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High DER Future Grid Study Workshop #1 Operations Needed

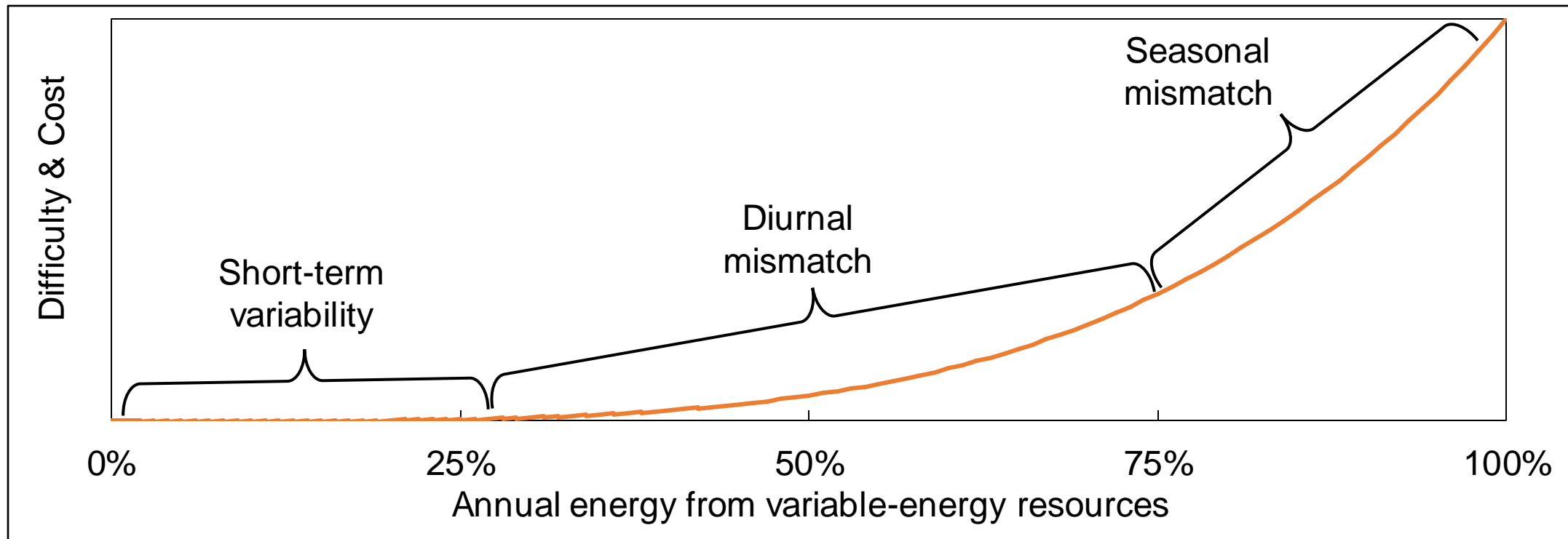
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Distribution Planning and Policy

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Distributed Resource Growth Requires Grid Planning

- By 2030, California will see substantial deployment of distributed energy resources (DERs): electric vehicle chargers, space and water heat pumps, rooftop solar panels. Some of these resources can modulate demand in response to remote signals.
- California's bulk power system will simultaneously be contending with high variable-energy-resource (VER) generation.
- Inadequate planning could result in resiliency and reliability challenges and inequitable outcomes.



Goal and Objectives

- Aligning DER operation with the grid's needs holds potentially tremendous value to California's electricity ratepayers; shifting demand to periods of abundant supply (and optimizing existing resources) can reduce the costs of generation, transmission, and distribution infrastructure.
- Future grid operations and planning should provide the right signals to DERs so that they operate and locate when and where they maximize societal net benefit, considering the following objectives:
 - I. minimize cost;
 - II. maximize safety;
 - III. maximize reliability;
 - IV. minimize environmental impact; and,
 - V. maximize equity.

Operations Needed to Meet Objectives

The following operations are needed to meet our identified goals and objectives. Which entity will perform which operations should be discussed in workshops two and three.

1. Operate distribution grids: Maintain operational flexibility, voltage stability, safety, etc.
2. Maintain grid frequency: Ensure sufficient (local and bulk) inertia, generation capacity, and frequency response.
3. Plan and procure the distribution grid.
 - Forecast grid needs.
 - Optimize DER integration to defer or displace wires build.
 - Timely energize customers.
4. Set policy on, authorize, and implement interconnection; **establish DER operating limits** and (smart) inverter requirements.
5. Choose when to operate (*i.e.*, schedule) DERs.
6. Operate (*i.e.*, dispatch) DERs.
7. **Monitor/model DER and non-DER data and convey to transmission operator**
 - *e.g.*, develop the function $Net\ Demand = f(Price)$.

Operations Needed to Meet Objectives

8. **Manage data access for all data relevant to distribution grid operation:** Track DER performance and interconnection characteristics, DER state-of-charge, cost of operation, historical performance, aggregator data, real-time prices. Manage confidentiality and data access.
9. Own and fund distribution grid. Some entities or entities must pay for grid infrastructure; ownership rights are typically associated with funding.
10. Own and fund DERs. Some entities or entities must pay for DERs; ownership rights are typically associated with funding.
11. **Set appropriate rates for consumption and generation based upon cost causation.**
 - Prevent market manipulation
12. System defense and restoration (e.g., cybersecurity, emergency load reduction, resiliency, black start).
13. Measure meter data (including submetering) and settle bills.
14. Customers make informed consumption choices.