

An Overview of Distribution Resources Planning

The rapid deployment of distributed generation (DG) and the anticipated proliferation of additional distributed energy resources (DER) are transforming the power system. DER—including DG, energy storage, demand response, and advanced inverters—increasingly offer a cost-competitive alternative to transmission-dependent generation. And modernizing the grid with DER delivers additional benefits, including greater system efficiency, increased reliability, and a cost-effective pathway to meet state environmental goals. Yet, few electric utilities are actively planning for the rise of DER. This paper is intended to inform utilities, regulators, clean energy businesses, and other key stakeholders about the benefits of proactive distribution grid planning and provide a summary of key components.

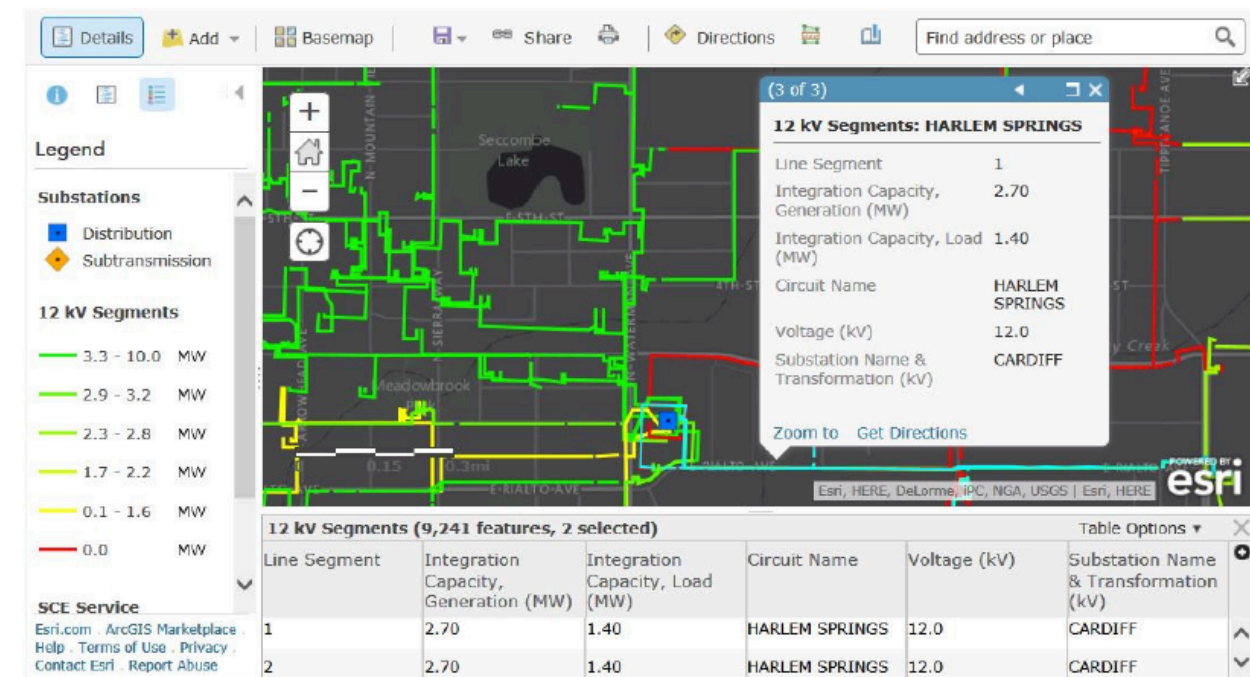
Goals and Outcomes

Most grid planning efforts continue to focus primarily on centralized generation and transmission to meet system needs. For the most part, consideration of DER is absent in grid planning processes. Therefore, a new approach to grid planning—one that identifies opportunities within distribution grids to cost-effectively meet system needs—is essential in ensuring that ratepayer dollars are efficiently invested in a smarter, cleaner, and more resilient grid.

An effective Distribution Resources Planning effort should result in the following outcomes:

- **Grid integration capacity:** Utilities will determine the ability of existing grid to accommodate new DER within the distribution network. Grid maps, with details on available capacity down to the circuit level, will be made publicly available.
- **Methodology to value DER:** Utilities will propose, and regulators will approve, a methodology to value DER, which recognizes locational value (details on locational value are below).
- **Substation-level demonstration projects:** Utilities will propose, and regulators will approve, substation-level pilot projects that deploy DER to achieve immediate ratepayer savings when compared to conventional approaches like centralized generation and transmission investments.
- **DER forecasts:** Utilities will propose, and regulators will approve, three forecasts for DER growth through 2025, with details on expected siting at the distribution substation level and impacts on distribution planning.

Collectively, these outcomes will lead towards the creation of a distribution grid that is “plug and play” for DER. Through greater access to grid data, formal valuation of DER assets, pre-identified optimal locations and planned investments to accommodate future DER growth, Distribution Resources Planning can greatly streamline deployment of DER—saving money for ratepayers and utilities alike.



A snapshot from Southern California Edison's (SCE) new interconnection map, which is a result of California's Distribution Resources Planning proceeding. A grid integration capacity analysis, such as this, details the available capacity within a distribution circuit to accommodate new distributed energy resources.

Distribution Resources Planning Captures Locational Value for Ratepayers

Locational value is the real, measurable, and material advantages associated with siting grid assets (generation, storage, etc.) in one location compared to another. Locational value offers direct cost savings to ratepayers through:

- Avoided costs associated with capital investments in expanding transmission and distribution grids;
- Avoided costs associated with transmission infrastructure operation and maintenance;
- Avoided costs associated with transmission and distribution grid line losses of real and reactive power that occur as energy moves through the grid;
- Avoided costs associated with congestion charges applied to energy sourced from constrained networks;
- Enhanced electric system reliability from geographic and resource diversity, distributed voltage control, and event ride-through capabilities of advanced inverters paired with distributed generation; and
- Societal benefits, such as those driven by separate “non-ratepayer” policy goals, including:
 - Reduced pollution, particularly in highly impacted areas,
 - Planning factors such as rapid and efficient deployment, as opposed to delays and uncertainty related to central generation's environmental impact, permitting, and the availability of new transmission facilities,
 - Increased energy security and resilience; and
 - Local community benefits through targeted employment, auxiliary land use, and new private investment.

California: A Case Study in Distribution Resources Planning

California's Assembly Bill (AB) 327, signed into law in October 2013, required the state's large investor-owned utilities to begin proactively planning for a distributed power system. Under this legislative mandate, the California Public Utilities Commission (CPUC) opened Rulemaking 14-08-013 to initiate the Distribution Resources Planning process. Through this public process the utilities will produce Distribution Resources Plans (DRPs) that identify areas on the grid where DER provide net benefits to ratepayers while accommodating greater customer choice.

Utilities filed initial DRPs on July 1, 2015 (available at www.cpuc.ca.gov/PUC/energy/drp/). The CPUC is currently reviewing the DRPs and parties' comments, and it is anticipated that the CPUC will approve, or modify and approve, the plans by March 2016. Each utility will then implement its DRP in one distribution grid area in 2016. AB 327 also requires that the utilities propose any spending on distribution infrastructure necessary to implement the DRPs as part of the next general rate case. The CPUC will approve the proposed spending if ratepayers would realize net benefits and the associated costs are just and reasonable. Utilities will file DRPs for all distribution grid area in 2017 and update their DRPs biennially for at least ten years.

California's DRPs are also the first step in a larger process to improve the power system and lay the groundwork for an evolution of the utility business model towards a role of grid integrator—otherwise known as a distribution platform provider or distribution system operator. Under this model, utilities will profit by enabling and streamlining the deployment of cost-effective, clean local resources. The DRP proceeding is concerned with the distribution planning process, and other proceedings will address implementation and integration.

Now is the Time to Start a Distribution Planning Process

It is important for other states to initiate similar processes expeditiously because of the time required to undertake such efforts. AB 327 became law in October 2013, but utilities in California did not release draft DRPs until July 2015. Following Hurricane Sandy, New York also realized that it would benefit from a similar process and created the Reforming the Energy Vision (REV) initiative. Other states would be wise to do the same to ensure that they are not left behind, and instead realize the full range of benefits offered by DER.