



Environmental Energy Technologies Division Lawrence Berkeley National Laboratory

Demand Response in Western Regional Planning

Andy Satchwell

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DSM Inputs to Western Regional Planning



- LBNL has worked with WECC staff and the State and Provincial Steering Committee (SPSC) over the past five years to develop DSM-related assumptions and modeling inputs for WECC's regional transmission planning studies
- Two types of DR modeling assumptions required for each study case:
 - **DR resource quantities:** How much DR is available to be dispatched in any given hour for each load zone?
 - **DR dispatch mechanics:** When is the DR dispatched and how does it affect hourly loads and peak demand?

What DR program types are included?

Interruptible load

- demand made available by contract or agreement for curtailment

Direct load control

- demand under control of system operator

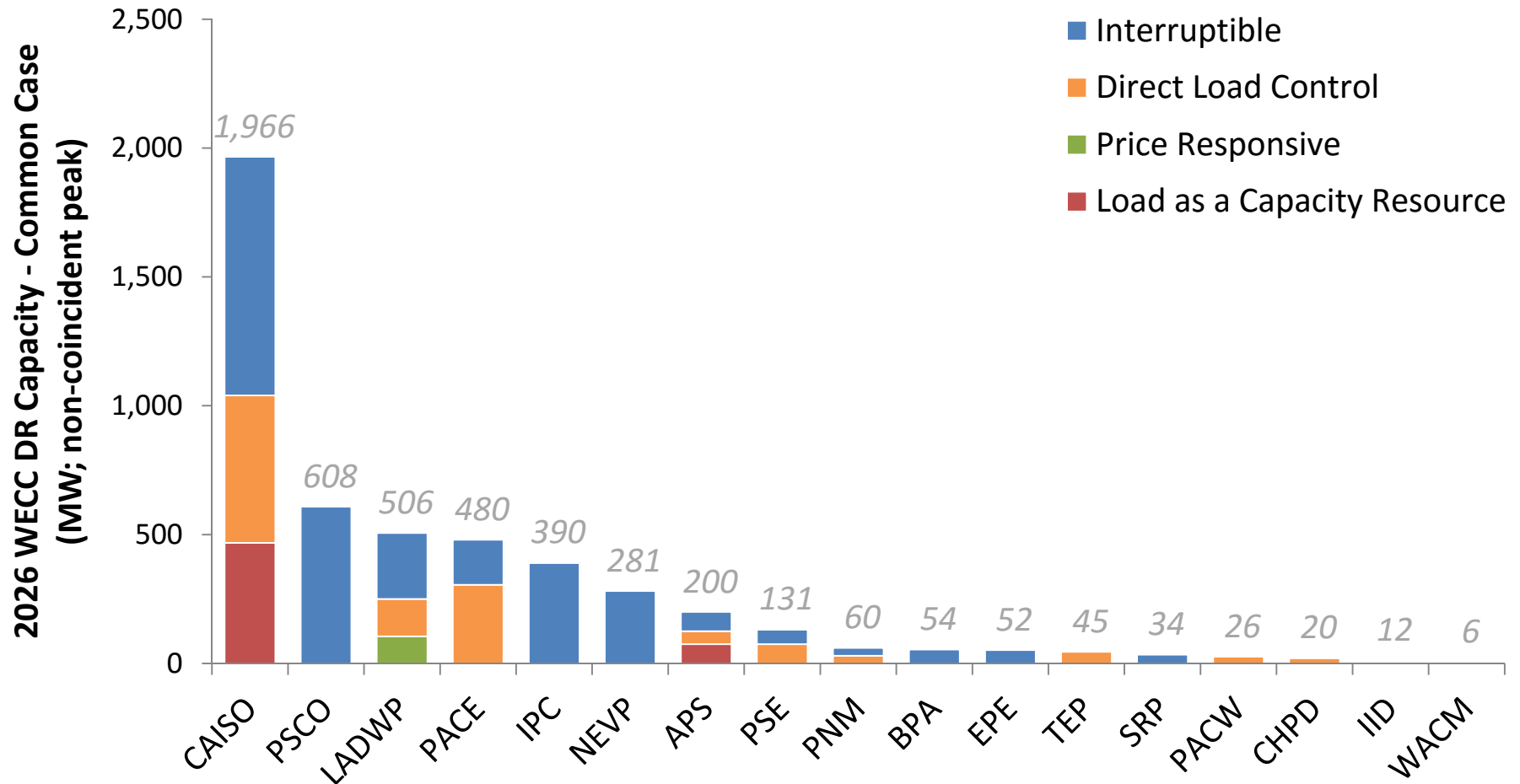
Pricing

- demand made available at times of pre-specified peak price

Load as a capacity resource

- can be committed for pre-specified load reductions under certain system conditions

2026 'Common Case' DR capacity by load zone and program type

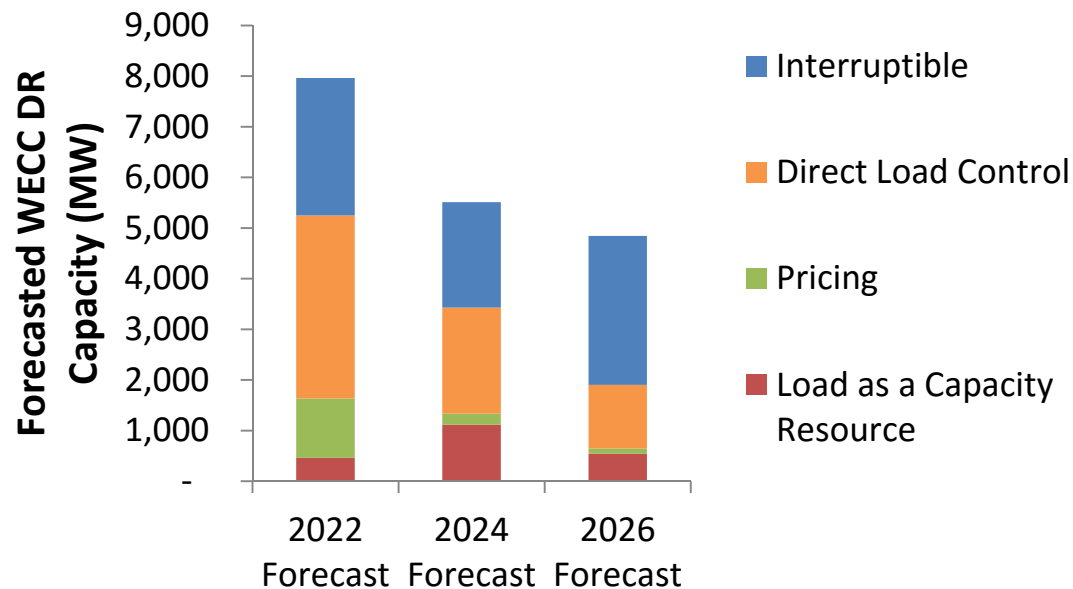


- LBNL validated forecasted DR against public data sources and confirmed adjustments with planning staff
- WECC load zones not shown have *no* DR in 2026 'Common Case'

How does 2026 compare to prior forecasts of DR in the Western Region?



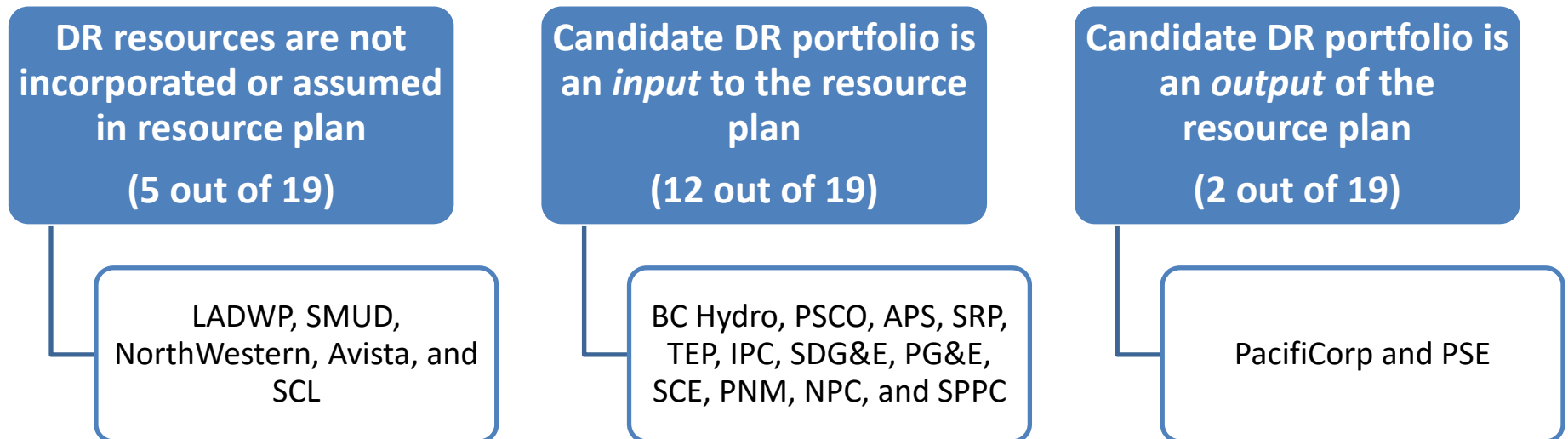
- Total DR capacity has declined from ~7.9 GW in 2022 forecast to ~4.8 GW in 2026 forecast
- Almost all the decrease can be attributed to changes in CEC forecasts regarding AMI-enabled DR and pricing impacts



DR Program Type	CAISO 2022 Forecast (MW; NCP)	CAISO 2024 Forecast (MW; NCP)	CAISO 2026 Forecast (MW; NCP)
Interruptible	1,031	993	926
Direct Load Control	1,626	449	572
Pricing	932	215	-
Load as a Capacity Resource	462	556	468
Total	4,051	2,213	1,966

Observations from developing DR forecasts

- Approaches to construct portfolio of DR programs varies widely among utilities



- Utilities commonly treat DR as a peak load reduction in resource plans and few allow DR to “compete” against supply-side resources within planning framework
- Common lack of internal utility coordination between planning staff and DR program staff

Questions?



Andy Satchwell | asatchwell@lbl.gov | 510-486-6544

Publications:

<https://emp.lbl.gov/reports/resp>



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Appendix

Enhanced DR modeling approach



- LBNL developed and implemented a DR modeling approach premised on more realistic dispatch within the constraints of production cost models
- What do we mean by “realistic dispatch?”
 - DR programs are used for reliability and economic purposes
 - DR program dispatch is limited by tariff provisions specifying maximum number of events per month or year
 - DR program tariffs also specify multiple, sequential blocks (e.g., 4 to 6 hours) for events

LBNL's Demand Response Dispatch Tool



Inputs

- Hourly Load
- Hourly LMPs
- Maximum Available Monthly DR
- Program constraints



Resource Availability

- Calculate "hourly shaping factors" to scale maximum available DR to hourly load



Simulated Dispatch

- Identify top-LMP hours to act as dispatch trigger
- Dispatch DR over top-LMP hours, subject to program constraints



Output

- 8760 load-modifying profile of DR used in production cost model as static profile

