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Clean Coalition Comments on SB 100 Kickoff Workshop

Additional submitted attachment is included below.

15 September 2023

California Energy
Commission
715 P Street, Sacramento,
CA 9581
Via Electronic Filing

CEC Docket 23-SB-100: Clean Coalition Comments SB 100 Kickoff Workshop

Dear Chair Hochschild, Vice Chair Gunda, California Energy Commission Members, and Staff,

The Clean Coalition appreciates the detailed work that staff has done to put this workshop together and the opportunity to discuss modeling scenarios to ensure California can achieve the SB 100 goals in a way that is affordable and beneficial for the ratepayers. Based on the Clean Coalition's technical policy and project-based expertise, we are confident that a scenario that values the full range of benefits created by distributed energy resources ("DER") will result in the greatest savings for the ratepayers and the most efficient pathway to a decarbonized society.

California's commitment to a clean energy future, as outlined in Senate Bill 100, is characterized by ambitious goals of achieving 100% clean energy by 2045. To achieve these goals, the state will need to rapidly electrify vehicles and buildings, while transitioning to a portfolio of clean energy resources. Senate Bill 32 mandates that by 2035, 100% of all new vehicles sold must be electric, which will result in mobile storage capacity that can be used to reduce demand during peak periods (through vehicle-to-grid integration). Moreover, in addition to the impressive amount of existing Local Solar that has been deployed, forecasts suggest that around 12,000 MW of new customer-sited solar will be required by 2030 to meet the increasing demand for energy. It is quite apparent that an increasing number of Distributed Energy Resources ("DER") will be deployed as the state electrifies. However, a distinction should be made between the number of DER increasing organically as residents/businesses electrify and the state actively modeling a scenario with a greater number of DER as part of the Preferred System Plan ("PSP"). Modeling higher numbers of DER will reveal the billions of dollars of savings for the ratepayers over the next two decades due to value stacking opportunities and reduced reliance on the transmission system. The Clean Coalition strongly believes that the state should support the integration of these distributed resources in the modeling process for the SB 100 report, rather than solely focusing on remotely-interconnected resources. Preparing for the grid of the future by maximizing the economic, environmental and resilience benefits from DER will yield unmatched benefits for both the ratepayers and the broader electrical grid. The Clean Coalition supports the DER Focus Pathway and considerations of grid management strategies to maximize the benefits of these resources, as a high penetration of DER best addresses the intersectional issues of affordability, resilience, reliability, equity, environmental justice, and clean energy. We urge the Commission to consider:

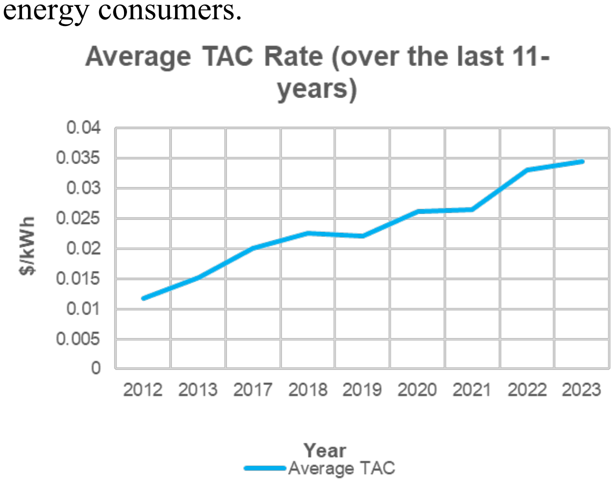
- Forecasting scenarios with high levels of remote-interconnected resources will require a significant buildout of the transmission system, heaping hundreds of billions of dollars in transmission infrastructure costs onto ratepayers over the next two decades.
- Local Solar offers a plethora of benefits for ratepayers and the broader grid, increasing affordability due to savings from onsite-generation and providing reliability benefits at peak periods when the grid is stressed.
- Greater levels of DER deployments set the stage for Community Microgrids, which provide unmatched indefinite renewables-driven resilience for all critical community loads and facilities.

- The staging of Distribution System Operators ("DSOs") will maximize the value of DER for the ratepayer and the broader grid. This additional value should be considered in the modeling of the DER Focus Pathway, to fully capture the benefits of a higher penetration of DER.
- Modeling should include a greater number of opportunities for DER deferral, based on the actual value created by deferral projects as compared to the number of opportunities in the existing Distribution Investment Deferral Framework.
- DER deployments are essential for retiring fossil fuel-burning peaker plants, which are often located in disadvantaged communities ("DACS") and result in localized health concerns.
- The modeling of DER should include non-energy benefits, to internalize the costs of externalities that are borne by the ratepayers but not valued in the existing procurement processes.

The Clean Coalition is a nonprofit organization whose mission is to accelerate the transition to renewable energy and a modern grid through technical, policy, and project development expertise. The Clean Coalition drives policy innovation to remove barriers to procurement and interconnection of distributed energy resources ("DER") — such as local renewables, demand response, and energy storage — and we establish market mechanisms that realize the full potential of integrating these solutions for optimized economic, environmental, and resilience benefits. The Clean Coalition also collaborates with utilities, municipalities, property owners, and other stakeholders to create near-term deployment opportunities that prove the unparalleled benefits of local renewables and other DER.

Transmission Costs

As the fastest growing part of electricity bills, transmission costs are the most important concern when considering different forecasting outcomes. A change in proposed transmission spending will have a substantial impact on rates. Forecasting scenarios that propose high levels of transmission-interconnected resources will require a significant increase in transmission spending to connect these far-away resources to end users. All these investments in transmission infrastructure are directly paid for by energy consumers.



Transmission Access Charges (TAC) Rate for the Investor-Owned Utilities (as of 1 January 2023)

	PG&E	SCE	SDG&E
High Voltage TAC ($/kWh)	0.0095034 ($/kWh)	0.0136576 ($/kWh)	0.0317925 ($/kWh)
Low Voltage TAC ($/kWh)	0.0204047 ($/kWh)	0.0005741 ($/kWh)	0.0273127 ($/kWh)
Total TAC Rate ($/kWh)	**0.0299081 ($/kWh)**	**0.0142316 ($/kWh)**	**0.0591052 ($/kWh)**

- Weighted Average TAC Rate: **0.02538202 $/kWh**
- Average TAC Rate: **0.03441497 $/kWh**

The price of transmission Access Charges (TAC) have already tripled in the last 11 years and will increase exponentially with newly proposed transmission spending. On the other hand, the forecasting scenario with high levels of distributed generation negates much of the transmission spending necessary in the other scenarios, preventing overbuilding of the transmission system. Therefore, the high DER penetration scenario will save ratepayers hundreds of billions of dollars in avoided transmission infrastructure costs over the next two decades.

Clean Coalition

The California Independent System Operator ("CAISO") estimates that deployment of remote renewable resources with necessary transmission infrastructure will cost ratepayers an additional $30 billion in the next two decades. These estimates only represent capital expenditure costs, which are a small fraction of the total price of a transmission asset.

Nominal costs

Asset value capital cost ($100 base)	$100
Return	$197
O&M	$631
Total nominal ratepayer cost per $100 investment (50 years)	**$928**

Real costs, discounted for inflation

Discount rate	2.19%
Asset value capital cost ($100 base)	$100
Return, discounted	$140
O&M, discounted	$296
Total discounted (real) ratepayer cost per $100 investment (50 years)	**$536**

In nominal dollars, total lifetime ratepayer cost is nearly 10x the initial capital cost; O&M accounts for 68% of this because it increases much faster than inflation. In real dollars (constant value dollars, accounting for inflation), the total lifetime cost is 5x the initial capital cost, and O&M accounts for 55% of this.

With the added cost of operations and maintenance ("O&M"), plus the guaranteed return-on-equity ("ROE") on transmission investments of 12%, transmission costs go up 10 times beyond their up-front costs. These costs are all passed directly on to the ratepayers.

The primary driver of expanding transmission infrastructure is peak transmission usage, which correlates to system peak demand. The higher the demand for energy, the more strained the transmission grid becomes, increasing line losses/congestion and resulting in less-than-optimal economic outcomes. It should be noted that the deployment of a remote resource, renewable or otherwise, relies on the transmission system. Thus, remote solar deployments will not reduce peak transmission usage whatsoever. However, deployments of distributed generation can meet load during periods of peak demand without requiring significant transmission infrastructure investments. Vibrant Clean Energy estimates that scaling up solar+storage in coordination with utility-scale renewables can achieve clean energy goals while saving ratepayers $473 billion. However, key to this strategy is having the state investing intelligently to deploy DER in target locations to create the most value for the ratepayers.

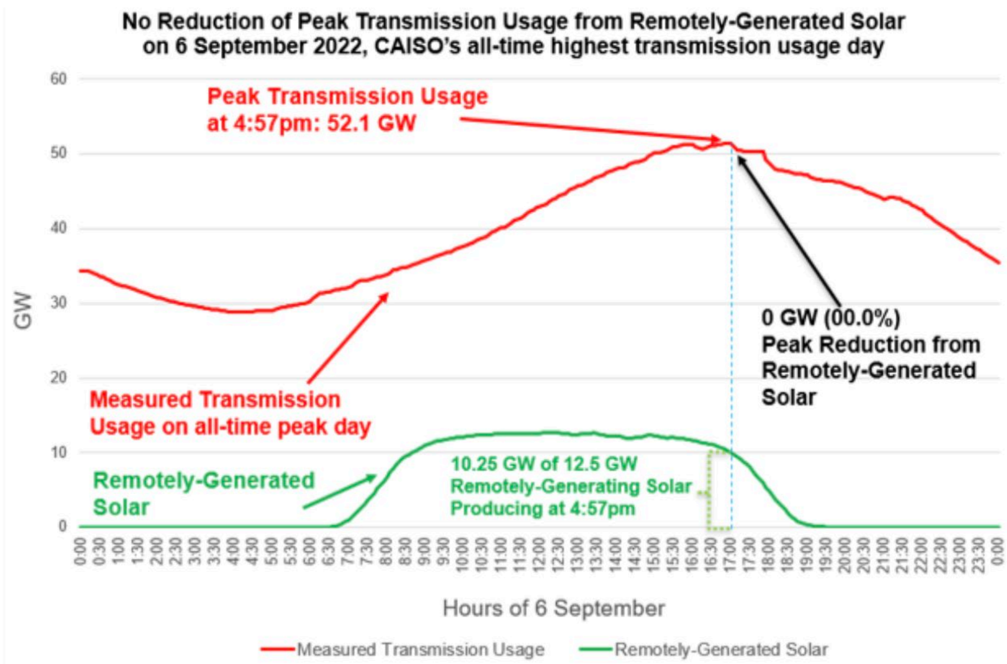
Another disadvantage of reliance on transmission assets is that a significant portion of energy utilizing the transmission system is lost, especially when the grid is strained. The average loss of energy from heat during transmission from remote power plants to consumers is 10%. In addition, congestion can lead to higher costs of energy. As with other transmission costs, the additional cost of this energy is directly passed onto consumers. Energy generated locally through DER, however, avoids these long-distance line losses, and thus results in grid efficiency and cheaper prices (when the cost of delivery is factored in). As electrification increases, local resources are critical to meet the increased demand while saving ratepayers hundreds of billions of dollars over the next two decades in avoided transmission infrastructure costs and ensuring resilience to local communities.

Value of Local Solar

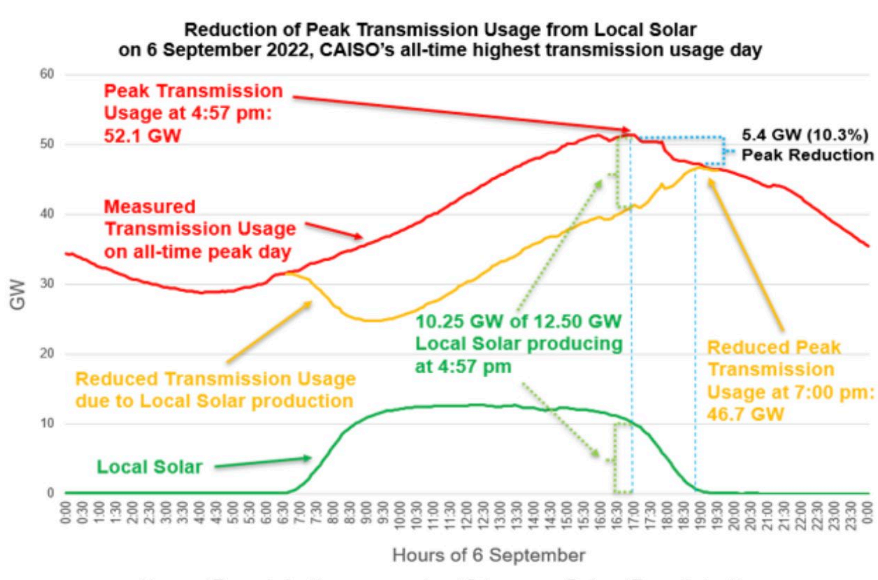
The DER Focus Pathway with significant amounts of new distributed capacity deployed, particularly as Local Solar, offers the most benefits to ratepayers and the broader grid. High penetrations of local solar will increase affordability by reducing overall electricity rates and providing significant reliability benefits during peak periods when the grid is stressed. The primary grid benefit from Local Solar is reduced transmission usage during peak periods (called peak transmission usage).

Remote generation, renewable or not, relies on the transmission system for energy delivery and thus does not reduce peak transmission usage whatsoever. On the other hand, Local Solar is far more efficient, serving loads that are either on-site or on nearby distribution feeders, without use of the transmission system. Therefore, energy generated locally is the best way to reduce reliance on the transmission system, easing grid congestion and reducing electricity rates for all customers.

This point becomes clear when considering the grid conditions on September 6th, 2022. This date marks the all-time record for peak transmission usage in California. At the time of the system peak, 4:57 pm, there was 10.25 GW of remotely-generated solar production. However, since remotely-generated solar relies on the transmission system, the grid experienced no reduction in transmission usage and remained stressed.

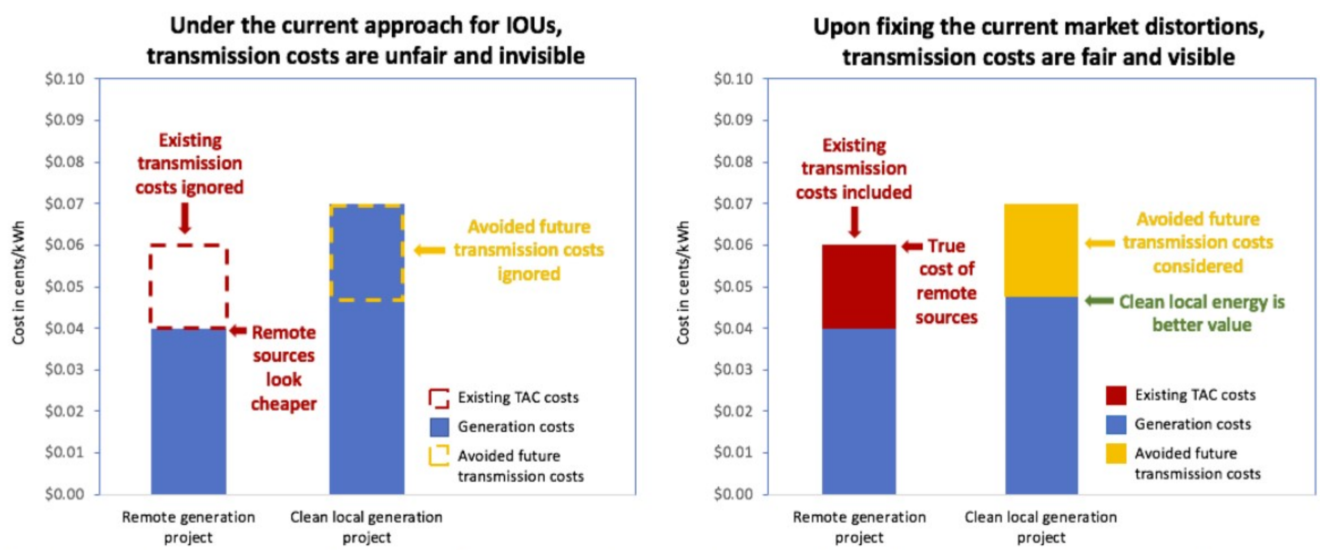


Had the 10.25 GW of Solar instead been generated and met loads locally, overall reliance on the transmission system would have been reduced by 5.4 GW, or 10%. Such a substantial reduction would have been sufficient to ensure that California was not in danger of an outage.



Not only does this reduced peak transmission usage negate the need for greater transmission spending and save ratepayers the aforementioned hundreds of billions of dollars in the next two decades, but it also eases congestion on the grid. Since transmission system energy prices are based on energy supply relative to demand, reduced peak usage leads to more efficient market outcomes, reducing electricity rates for *all* customers.

Though it offers a plethora of benefits, Local Solar in its current state is significantly undervalued. In investor-owned utility ("IOU") territories in California, Transmission Access Charges ("TAC") are currently assessed at the customer meter. This means that even if energy is generated locally and never touches the transmission system, the customer is still charged for use of that system. This market distortion significantly depresses the value of Local Solar resources. If Local Solar is deployed and does not use the transmission system, it should not be priced for use of that system. Therefore, TAC should be assessed at the Transmission-Distribution substation rather than the customer meter. This ensures that TAC are only assigned to energy that reaches the local distribution system through use of transmission lines. With this market distortion removed, and transmission costs allocated fairly, the economic benefits of local solar are realized.

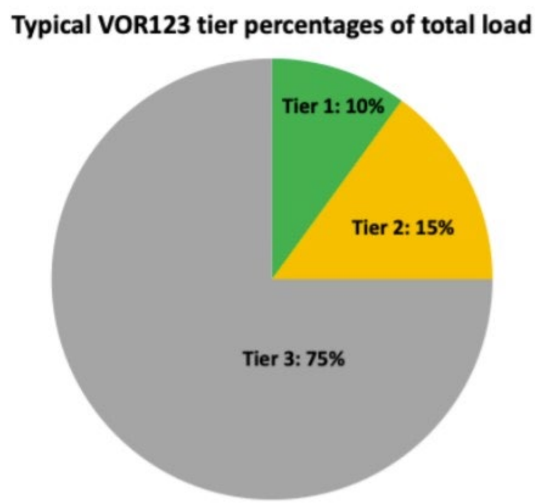


Existing transmission costs, assessed as TAC and currently averaging 2¢/kWh, should be added to the cost of remote generation that requires use of the transmission grid to get energy from where it is generated to where it is used, which is almost always on the distribution grid where people live and work. Future transmission investments, currently averaging 2.5¢/kWh in the evenings, can be avoided via dispatchable local generation, and that value should reduce the evaluated cost of local generation. When correctly considering ratepayer impacts of transmission costs, dispatchable local generation provides an average of 4.5¢/kWh of better value to ratepayers than is currently assumed in the majority of instances.

The DER Focus Pathway maximizes the benefits of local solar deployment. California is ripe with rooftops, parking lots, and parking structures in which local solar resources may be installed. Deploying solar in these local locations saves pristine lands otherwise destroyed by remote resource generation. Furthermore, local solar and storage deployment are crucial components in setting the stage for the deployment of Community Microgrids.

Microgrids

A high penetration of DER promotes the development of Community Microgrids, which are the best solution for addressing resilience & reliability needs. Community Microgrids are coordinated local grid areas supported by high penetration of local renewables and other DER such as demand response and energy efficiency. Microgrids provide an unparalleled trifecta of economic, environmental, and resilience benefits. Because it is difficult to quantify the value of resilience, the Clean Coalition has created a method to assign a value to this service, called the Value of Resilience ("VOR") 123 methodology. Based on this methodology, customers looking for resilience for their most critical needs should be ready to pay an extra 25% on top of their normal cost of electricity.

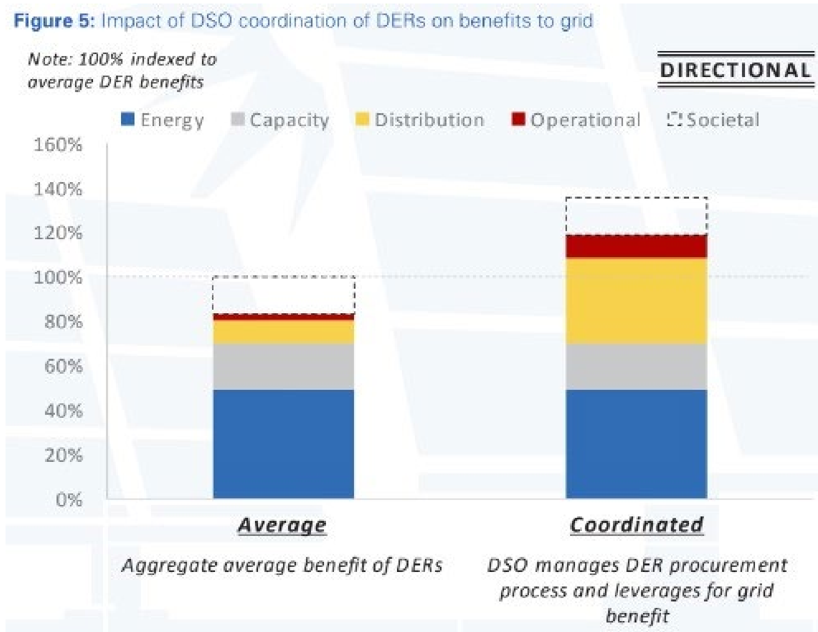


In a given facility, tier 1 critical loads represent about 10% of the total load, and tier 2 priority loads represent about 15% of the total load. When generation and storage is sized properly, Community Microgrids are able to island from the broader grid and provide indefinite renewables driven resilience to tier 1 and tier 2 loads. The value of retaining resilience for tier 1 loads is estimated to be worth three times the average price paid for electricity, and the value of retaining resilience of tier 2 loads is estimated at 1.5 times the average price paid for electricity. From these numbers, a 25% energy bill increase is justifiable. Furthermore, the Department of Energy ("DOE") performed a Multiplier VOR analysis and determined that an average of $117/kWh from critical loads is missed due to grid outages. Solar Microgrid deployment provides resilience during these grid outages, negating this lost income from outage scenarios. Even under the assumption of a conservative average annual outage time of three days, the economic value generated through the resilience capabilities of solar microgrid deployment is greater than 25% of one's electric bill.

Microgrids are superior to diesel gas generators, which are limited to the fuel onsite. Most diesel generators have a 24-hour fuel tank and in the face of natural disasters simply stop providing resilience once this fuel runs out. Microgrids, however, can ensure operations continuously even during grid outage scenarios. Additionally, microgrids can be seamlessly transitioned back to grid operations after natural disasters. Natural gas, on the other hand, is much more vulnerable to earthquakes and wildfires, and can take months to be restored. Solar Microgrids offer unparalleled resilience and reliability benefits at affordable prices. They are necessary in responding to increasing concerns about resilience in the face of increasingly prevalent wildfires and other natural disasters. The DER Focus Pathway is the best means of increasing solar microgrid deployment and maximizing its benefits.

Distribution System Operators and DER Deferral

Distribution System Operators ("DSOs") should be considered in future scenario modeling, as DSOs will increase the benefits of DER and fit well as operators of Community Microgrids. Once the utilities have DER Management Systems ("DERMS") in place, behind-the-meter resources will be visible and the value from distribution (grid operations & markets) can be maximized, prior to importing energy from the transmission grid or operating in transmission-level markets. The DSO model of grid management will be best suited to integrate and manage renewable energy resources, maximizing the value they provide for the ratepayer and the grid.



As more DER are integrated into the grid, the value of a DSO capable of managing the efficient distribution of this localized energy will increase. As can be seen from the graphic above, a DSO that seamlessly integrates DER into the grid while maintaining grid stability can increase the value of DER by close to 40%. Furthermore, an increased penetration of DERs and energy demand will necessitate distribution grid enhancements. A DSO model of grid management is optimal for upgrading distribution infrastructure and implementing advanced grid management and DER deferral technologies such as demand response and grid flexibility. Using software optimization and incentive structures to encourage customers to use electricity during off-peak hours will provide significant benefits towards balancing the grid and defer the need for increased power generation capacity. Grid modernization through technologies such as smart meters, sensors, and automation will also be needed to accommodate the changing energy landscape. DSOs are best situated to deploy and manage these resources.

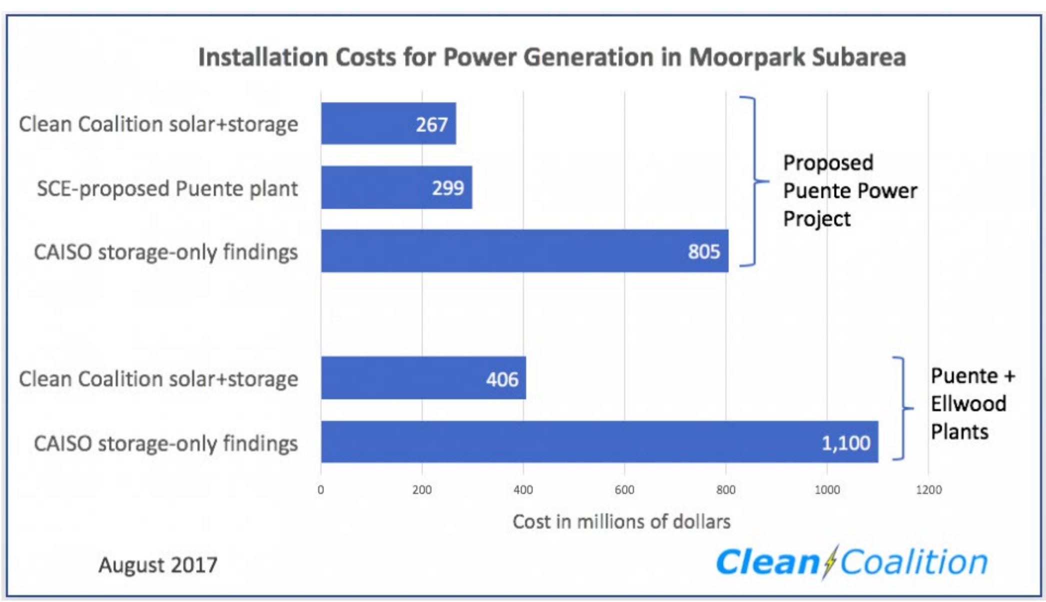
Like Local Solar, these grid optimization technologies will save ratepayers hundreds of billions of dollars in avoided transmission infrastructure costs. For instance, in regions of grid congestion, the IOUs default to costly grid upgrades. However, non-wires solutions are capable of providing significant congestion relief by generating or storing electricity locally, deferring the need for expensive grid upgrades. Batteries, for example, can be used to import energy from the grid when there is an excess, and export energy back to the grid when there is greater demand. This reduces congestion, generates economic value for the DER operator, and defers the need for costly grid upgrades.

The economic benefits of these technologies are not theoretical; from the limited case studies that exist in California, they serve as significantly cheaper alternatives to traditional wires solutions. For instance, with two DER deferral projects in Southern California Edison territories, the total ratepayer value was close to $8 million. Despite only a handful of examples of locations where DER deferral has occurred, there are hundreds of instances where these technologies could — and should — be utilized. Within the current Distribution Investment Deferral Framework (“DIDF”), these non-wires solutions are rarely considered. IOUs default to traditional grid upgrades and do the bare minimum to meet the CPUC’s pilot requirements instead of attempting to save money for the ratepayers. Thus, it is critical that DER deferral opportunities are fully incorporated into future modeling scenarios based on the actual value created by these projects. With the number of upgrades necessary to achieve electrification, the opportunities for substantial savings from DER deferral will be significant.

Retiring Peaker Plants

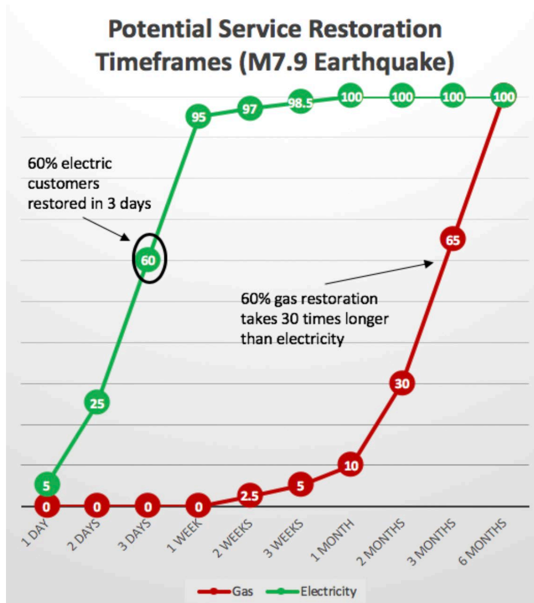
DER deployments are essential for retiring fossil fuel-burning peaker plants and transitioning to an energy makeup that is more sustainable and resilient. Peaker Plants are designed to meet short-term spikes in local electricity demand based on local capacity requirements. These plants, which use natural gas to meet electricity demand, are significantly more costly and less efficient than renewable energy because they can only be run a percentage of the time due to air pollution standards. Furthermore, peaker plants are disproportionately located in or near disadvantaged communities: the emissions from these plants contribute to local air pollution, exacerbating health problems such as asthma and respiratory diseases in these communities.

Retiring these fossil fuel plants is necessary to meet California's clean energy and climate justice goals, and a high level of DER deployment is the best means of achieving this. Installations of Local Solar+storage serve load during peak periods without the emissions and health risk of fossil fuel-burning peaker plants. Furthermore, installing solar+storage is far cheaper than deploying a gas peaker plant. Even without factoring in the exorbitant operations and maintenance costs of fossil fuel projects (and decommissioning costs), renewables-driven Community Microgrids have lower capital costs. And unlike typical peaker plants, which sit idle much of the time when they are not needed, Community Microgrids remain fully operational even during non-high demand situations, generating economic value through energy production, resilience and grid services. For example, consider the Clean Coalition's modeling of a solar+storage solutions compared to the costs for continuing to run the Puente and Ellwood Peaker Plants that CAISO conducted in 2017. The models show that a solar+storage solution is achievable at $267 million to install, compared to $299 million for the Puente proposal. Solar+storage could replace both Puente and Ellwood for approximately $406 million.



Clean Coalition modeling of solar+storage compared with Puente and Ellwood Peaker Plant solutions

In addition, there is also the question of resilience following an outage. Electric lines experience significantly quicker restoration times than gas lines, which peaker plants are reliant on. In models of service restoration time frames after a significant earthquake, 60% of electric customers are expected to have energy restored in 3 days; gas restoration is expected to take three months:



Solar+Storage installation is the best means of retiring costly peaker plants, saving ratepayer dollars, meeting environmental justice goals by uplifting disadvantaged communities, and providing resilience benefits and grid services.

Non-Energy Benefits

In future modeling scenarios of DER, it is crucial to give consideration to non-energy benefits for a more comprehensive understanding of the broader societal and economic implications of DER deployment. Neglecting these non-energy aspects has resulted in incomplete assessments that underestimate the true value of DERs for communities and society at large. For instance, a Local Solar installation not only reduces electricity bills, but also contributes to cleaner air, increases customer satisfaction and sense of control, and potentially creates local job opportunities. While greenhouse gas abatement is valued, the reduction in local pollution (and thereby, local health effects) is not compensated despite being real and measurable. DER contribute to cleaner air and leads to a decrease in respiratory illnesses and other health problems linked to air pollution, reducing medical costs borne by customers. Improved health conditions are also linked to improved job productivity and reduced sick days. The economic benefits of improved public health as a result of DER deployment are quantifiable and should be included in DER modeling.

Non-energy benefits also include environmental benefits (those related to air emissions, waste, and water and land use), economic and job stimulation linked to construction and operation of DER and additional work associated with DER programs, and increased energy security with reduced importation of energy. Models to quantify and evaluate this wide range of benefits should be developed and utilized in a DER forecasting scenario. It should be noted that low-income customers often experience these benefits with greater effect, due to the economic stress they experience. For one, these customers spend a larger percentage of their income on energy bills, so the cost savings from reduced energy expenses as a result of DER can have a significant impact on their overall financial well-being. Additionally, underserved areas often have outdated centralized grid infrastructure; access to reliable and resilient energy through DER can significantly improve quality of life, stimulate economic activity, and ease stress on low-income customers. Furthermore, As mentioned above, low-income customers are disproportionately affected by air pollution. Cleaner air as a result of DER deployment can lead to better health outcomes for these populations, ultimately reducing healthcare costs. Including non-energy benefits in DER models provides a more holistic and accurate representation of the true value of DER deployment.

Conclusion
The Clean Coalition appreciates the opportunity to submit these comments and urges the Energy Commission to pursue the DER Focus Pathway while including the full range of benefits created by DER, including non-energy benefits, retiring peaker plants, and integration with Community Microgrids & DSOs.

/s/ BEN SCHWARTZ
Ben Schwartz
Policy Manager
Clean Coalition
1800 Garden Street
Santa Barbara, CA 93101
Phone: 626-232-7573
ben@clean-coalition.org

/s/ BENJAMIN OAKES
Benjamin Oakes
Policy Intern
Clean Coalition
1800 Garden Street
Santa Barbara, CA 93101
Phone: 805-807-7695
benjamin@clean-coalition.org

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