

The IOUs' Natural Monopolies are Being Eliminated by Distributed Energy Resources

--Ted Howard (6/28/18)

With “*California Customer Choice: An Evaluation of Regulatory Framework Options for an Evolving Electricity Market*”, the CPUC might first step back and consider: the increasing cost effectiveness and profitability of distributed energy resources (DER)¹ is inevitable. The trend is clear, and the implications for investor owner utilities (IOUs) are profound. DERs are reducing the profitability of IOUs, thereby reducing the natural monopoly of those IOUs.

DERs can be deployed relatively quickly in congested areas where demand for electricity exceeds supply, thereby increasing reliability, reducing the costs for investment and maintenance of distribution and transmission networks, while reducing greenhouse gas emissions.

As just one example, with the increasing use of electric vehicles (EVs) connected to the grid and powered by distributed solar, controlled charging (V1G) and vehicle-to-grid (V2G) can be utilized to stabilize, and provide power for, the grid. Lawrence Berkeley National Labs (LBNL) recently published a report that concluded V1G could be more cost effective as a source of storage, than the current sources of storage identified in the CPUC energy storage mandate (Storage Mandate) requiring 1.3 GW by 2020. By charging vehicles in the middle of the day when there is often excess solar generation, EVs can help stabilize the grid by storing surpluses of electricity and avoiding curtailment. Including V2G for two way charging/discharging provides even greater benefits to the grid for mitigation of renewable energy intermittency, at a fraction of the cost of the Storage Mandate.²

Simultaneously, solar plus storage is becoming increasingly cost effective. The National Renewable Energy Laboratory (NREL) released a study which estimates the net benefits of PV rooftop solar plus storage will exceed the net benefits of stand-alone PV rooftop solar by around 2020.³

¹ DERs can be generally defined to include non-centralized clean energy sources such as distributed generation, energy storage, electric vehicles, energy efficiency, demand response, microgrids, and combined heat and power.

² Jonathan Coignard, Samveg Saxena, Jeffery Greenblatt and Dai Wang; “Clean Vehicles as an Enabler for a Clean Electricity Grid”; Environmental Research Letters, Volume 13, Number 5; <http://iopscience.iop.org/article/10.1088/1748-9326/aabe97/meta>; May 16, 2018.

³ Paul Denholm, Josh Eichman, and Robert Margolis; “Evaluating the Technical and Economic Performance of PV Plus Storage Power Plants”; NREL Technical Report; <https://www.nrel.gov/docs/fy17osti/68737.pdf>; August, 2017.

The increasing cost effectiveness of other DERs, including energy efficiency, demand response, and aggregation of DERs, will also provide customers with lower cost alternatives for energy and capacity. Demand elasticity will increase, as customers are offered an increasing variety of DER options, which decreases demand for IOU centralized generation. This will accelerate the inevitable shift to DERs. Note that this shift would occur with, or without, Community Choice Energy providers (CCEs).

The deployment of smart meters and the smart grid is enabling real-time pay-for-performance services, which also undermines IOUs' natural monopolies, by distributing intelligence and power (both figuratively and literally) to customers at the grid's edge. Furthermore, with smart inverters required for all new rooftop PV solar systems in California, the viability of peer-to-peer transactive energy, possibly enabled by blockchain technology, will evolve in the coming years as a fundamental alternative to centralized generation⁴. Again, this transition would occur with, or without, CCEs.

As IOUs are increasingly unable to charge prices to cover costs, due to the above factors favoring DERs over centralized generalization, the services they provide begin to take on an inescapable feature of Public Goods: costs exceeding revenues, making profitability impossible. Public Goods are goods (or services) which can be consumed by one individual without reducing the product's availability to another individual, and no-one can be excluded from consuming the product, even when not paying for consuming the product. Examples of Public Goods include clean air and other environmental benefits.

Public Goods are provided by government, or non-profit organizations, because of the inability to exclude those who do not pay for the good. There is "market failure" because the private sector does not provide the Public Goods, even when the total societal benefits from the Public Goods exceed the costs. Stated another way, private sector companies will not offer Public Goods due to the inability to make a profit, and the Public Goods would therefore not be provided, unless the government or a non-profit organization does so. For example, this "market failure" of the private sector to offer the Public Good which results from climate change mitigation requires that government and/or non-profit organizations achieve climate change mitigation.

And if DERs reduce IOU revenues more than they reduce IOU costs, the IOUs could find themselves offering de facto Public Goods (e.g. cleaner air from clean energy) for which costs exceed revenues.⁵

Consequently, as DERs become more widespread, IOUs will continuously encounter declining economies of scale. As IOUs gradually lose their natural monopolies, the CPUC needs to adapt regulatory policies which reflect this transition.

⁴ The 2019 Title 24, Part 6 requirement for rooftop PV solar on new homes will further accelerate the shift from centralized generation to distributed solar.

⁵ Steve Corneli and Steve Kihm, "Will Distributed Energy End the Utility Natural Monopoly?"; Electricity Policy; https://emp.lbl.gov/sites/default/files/corneli_29june2016.pdf; June, 2016.

A major part of the solution is CCEs. CCEs provide many benefits, including cleaner energy, lower rates, empowerment of local consumers (both figuratively and literally), local economic development, consumer protection, stimulation of prosumers (rather than just consumers), reduced costs for investing and maintaining transmission and distribution grids, and greater grid reliability.

If the CPUC remains concerned about the ability of some CCEs to ensure grid reliability via adequate and reliable electricity service, there is also the option of CCEs taking over the distribution grid within the municipalities in their service territories, becoming publicly owned utilities. The IOUs would then transition into Distribution System Operators (DSOs), responsible for the remaining distribution grid as neutral gatekeepers between buyers and sellers of energy, coordinating grid-wide DER activities as a market administrator.⁶

This Public Service would utilize the strengths and capabilities of the IOUs in maintaining the reliability of the grid most cost effectively and most efficiently. CCEs and other energy service providers can most cost effectively and efficiently offer DERs at the local level, while achieving the state's critical climate change goals.

⁶ The New York Public Service Commission's "Reforming the Energy Vision" recognizes the advantages of this strategy: "...aligning markets and the regulatory landscape with the overarching state policy objectives of giving all customers new opportunities for energy savings, local power generation, and enhanced reliability to provide safe, clean, and affordable electric service." See <http://www3.dps.ny.gov/W/PSCWeb.nsf/All/CC4F2EFA3A23551585257DEA007DCFE2?OpenDocument>