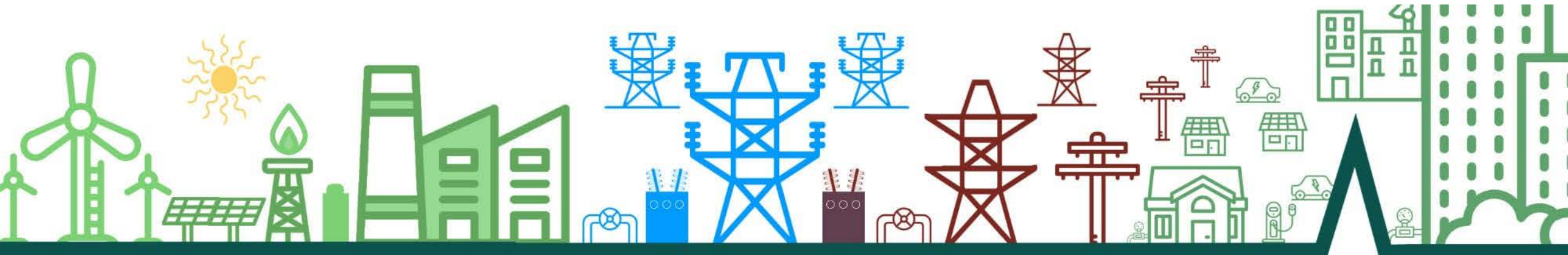


The Future of Distributed Energy Resources

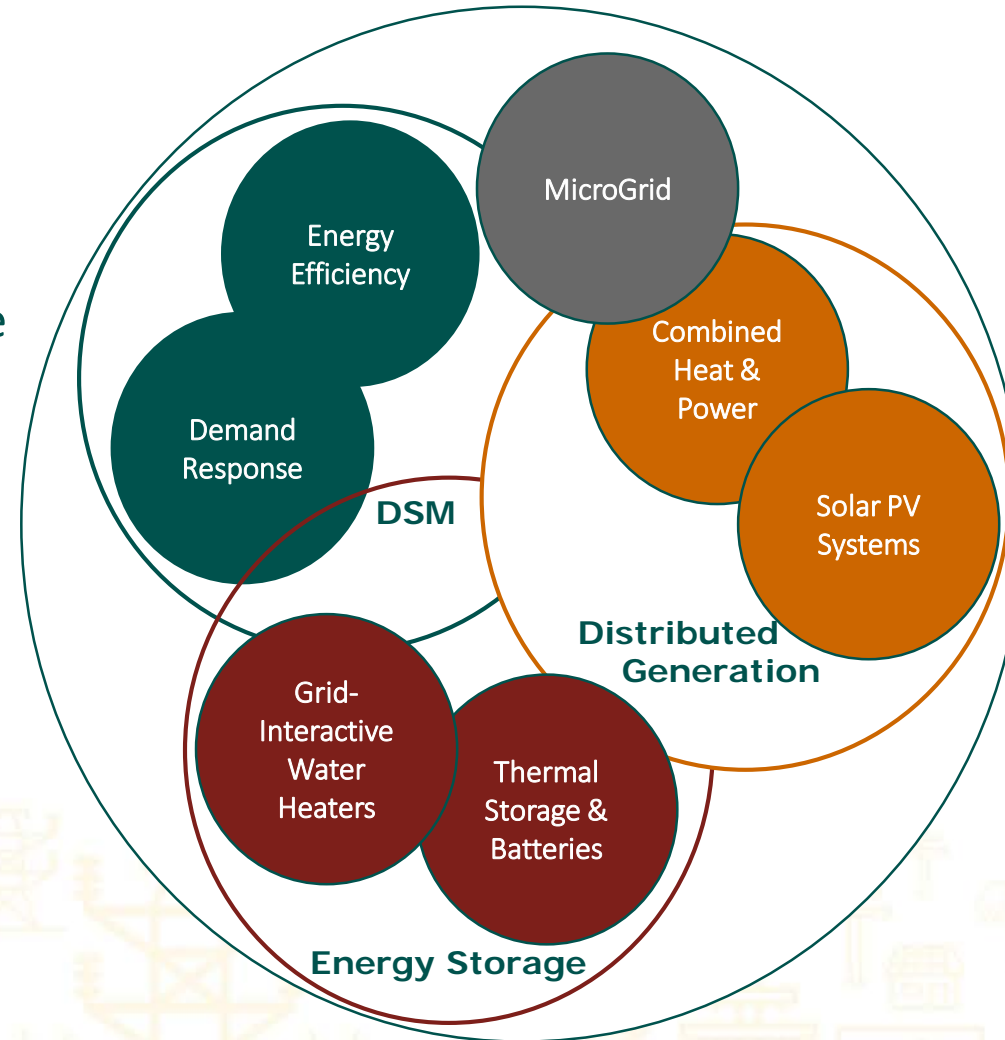
*Brian Doyle, Xcel Energy and Utility Load Management
Exchange Steering Committee Co-Chair*

*Jenny Roehm, Schneider Electric and PLMA Thought Leadership
Group Co-Chair*

Presented at the 2019 ACEEE National Conference on Energy Efficiency as a Resource



A program design type that delivers the benefits of EE to customers and DR to the grid using the same technology intervention and/or a linked incentive while leveraging the same program delivery resources and infrastructure.



Demand Response Evolution

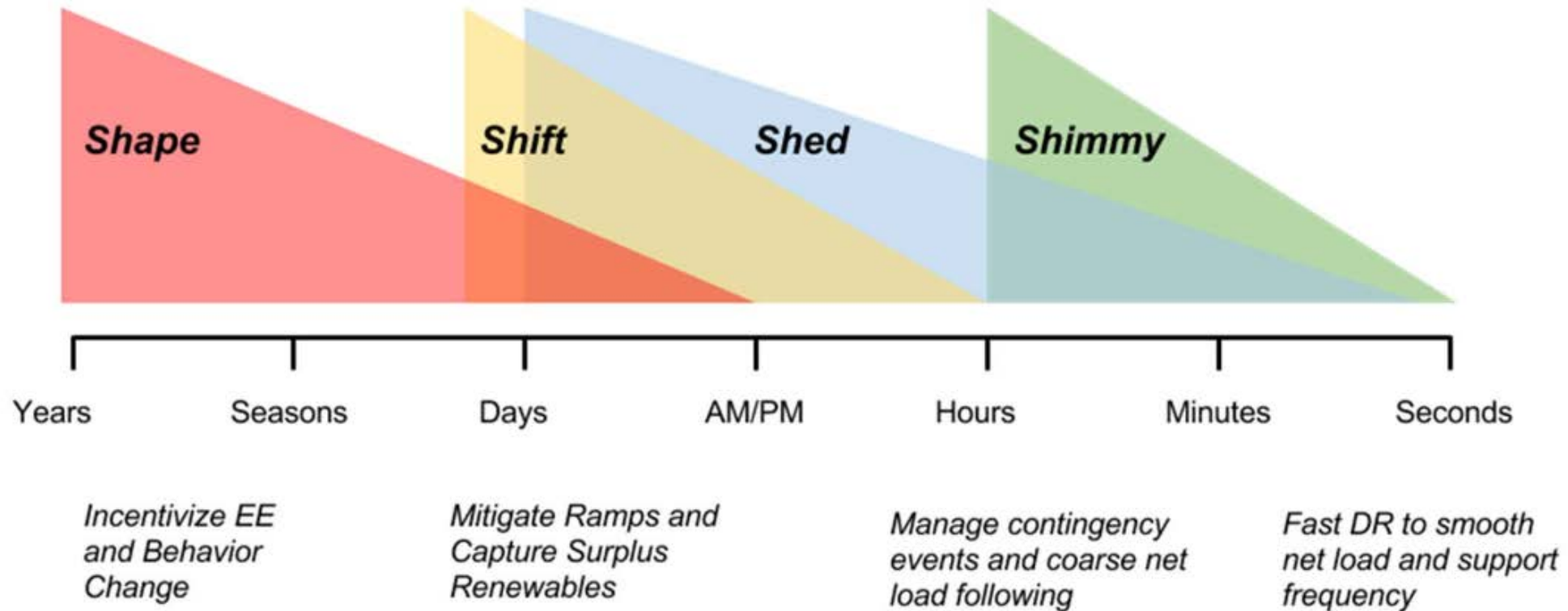


- Largely manual control
- Interruptible tariffs for large C&I
- 1-way Direct Load Control for Residential
- Used for Capacity Planning & Emergencies

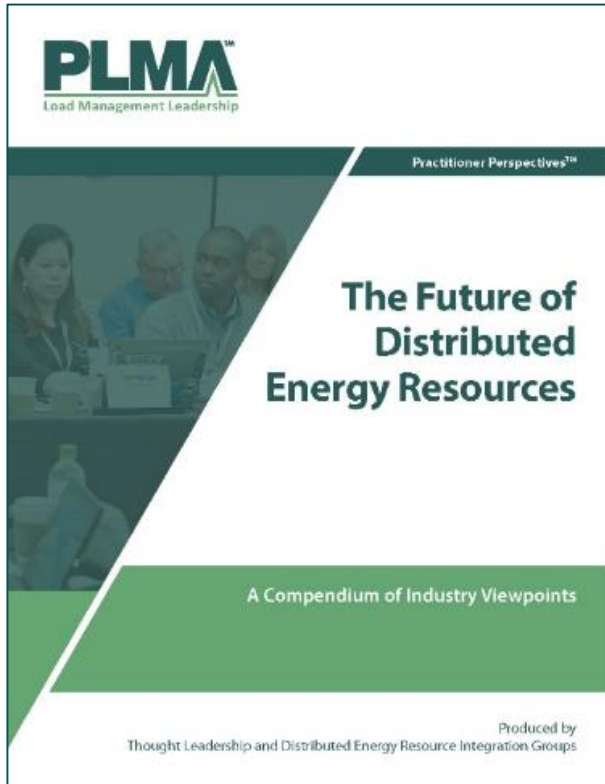
- Introduced To Wholesale Markets
- Increased automation
- Increased Precision
- Eventually Ancillary Services
- Behavioral/voluntary Options
- Smarter Equipment
- 2-way communications
- Some Near Real-Time Visibility

- Provide Multiple Grid Services
- Respond to Controls and/or Price Signals
- Distribution & Transmission Relief
- Introduction of Storage
- Migration to DER

Demand Management Portfolio



[Lawrence Berkeley National Laboratory California Demand Response Potential Study](#)



Planning/Foundational Category - Defined as those utilities taking bold steps to leapfrog pilots/technology straight to integrative planning and procuring, and change management.

- **Hawaiian Electric's Integrated Grid Planning**, *Hawaiian Electric Company*
- **Distributed Resource & Flexible Load Study**, *Portland General Electric and Navigant*
- **Integrating DER planning, Research and Program Development**, *Tacoma Power*



“DR Plus” Category - Defined as customer-sited assets (with or without involvement of an aggregator) to monetize DER operations for utility/grid benefits to a growing spectrum of network problems.

- **Deriving New Wholesale Market Revenue Opportunities and Maximizing Customer Utility Savings with Behind-the-Meter Distributed Energy Resources, Center for Sustainable Energy, Tesla, Conectric Networks, and Olivine**
- **Expanding National Grid’s ConnectedSolutions program to Include Energy Storage, Sunrun, EnergyHub, and National Grid**





Microgrids Category - Defined as customer-sited assets that have great degrees of flexibility and opportunity for monetization.

- **Microgrid Enables Military Facility to Participate in Utility Services, Eaton**
- **Energy Storage and Microgrid Performance in Non-Wires Solutions and Other Demand Management Programs, Enel X**

Pena Station NEXT

- This transportation oriented district (TOD) is what Panasonic, the City of Denver, DEN, and Fullenwider envisioned when Panasonic announced plans to relocate its division headquarters to Colorado in 2015.
 - Xcel Energy as their utility partner worked to shape how the energy needs of this development could be met



International Category

- **First Movers in DER in Colombia, *U.S. Energy Association***



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Learn more at www.peakload.org