Company's (SCE) revenue request to upgrade grid capacity to support transportation electrification anticipated and required to occur to meet the State of California's air quality, climate, and equity statutory and regulatory requirements.

(2) Establish a two-way balancing account for funds authorized to support energization of load-growth-related infrastructure, which will ensure that SCE has enough funds to make necessary grid upgrades while also ensuring that ratepayer funds will be reimbursed if less capital is ultimately required.

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Pursuant to Rule 13.12 of the Commission's Rules of Practice and Procedure and the September 5, 2023 Assigned Commissioner's Scoping Memo and Ruling, as modified by the Administrative Law Judges' May 24, 2024 Email Ruling Granting Extension of Time to File Briefs, the Natural Resources Defense Council (NRDC) submits this opening brief.

I. Introduction

The State of California has adopted ambitious climate and air quality laws and regulations, including a statutory requirement to reach carbon neutrality by 2045 and regulations that will eventually result in all new vehicles sold being zero-emission vehicles. To comply with these laws and regulations, we must dramatically reduce vehicle emissions by electrifying cars, trucks, and other vehicles across the state. Recognizing the importance of transportation electrification, California enacted Assembly Bill (AB) 2700 in 2022 and Senate Bill (SB) 410 in 2023. These bills amended the California Public Utilities (PU) Code to require consideration of anticipated electric vehicle (EV) adoption in each electrical corporation's distribution planning process and general rate case (GRC), in order to facilitate distribution system readiness to support EV charging needed to achieve state climate goals. As a result, the PU Code requires the Commission to ensure that Southern California Edison Company's (SCE) investments in this proceeding are sufficient to prepare the electrical grid to meet goals and requirements for EV adoption, a key component of

expected future load growth for which utilities must plan pursuant to their fundamental obligation to serve.

NRDC intervened in this proceeding to provide factual and legal analysis of SCE's proposal to upgrade distribution infrastructure in expectation of and to enable California's electrification requirements. As detailed below, SCE's proposed transportation-electrification-related load growth investments are necessary to comply with state law, and NRDC's independent analysis confirms that SCE's estimates of upgrade needs and related revenue requirement are reasonable, demonstrating that when capacity upgrade needs are estimated using the most recent California Energy Commission (CEC) demand forecast (which was not available at the time SCE developed its own estimates), the total amount of capacity shortfall in the distribution grid is at least as large as originally estimated by SCE. The PU Code requires SCE to begin planning grid upgrades now, in this GRC, so that upgraded grid components will be ready in time to serve increased EV charging load.

For these reasons, and as further explained below, NRDC recommends the Commission approve SCE's revenue request for investments to meet load growth due to transportation electrification. To address the inherent uncertainty regarding exactly where, when, and how transportation electrification load will manifest, NRDC recommends the Commission establish a two-way balancing account for funds authorized to support energization of load-growth-related infrastructure.

II. Legal Standard

This GRC is a case of first impression for implementing recently enacted changes to the PU Code, codified by AB 2700 and SB 410. Pursuant to that legislation, in addition to complying with the legal requirements governing GRCs generally, the investments approved in this GRC must

be sufficient to allow SCE to plan and build distribution infrastructure sufficient to accommodate transportation electrification and meet state and federal climate, air quality, and equity goals.

With the enactment of AB 2700 and SB 410, governing law makes it state policy that each electrical corporation, "[u]pgrade the state's electrical distribution systems as needed and in time to achieve the state's decarbonization goals and implement federal, state, regional, and local air quality and decarbonization standards."[1] SCE must "conduct[] sufficient advance planning, engineering, and construction of increased distribution system capacity so that customers can be energized without substantial delay."[2] As part of its distribution planning process, SCE must consider fleet data produced by the CEC, and other available data, to facilitate the readiness of its distribution systems to support the level of EV charging anticipated in its service territory by various sources, including Executive Orders and state and regional reports, policies, regulations, and plans.[3] In its GRC, SCE must identify how investments made will support EV deployment.[4]

State law also states the Commission "shall ensure proposed investments are consistent with preparing the electrical grid for the achievement of the state's goals and regulations" (including those described below).[5] The Commission must require electric utilities to consider both CEC load projections and load projections that exceed CEC forecasts, as well as federal, state, and regional decarbonization and transportation electrification goals, plans, and requirements.[6] The

[1] Cal. Pub. Util. Code § 933(a); *see also* Proposed Decision in A.21-06-021 (May 17, 2024), approved by the Commission at its July 11, 2024 voting meeting, at 6 (summarizing requirements imposed by SB 410).

[2] *Id.* § 933(b).

[3] *Id.* § 740.21(a).

[4] *Id.* § 740.21(b).

[5] *Id.* § 740.21(c).

[6] *Id.* § 936(a)(1).

Commission must require electric utilities to adopt and implement plans that will support achieving those goals, plans, and requirements, including by upgrading the grid to be ready for electrification.[7] The Commission must also ensure electric utilities have sufficient and timely recovery of costs to achieve state policies regarding decarbonization and upgrading grid capacity.[8]

Therefore, pursuant to this governing law, the Commission must ensure SCE is making sufficient grid investments to achieve state laws and regulations, including California Air Resources Board (CARB) regulations requiring 100 percent of sales of new passenger vehicles to be zero-emission by 2035; requiring 100 percent of all fleet vehicle purchases to be zero-emission starting in 2035 for smaller vehicles and in 2042 for the largest vehicles; and requiring increasing percentages of new truck sales to be zero-emission.[9] Further, SCE must act promptly to commence planning, engineering, and construction of distribution system upgrades well in advance of anticipated EV deployment, as these upgrades must be complete and operational by the time capacity to meet increased EV charging levels is needed.[10]

While the governing law requires electric utilities to take numerous considerations into account in their GRCs and distribution planning processes, it does *not* require electric utilities to weigh the comparative social benefits of the electrification of the transportation sector that requires grid upgrades against potential costs. This is for good reason. The appropriate forum for evaluating the cost-effectiveness of regulations and policies is before the decision-making body adopting them. In this case, CARB weighed the costs and benefits of transportation electrification when it adopted regulations requiring increased EV sales. Now that those regulations have been adopted,

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[7] *Id.* § 936(a)(2).

[8] *Id.* § 937(a).

[9] NRDC-01E at 23:4-17; SCE-02, Vol. 7 at 7:20-8:5.

[10] *See* Cal. Pub. Util. Code § 933(a)-(d).

regulated utilities and the Commission are required by law to take action to ensure that electrification goals can be achieved.[11] Governing law does not include a requirement for either electric utilities or the Commission to weigh costs and benefits of distribution grid upgrades needed to achieve those goals, even if the benefits far outweigh costs.[12]

What's more, EV-specific cost-benefit analysis is simply not feasible in the context of a distribution system.[13] If SCE were to determine whether the value created from delivering additional amounts of electricity is equal to or greater than the cost of an upgrade to facilitate this creation, the analysis would also have to account for the value of unmet load due to equipment failure occurring because it was not upgraded in time to meet increasing electricity demand.[14] Distribution system equipment cannot differentiate between the end-use of electricity.[15] For example, electrons flowing to televisions and to EVs look, feel, and smell the same.[16] There is no way for systems to differentiate between electric demand from transportation electrification or other sources of load.[17] If a component within the system fails due to the lack of a timely upgrade, the result causes a loss of load for any end-use that depends on that specific component, regardless of whether that end-use involves EVs.[18]

While such a cost-benefit-analysis is not required by law and is not feasible to conduct with perfect attribution, this does not negate the fact that upgrading the electric grid is necessary to

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[11] *See, e.g.*, *id.* §§ 740.21, 930 *et seq.*

[12] *See generally id.* §§ 740.21, 930 *et seq.*

[13] TURN-313 at 8-9.

[14] *Id.* at 7-8.

[15] *Id.* at 8.

[16] *Id.*

[17] *Id.*

[18] *Id.*

unlock the significant benefits EVs can provide in Southern California, which far exceed the total revenue requirement SCE has requested in this case; Commission staff working with Energy and Environmental Economics, Inc. (E3) estimates electrifying vehicles in Southern California would yield approximately $27 billion in public health benefits.[19]

III. Policy

SCE's proposed investment to ready the distribution system for increased transportation electrification is consistent with state climate policy and necessary for California to comply with its own laws and binding federal air quality standards.

The State of California has an ambitious policy to reach carbon neutrality by 2045 and to maintain net negative emissions of greenhouse gases in subsequent years.[20] Increased electrification, and specifically transportation electrification, will be critical for the State to meet those goals and requirements.[21] There is simply no feasible path to compliance with the State's climate regulations that does not involve electrifying the transportation sector.[22] Likewise, there is simply no feasible path to comply with federal air quality standards that does not involve EVs because tailpipes are the largest source of local air pollution in the state and in SCE territory. As noted in the testimony of Maya Iñigo-Anderson of Communities for a Better Environment, according to the CEC, about "50 percent of the state's greenhouse gas emissions, nearly 80 percent

[19] TURN-314 at 2 (citing Gabe Mantegna et al., Energy & Env't Econ., Quantifying the Air Quality Impacts of Decarbonization and Distributed Energy Programs in California 40 (2021), https://www.ethree.com/wp-content/uploads/2022/01/CPUC-Air-Quality-Report-FINAL.pdf).

[20] Cal. Pub. Util. Code § 932(a)(1).

[21] *See Id.*

[22] NRDC-01E at 1:10-11; *see also* EHT at 1521:2-10 (Ashford, TURN) (agreeing that transportation electrification is a particularly crucial component of the clean energy transition, and that failing to account for CARB's electrification regulations in the grid planning process could harm achievement of the State's goals).

of nitrogen oxide pollution, and 90 percent of diesel particulate matter pollution" come from the transportation sector.[23] Recognizing the importance of transportation electrification, the California Legislature enacted AB 2700 and SB 410 to ensure distribution grid buildout sufficient to support the increased electricity use necessary to comply with state and federal laws and regulations.[24] This includes compliance with state EV regulations, which require increasing percentages of new passenger vehicles and trucks sold over the coming decade to be zero-emission vehicles.[25]

Therefore, state policy plays a key role in this proceeding. Per the PU Code, SCE must request, and the Commission must authorize, rates and investments that will allow the grid buildout necessary for the achievement of those electric vehicle regulations, consistent with state policy.

IV. Affordability and Equity

Investment in grid upgrades that increase transportation electrification can actually improve affordability by bringing in new revenue in excess of costs, putting downward pressure on electrical rates to the benefit of all customers. Like other parties in this proceeding, NRDC is concerned about the impact of rising electricity rates, especially on residential customers. NRDC has worked to address this issue in other Commission proceedings, including jointly advocating with the Public Advocates Office (Cal Advocates) and The Utility Reform Network (TURN) for reforms to lower volumetric rates.[26] As NRDC explained in written testimony, proactive investment in grid upgrades has been shown to induce EV adoption, and increased residential load will result in additional revenue collected that will put downward pressure on rates the following

[23] NDRC-02E at 7:14-15 (quoting California Energy Commission, *Transforming Transportation* (2024), https://www.energy.ca.gov/about/core-responsibility-fact-sheets/transforming-transportation).

[24] *See supra* Part II.

[25] NRDC-01E at 23:4-17; SCE-02, Vol. 7 at 7:20-8:5.

[26] R.22-07-005 (rulemaking to advance demand flexibility through electric rates).

year.[27] The California Legislature codified its acknowledgment of this phenomenon in SB 410, declaring that "[e]lectrifying transportation and buildings may put downward pressure on rates by spreading fixed costs over more kilowatthours of usage."[28] Cal Advocates has found that increased electric load in SCE territory will decrease residential rates by $0.02 per kWh by 2035.[29]

Investing in capacity-related grid upgrades early, in a proactive way, also lowers costs. SCE needs between seven and fifteen years to complete large projects such as new distribution substations.[30] When "load materializes faster than SCE can upgrade the grid with long lead-time projects," SCE must rely on interim solutions to meet customer need, which are "ultimately cost-inefficient stop-gap measures."[31] Additionally, building grid infrastructure one time at the right size is less expensive than completing smaller capacity upgrade projects piecemeal.[32] Distribution system capacity upgrades have high fixed costs and significant economies of scale—once an upgrade is being performed, modestly increasing the capacity requires only the incremental costs of modestly larger capacity equipment.[33] Authorizing SCE to begin investing in distribution system upgrades in this GRC will be less expensive and more efficient for SCE's customers in the long run.

Investment in grid upgrades is also important to support equity goals. More than half of the Transportation Electrification Grid Readiness (TEGR) distribution system upgrades SCE has

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[27] NRDC-01E at 23:25-24:13.

[28] Cal. Pub. Util. Code § 932(a)(7).

[29] NRDC-01E at 24:6-8; *see also* TSL-01E at 13:14-14:11 (summarizing studies finding that new load from EV drivers puts downward pressure on electric rates).

[30] NRDC-01E at 10:12-14; EHT at 612:19-21 (Esguerra, SCE).

[31] SCE-02, Vol. 07 at 25:9-26:3.

[32] NRDC-01E at 9:8-10:6; NRDC-03 at 9:21-10:1.

[33] NRDC-01E at 9:16-19.

proposed are located in "Disadvantaged Communities" (DACs), which include areas that are disproportionately affected by environmental pollution and areas with concentrations of people that are of low income, high unemployment, low levels of homeownership, high rent burden, sensitive populations, or low levels of educational attainment.[34] Thirty-nine out of SCE's forty-seven proposed projects are within two miles of a DAC.[35] Completing these grid upgrades will ensure there is local grid capacity to support electric vehicles in DACs, the neighborhoods most in need of relief from gas-powered vehicle pollution.[36] As noted in the testimony of Maya Iñigo-Anderson of Communities for a Better Environment: "Environmental justice communities have the most to gain from transportation electrification since they tend to have the worst air pollution rates."[37] This pollution disproportionately impacts low-income communities and communities of color that often live near freeways, ports, and other facilities that involve a large amount of vehicle traffic.[38] DACs will therefore benefit from approving SCE's proposed investments in this GRC.

V. Risk-Informed Strategy and Business Plan

A. Climate Change Policy

As discussed above, state law requires electric utilities to consider forecasts of EV adoption given state climate policy and regulations requiring transportation electrification, and to make investments needed to upgrade distribution systems to facilitate EV readiness.[39] State law also

[34] NRDC-02E at 9:7-9; Cal. Health & Safety Code § 39711(a).

[35] NRDC-02E at 9:7-9.

[36] *See* NRDC-04 at 3:12-21.

[37] NRDC-02E at 8:24-25.

[38] *Id.* at 4:1-5:7; *see also* TURN-314 at 2.

[39] *See supra* Part II.

recognizes that planning, engineering, and constructing distribution infrastructure sufficiently in advance to meet new load is necessary for an electric utility to comply with its obligation to serve.[40]

Failure to upgrade the distribution grid in time to support accelerating EV proliferation is not only contrary to the legislative framework and achievement of the State's goals discussed above, it presents a real risk that SCE would not be able to fulfil its obligation to serve and support its customers' business objectives that are vital to the state's economy. Unfortunately, this is already happening. SCE has "experienced cases in which prospective [transportation electrification] charging infrastructure developers have submitted load interconnection requests for service requiring grid upgrade timelines exceeding the charging infrastructure developer's timeline for service need."[41] SCE informed those customers of delays of up to two to three years.[42]

The end users of electricity are also affected. The Joint Truck OEMs note that they "have observed a number of fleets that, in spite of a genuine interest in decarbonizing their fleets, ultimately decided to defer or cancel their plans to acquire zero-emission electric trucks due to uncertainties about SCE's ability to provide a firm energization date for needed grid capacity to operate [chargers]."[43] If SCE cannot ensure that the needed distribution grid infrastructure will be available for electric trucks, they "become expensive stranded assets that are unable to charge and do the work for which they were purchased."[44] Similarly, Tesla notes that if SCE does not proactively build out distribution system infrastructure, "builders and operators of EV charging

[40] Cal. Pub. Util. Code § 933(b).

[41] SCE-02, Vol. 7 at 25:1-11.

[42] *Id.* at 25:11-12.

[43] Joint Truck OEMs-01 at 8:20-9:3.

[44] *Id.* at 14:7-11.

sites will be subject to unacceptable wait times to construct and energize those sites," and EV drivers will see frustratingly long wait times for public charging.[45]

Thus, when a utility does not meet its customers' infrastructure needs, it results in real-world costs and delays that hurt California's economy. Note that all end uses downstream of a capacity-challenged grid component—not only EV charging—suffer. Costs and delays for all users can and should be avoided with adequate investment in distribution system upgrades.

XI. Load Growth, Transmission Projects, and Engineering

A. Load Growth

1. SCE's revenue request for load growth related to transportation electrification is reasonable and, if anything, conservative.

In addition to its base forecast, SCE developed the TEGR forecast, a supplemental forecast to plan for load growth related to transportation electrification. The TEGR forecast was necessary because the CEC's 2020 Integrated Energy Policy Report (IEPR) available at the time of SCE's planning and used for SCE's base load growth forecast did not adequately take into account state policies, including those discussed above, that will impact the growth of transportation electrification in SCE's service area.[46] The TEGR forecast identified the need for upgraded and new infrastructure to meet forecasted demand from transportation electrification.[47] SCE's TEGR forecast is reasonable, and SCE's revenue request for load-growth-related investments should be approved.

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[45] TSL-01E at 8:23-9:15.

[46] SCE-02, Vol. 07 at 19:14-23; *see also, e.g.*, SCE-013, Vol. 07 at 10:25-11:10.

[47] SCE-02, Vol. 07 at 32:17-35:11.

(a) SCE complied with governing law.

SCE was on firm legal ground in developing and relying on the TEGR forecast. Indeed, a supplemental forecast was not only acceptable, it was necessary for SCE to comply with governing law. As detailed above, state law required SCE to take into account state policies and regulations requiring transportation electrification.[48] Because the 2020 IEPR did not take those policies and regulations into account,[49] SCE needed to look to alternative forecasts in order to comply with state law directives to consider state electric vehicle goals and requirements and ready the distribution grid to those goals and requirements.

Additionally, state law specifically authorizes SCE to consider forecasts that exceed those in the IEPR.[50] Thus, it was appropriate for SCE to consider CARB's 2020 Mobile Source Strategy and the CEC's AB 2127 EV Charging Infrastructure Assessment to forecast load growth due to transportation electrification. When SCE relies on a forecast that exceeds the CEC forecast, it must provide the Commission with detailed information on how the forecast is developed and what necessitated the alternative forecast.[51] SCE has done so here, documenting its development of the TEGR forecast and explaining that the TEGR forecast was necessitated by state decarbonization and transportation electrification policies, which were not incorporated in the most recent CEC forecast that was available to SCE at the time of its load growth analysis.[52] SCE's use of the TEGR forecast is reasonable and legally sound.

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[48] *Supra* Part II.

[49] SCE-13, Vol. 07 at 18:30-19:11.

[50] Cal. Pub. Util. Code § 936(a)(1)(E).

[51] *Id.* § 936(b).

[52] *E.g.*, SCE-13, Vol. 07 at 19:7-23:3.

(b) Independent NRDC analysis confirms the reasonableness of SCE's approach.

As noted above, SCE developed the TEGR forecast to supplement the 2020 IEPR, which was the latest CEC forecast available at the time of SCE's analysis. To confirm that the TEGR forecast identifies the number of upgrades needed to meet future load due to transportation electrification, NRDC conducted an independent analysis to determine the expected number of overloaded components in SCE's distribution system under demand forecast by the 2023 IEPR, CEC's most recent IEPR. As explained in further detail below, NRDC's analysis shows that the most recent 2023 IEPR leads to the same number of overloaded components as SCE's TEGR forecast, supporting the conclusion that the TEGR forecast is reasonable for planning and identifies the upgrades needed to meet coming demand.

Calculating the total cost of distribution grid upgrades driven by load growth requires estimating the number and type of components that need to be upgraded, estimating the added capacity of upgraded components, and conducting an engineering and cost analysis to estimate how much each upgrade would cost.[53] NRDC's analysis focused on the number of components that will be overloaded, or "violations," under different electricity demand forecasts for each major component of the distribution grid: circuits, A-stations, and B-stations.[54] These overloaded components are the components that will need to be upgraded to meet increased demand, including due to transportation electrification.

To conduct this analysis, NRDC first constructed a model of SCE's distribution system using detailed data provided by SCE in response to data requests.[55] After conducting an initial test

[53] NRDC-03 at 10:12-15.

[54] *Id.* at 10:15-17.

[55] *Id.* at 11:12-23.

to confirm that its recreation of SCE's distribution system was robust, NRDC developed a scenario representative of SCE's distribution system as it would function under conditions in the CEC's 2023 IEPR forecast.[56] This allowed NRDC to determine the number of overloaded components, or violations, expected under the 2023 IEPR forecast.[57] Those results showed a number of violations reasonably close to the number of violations expected under SCE's TEGR forecast.[58] This means that SCE's TEGR is a reasonable starting point for planning, because it predicts a similar component overload—and therefore upgrade need—to the overload and need anticipated under the most recent CEC IEPR forecast, which takes into account increased vehicle electrification to meet state policies and regulations. Put another way, SCE's revenue request seeks what is necessary to meet demand, with demand being what is forecast by the 2023 IEPR.

Some parties opposed to SCE's revenue request may argue that SCE's load growth forecast is too high because, relying on non-CEC forecasts to create the TEGR forecast, it assumes EV growth that exceeds the growth anticipated in CEC's 2020 and 2022 IEPR forecasts.[59] NRDC's analysis confirms that such arguments are misguided because upgrade needs do not decrease, and in some instances increase, when using the 2023 IEPR forecast.[60]

Further, because the 2022 and 2023 IEPR forecasts project EV load growth, that creates a legal obligation to plan for capacity upgrades that will ensure utilities can meet their customers'

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[56] *Id.* at 12:22-13:1. A detailed description of the steps, calculations, and assumptions in NRDC's analysis is provided in the Rebuttal Testimony of Mohit Chhabra, NRDC-03.

[57] *Id.* at 13:6-7.

[58] *Id.* at 14:1-6 & tbl.2.

[59] *E.g.*, TURN-07E at 6:23-13:10. *But see id.* at 11:2-5 (acknowledging that by 2028, the 2022 IEPR forecast estimates *fewer* EVs than estimated by TEGR); EHT at 1522:15-1523:23 (Ashford, TURN) (similar).

[60] NRDC-03 at 1:15-19.

needs in a timeframe consistent with state law.[61] NRDC's analysis also shows that upgrades are likely to be needed due to baseline load growth alone, even if transportation electrification and building electrification are removed from load growth forecasts.[62] SCE's load growth and grid upgrade need projections do not suggest overbuilding; they are what is required to meet anticipated load and facilitate the achievement of state climate goals, as required by state law.

(c) SCE's revenue request for load growth related to transportation electrification may understate upgrade and revenue need.

NRDC's analysis shows that not only are SCE's TEGR forecast and revenue request based on that forecast reasonable, the request may in fact understate needed grid upgrades and associated revenue.

In addition to the analysis described above, NRDC looked at the role that load growth uncertainty has on the number of overloaded distribution components. NRDC conducted a stochastic analysis in which it simulated load growth for each distribution component under different growth scenarios.[63] NRDC ran hundreds of simulations, which allowed it to examine the impact that variance from one central load growth forecast has on the distribution of overload violations.[64]

Looking at the distribution of probabilities of the number of overload violations predicted by NRDC's analysis provides insight into the likelihood that the actual number of upgrades needed will be more or less than SCE's estimate. As show in Figure 1 below, the distribution of

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[61] *See supra* Parts II, XI.A.1.(a).

[62] NRDC-03 at 19:13-18.

[63] *Id.* at 14:10-16. As noted above, a detailed description of NRDC's analysis and assumptions is provided in the Rebuttal Testimony of Mohit Chhabra, NRDC-03.

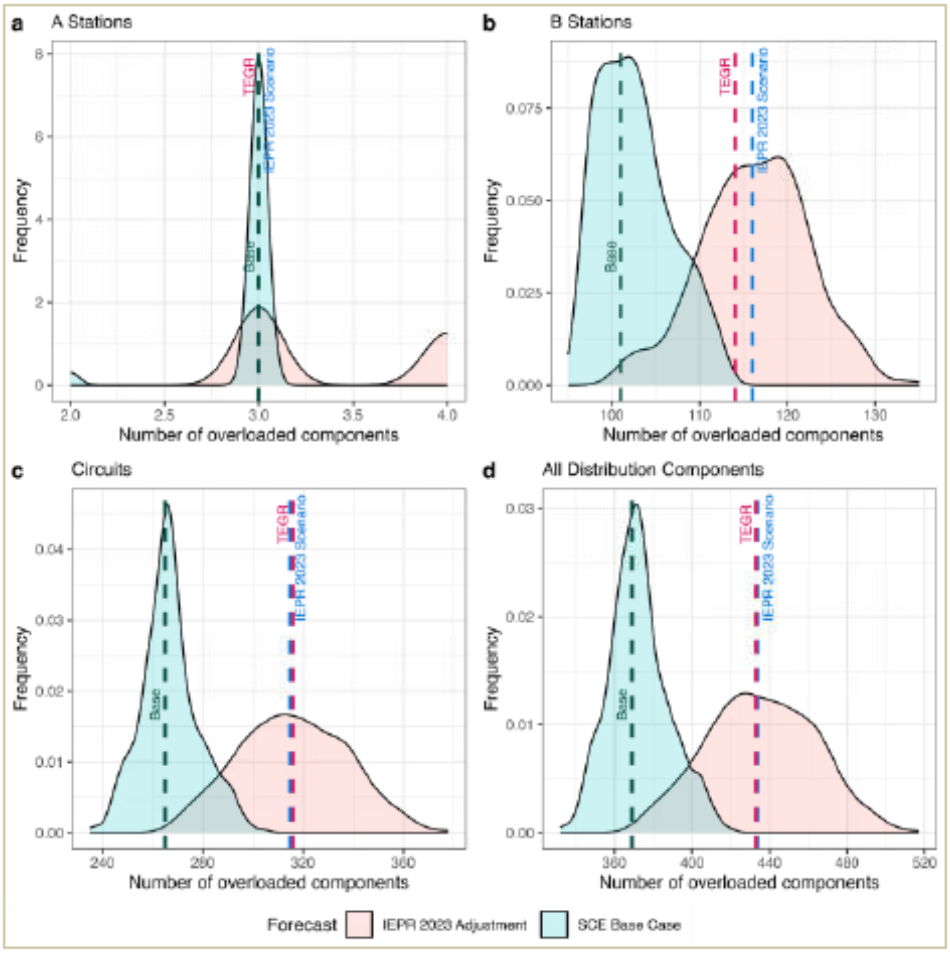
[64] *Id.* at 14:16-18.

probabilities of overload violations around the mean value in the IEPR 2023 scenario is relatively flat compared with the distribution around the mean value in the Base scenario. The relatively flat distribution means it is likely that the actual number of upgrades needed will be more or less than what SCE estimated based on TEGR.[65] By contrast, the "peaky" distribution around the mean value in the Base scenario implies confidence in the forecast of upgrade needs in that scenario.[66]

[65] *Id.* at 15:20-24, 16:4-7.

[66] *Id.* at 15:21-23.

Figure 1- Probability Distributions of Number of Overloads for Base and IEPR Scenario; Only Central Estimates of TEGR Implied Overloads Indicated. Y-Axis Represents Relative Frequences of Occurrence.[67]



There are two main factors that result in more uncertainty regarding upgrade needs under the IEPR 2023 scenario as compared with the Base scenario. First, more components in SCE's distribution grid are closer to being overloaded than not,[68] and the additional load growth anticipated under the IEPR 2023 scenario pushes those components over the overload threshold.[69]

[67] *Id.* at 16 fig.3.

[68] *Id.* at 16:8-17:2; *see also*TURN-313 at 11.

[69] NRDC-03 at 16:8-17:2; *see also id.* at 17:14-18:3 & fig.4.

Second, uncertainty around when, where, and how new load types, such as transportation electrification, will manifest is higher than uncertainty around these same questions for historical loads.[70] Because uncertainty about these loads is high, uncertainty about upgrade needs required to meet these loads is also high.[71]

While the above analysis shows SCE could be either underestimating or overestimating the number of grid upgrades that will be needed to meet transportation electrification load growth, action should be taken to mitigate the risk of underestimating that need, as underestimating upgrade need has serious consequences. If SCE has overestimated load growth due to transportation electrification, and makes upgrades before they are needed to meet increased EV charging load, the negative consequence is primarily the lost time value of money that has been spent on those upgrades sooner rather than later.[72] This is because—given the fact that most components in SCE's distribution grid are relatively close to capacity, and the significant number of overloads shown in NRDC's analysis under an IEPR 2023 scenario—those upgrades will almost always be fully utilized over a longer timeframe.[73] Additionally, as noted above, planning for these upgrades is not overbuilding, but rather is a proactive measure to be able to support the load needed to meet state climate goals and regulations, as required by state law.[74]

By contrast, delaying investment and making too few grid upgrades in the near term risks economic loss for SCE's customers. Economic loss occurs when there is unmet customer load.[75]

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[70] *Id.* at 9:7-10, 17:2-4.

[71] *Id.* at 17:2-4.

[72] *Id.* at 9:18-20.

[73] *Id.* at 8:24, 9:18-20; TURN-313 at 13-14.

[74] *See supra* Part IV.

[75] NRDC-03 at 9:14-15; TURN-313 at 15.

SCE could be collecting substantial additional revenue from new EV charging load, but if it does not have grid capacity to serve that demand, it will not do be able to so. SCE, the Joint Truck OEMs, and Tesla all report delays in energization, and corresponding consumer decisions, which mean this has likely already started to occur.[76] This will result in a setback to the electrification of California's economy, and means that customers will miss out on the potential of downward pressure on rates from increased EV load.[77] The California Legislature recognized this in SB 410, declaring that "[d]elays in energization, including service upgrades, are costly both to the customers awaiting service and to other customers deprived of the downward pressure on rates."[78] Customers will also experience economic loss if system capacity constraints force them to forgo electric usage for any purpose—not just limited to charging an EV.[79] Further, as also discussed above, there are significant customer savings due to economies of scale in distribution system capacity upgrades.[80] Upgrading the same component multiple times instead of making one sufficiently large capacity upgrade results in unnecessary costs to consumers.[81] SCE also notes that absent strategic, sufficiently scaled upgrades, it must conduct patchwork fixes to serve increased EV load, which approach is unnecessarily costly.[82]

In addition to these economic impacts, investing in too few grid upgrades risks interfering with achievement of the State's climate, air quality, and equity goals, laws, and regulations.[83] If

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[76] *See supra* Part V.A.

[77] NRDC-03 at 9:14-18; TURN-313 at 15; *see also* NRDC-01E at 23:24-24:8.

[78] Cal. Pub. Util. Code § 932(a)(8).

[79] *See* TURN-313 at 7-8.

[80] *See supra* Part IV.

[81] NRDC-03 at 9:21-10:1; TURN-313 at 15.

[82] SCE-02, Vol. 07 at 25:9-26:5.

[83] NRDC-03 at 9:14-17.

SCE cannot fulfill requests for new EV load, it will disincentivize, if not outright prevent, EV adoption in its service territory. As explained above, EV adoption is critical to meeting California's climate goals and to reducing the negative impacts of air pollution on DACs.[84] SCE's inability to serve new EV load may have further negative effect by undermining confidence in the electrification of the economy and decarbonization transition.[85] Thus, it is more prudent for SCE to err on the side of making upgrades to serve anticipated new EV load, even if there is some uncertainty about the precise amount or timing of future load growth.

Given that uncertainty, however, NRDC recommends that the Commission's revenue-setting for load growth should be flexible, to account for the fact that actual upgrade needs could be more or less than anticipated. Put another way, the Commission should ensure that SCE has enough funds to make timely upgrades, and at the same time ensure that ratepayers are protected. To that end, NRDC recommends a two-way balancing account, discussed further below.[86]

2. Load growth due to EV adoption is highly location-specific and should be analyzed as such.

As a general matter, grid upgrade needs due to load growth should be analyzed based on local, not system-wide, demand. This is especially true in the context of load growth due to EV adoption, which is geographically "lumpy" and may be clustered in certain areas.[87]

A grid upgrade due to load growth is needed when the demand for electricity at a specific distribution component is greater than the loading limit of that distribution component.[88] Thus, determining whether a capacity upgrade is necessary requires comparing the loading limit of a

[84] *See supra* Parts III-IV.

[85] NRDC-03 at 9:14-17; TURN-313 at 15.

[86] *See infra* Part XXXVIII.C.

[87] NRDC-01E at 7:11-12.

[88] *Id.* at 6:8-10.

specific component and the maximum power that component will need to carry in the future.[89] Each component must have enough capacity to serve the maximum coincident power demands of all the end uses it serves—*e.g.,* a B-Station must have enough capacity to serve the maximum coincident power demand on downstream circuits.[90] That maximum is the sum of demand of the downstream components at the instant it is *collectively* the highest.[91] This may be less than the sum of peak demand of each of the downstream components, if those components see peak demand conditions at different times of the day.[92]

Given this component-specific analysis, grid upgrade needs do not increase linearly with forecasted load, but are instead a function of existing remaining capacity and expected increases in power demand for each individual component of the distribution grid.[93] Remaining capacity and forecasted load vary significantly across SCE's service territory; whether any given component is in need of an upgrade varies based on local, not system-wide, peak demand and that component's capacity.[94] This means that even if there is no or low forecasted growth in SCE system-wide peak load, capacity upgrades may still be necessary to address local growth in demand on a particular circuit, where demand is projected to be greater than the capacity of that circuit.[95] Conversely, if

[89] *Id.* at 6:11-13.

[90] *Id.* at 6:14-18.

[91] *Id.* at 6:19-21.

[92] *Id.* at 6:19-28.

[93] *Id.* at 7:3-5.

[94] *Id.* at 7:5-8; NRDC-03 at 3:4-6; EHT at 597:11-21 (Esguerra, SCE) (explaining that distribution planning focuses on local factors and it is important to understand demand and capacity at a local level).

[95] *See* NRDC-03 at 2:8-3:8; EHT at 1504:10-14 (Van Skike, Cal Advocates) (acknowledging that local load may increase even when system peak load decreases).

system peak demand is growing, but a specific circuit has enough capacity to serve demand on that circuit, then that component does not have to be upgraded.[96]

New load due to EV adoption brings this issue into focus. New load due to EV adoption is geographically lumpy and temporally specific.[97] This is especially true with respect to medium-duty and heavy-duty (MD/HD) EVs—high-powered charging is necessary to meet the duty-cycles of many commercial trucks and allow them to replace diesel-powered trucks that are disproportionately responsible for climate change and local air pollution.[98] Concentrating this charging in one place to support the commercial trucking industry will have major impacts on electricity demand.[99] Even if SCE saw no base load growth from existing end uses on its grid in the coming years, increased EV adoption would require capacity-related upgrades, especially if EVs are adopted in parts of the grid with low remaining capacity. For example, if dense urban areas already have high electricity usage and less remaining capacity, and then see increased demand due to adoption of EVs, grid upgrades in those areas will be needed.[100] SCE must invest in capacity-related upgrades to meet anticipated local load growth, even if system-wide peak load growth is not forecasted to the same extent.

3. Grid upgrades to meet anticipated load growth must commence in this GRC cycle.

It is critical that grid upgrades to meet anticipated transportation electrification load growth commence early, in this GRC cycle. As stated above, distribution-grid upgrades are time-

[96] NRDC-03 at 3:8-10.

[97] NRDC-01E at 7:11-12.

[98] *Id.* at 8:4-9.

[99] *See id.* at 7:13-8:4 (noting that locating five one-megawatt electric truck charging plugs at a single location could equal the power demand of an outdoor sports stadium).

[100] NRDC-03 at 18:4-9.

intensive.[101] Historical data suggests that SCE generally needs between seven and fifteen years to complete large projects such as new distribution substations.[102] Given that long lead time, work on capacity upgrade needs that will arise after this GRC cycle should nevertheless commence within this GRC cycle.[103] As SCE explains, "proactively getting ahead of these long lead time projects is paramount to provide a measure of certainty for customers and enable customers' EV adoption and market transformation while maintaining grid reliability for the long term."[104] Failing to build in advance of need will lead to non-compliance with state and federal law.[105] The Commission must ensure that SCE's proposed investments are consistent with conducting this preparatory work.[106]

XII. New Service Connections and Customer Requested System Modifications

A. New Service Connections

In addition to the distribution planning requirements discussed above, SB 410 requires the Commission to establish reasonable average and maximum target energization time periods.[107] The targets shall ensure that work is completed in a manner that minimizes delay in meeting a customer energization request and that prioritizes work in a manner consistent with declared state policies to increase energization and upgrade the State's electrical distribution systems, among

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[101] *Supra* p. 8.

[102] NRDC-01E at 10:12-11:2; EHT at 612:19-21 (Esguerra, SCE).

[103] NRDC-01E at 11:8-11; *see also* EHT at 612:17-24 (Esguerra, SCE) (explaining that because larger infrastructure takes many years to build, when need is identified further out, SCE wants to start on those projects "sooner rather than later to be able to make it in time to meet that growth").

[104] SCE-02, Vol. 07 at 26:6-9.

[105] *See id* at 26:9-12.

[106] NRDC-01E at 11:10-14; Cal. Pub. Util. Code § 740.21.

[107] Cal. Pub. Util. Code § 934(a)(1).

other goals.[108] Given these legislative requirements, in this GRC, the Commission must authorize SCE to recover funds sufficient to make the capacity upgrades needed to comply with the energization timelines it has established pursuant to SB 410.

XXXVIII. Results of Operations

C. GRC Ratemaking Proposals, including Memorandum and Balancing Accounts

As discussed above, there is uncertainty regarding where, when, and how transportation electrification load will manifest and drive distribution upgrade needs.[109] Given that uncertainty, NRDC recommends that the Commission's revenue-setting for load growth should be flexible, to account for the fact that actual upgrade needs could be more or less than anticipated (though NRDC's analysis demonstrates it is more likely actual grid upgrade needs will be greater than anticipated). NRDC further recommends that the Commission establish a two-way balancing account for funds authorized to support energization of load-growth-related infrastructure. A two-way balancing account will ensure SCE has enough funds to make necessary grid upgrades—particularly important in light of the substantial negative effects of underinvestment in grid upgrades to meet load growth[110]—while also ensuring that ratepayer funds will be reimbursed if less capital is ultimately required.[111] A two-way balancing account is prudent in this proceeding.

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[108] *Id.*; *see also id.* §§ 932, 933.

[109] *Supra* Parts XI.A.1.(c), XI.A.2.

[110] *Supra* pp. 18-20.

[111] NRDC-03 at 10:5-10; *see also* SCE-18, Vol. 01 at 67:5-12. Recently, in the second phase of Pacific Gas and Electric Company's ("PG&E") Test Year 2023 GRC, the Commission adopted a ratemaking mechanism and established a memorandum account to enable PG&E to recover the costs of electric distribution capacity work due to accelerated transportation electrification. Proposed Decision in A.21-06-021 (May 17, 2024), approved by the Commission at its July 11, 2024 voting meeting, at 39-40. While SB 410 authorizes electrical corporations to request such a mechanism, SCE has not done so here and states that investments in transportation-

Conclusion

Transportation electrification is critical to the achievement of California's ambitious climate and air quality goals. For transportation electrification efforts to succeed, the distribution grid must be capable of supporting EV charging at increased levels. Consistent with its obligations under state law, SCE has determined the investments needed to prepare for load growth due to transportation electrification. And consistent with the relevant requirements of the PU Code, the Commission should approve SCE's revenue request for those investments and should establish a two-way balancing account for funds authorized to support energization of load-growth-related infrastructure.

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Respectfully submitted,

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electrification-driven load growth that are not planned to go into service until 2027 or later may be excluded from such a mechanism. SCE-13, Vol. 07 at 102:21-104:14.