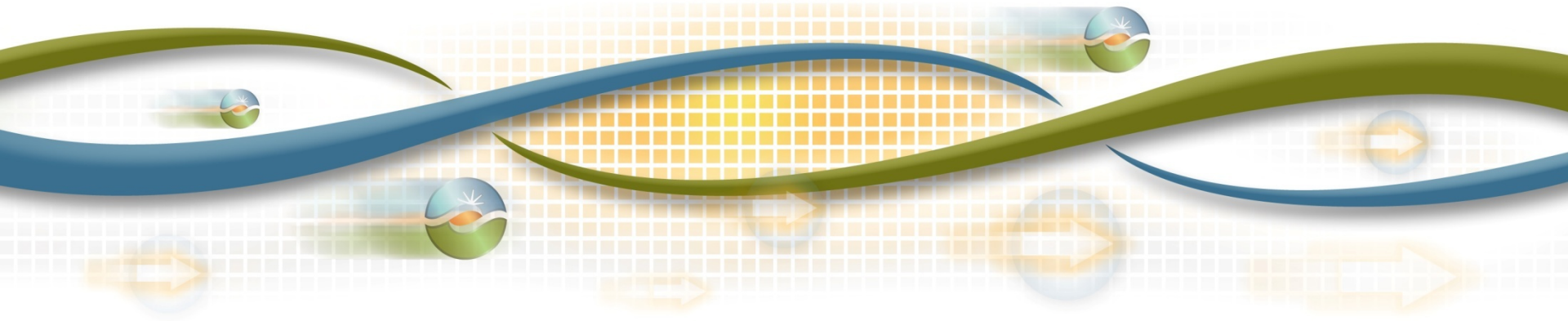




Joint Agency Workshop Microgrid Roadmap Development

Peter Klauer, Smart Grid Solutions Manager
California ISO

April 25, 2017



Microgrids are comprised of localized load and generation resources which *normally operate connected to and synchronous with the traditional centralized grid* but can disconnect and function autonomously as an island within the macrogrid



Source: DOE

Microgrid Services to the ISO Controlled Grid

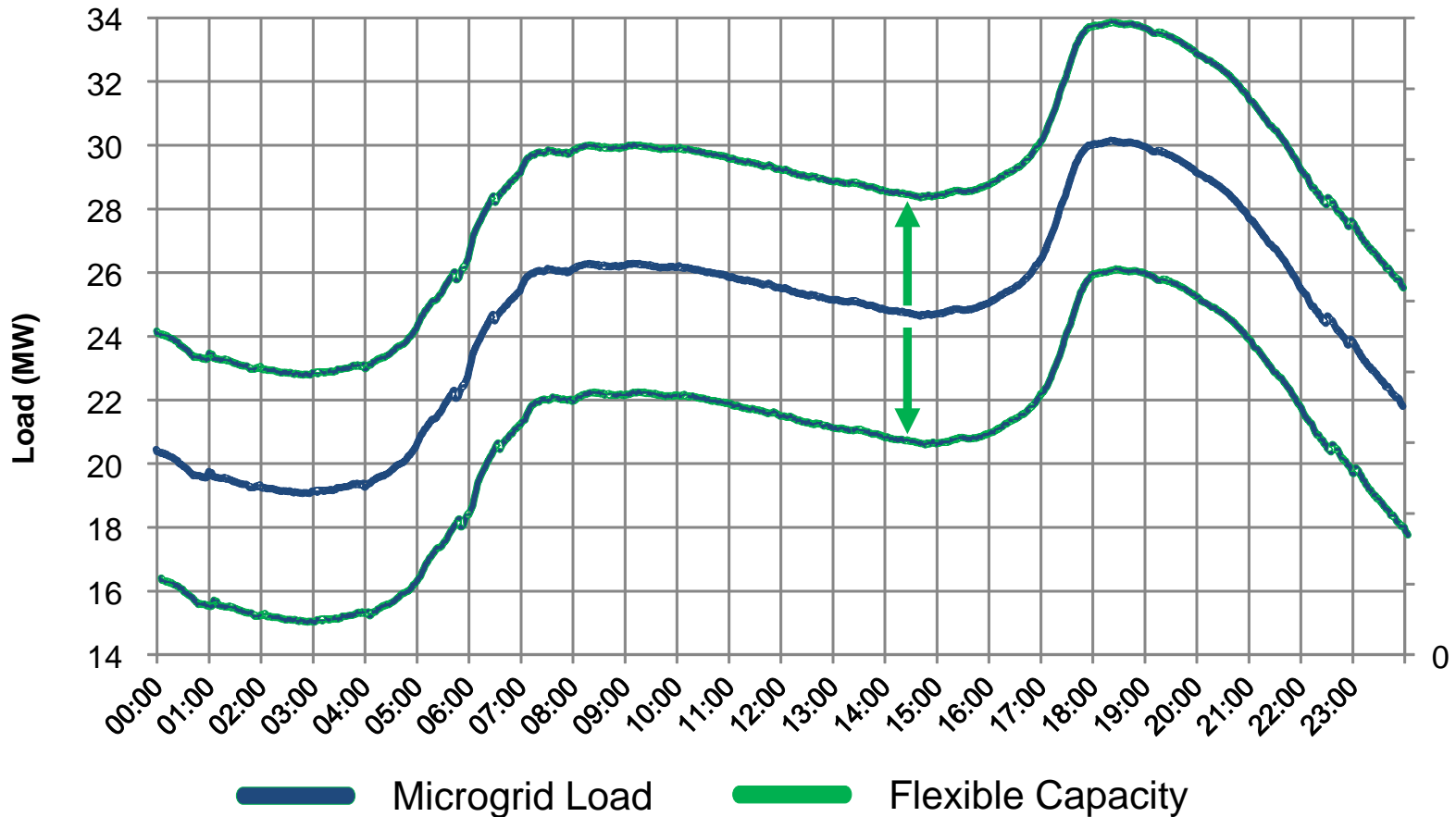
- Microgrids, like other wholesale grid resources can serve as:
 - A dispatchable energy resource
 - An ancillary service resource
 - A load curtailment resource
 - A load increase resource

Characteristics of a participating microgrid

- A collection of loads and DERs that meet the needs of the microgrid as well as provide services beyond the microgrid
- A portion of the microgrid is modeled as a flexible wholesale resource
- The grid operator visibility is at the microgrid resource level
- Microgrid controllers deliver grid services based on the collective action of the individual sub-resources within the microgrid
- Microgrids exhibit reliable disconnect and reconnect procedures

Microgrid Modeling and Performance

Microgrid Resource Load Profile



CAISO initiatives and FERC NOPR

Year	Initiative	Description
2013	Expanding Metering and Telemetry Options – Phase 1	Simplifying requirements for smaller resources
2015 - 2016	Expanding Metering and Telemetry Options – Phase 2	Created the Distributed Energy Resource Provider (DERP) to facilitate aggregation of smaller resources in the CAISO market
2016-2017	Metering Rules Enhancement	Provides expanded scheduling coordinator metered entity (SCME) optionality to certain market resources that otherwise must be CAISO metered entities (CAISOME) today
2015-2017	Energy Storage and Distributed Energy Resources (ESDER) Phase 1 & 2	Enhancements for CAISO connected and distribution connected resources to participate in the CAISO market
2017-2019	ESDER Phase 3 Issue Paper Fall 2017	(modeling, DR performance measurement, Multi-Use, Station Power)

- 11/17 – FERC issued a notice of proposed rulemaking to require ISOs and RTO to define distributed energy resource aggregators as a type of market participant that can participate in the organized wholesale electric markets