Distribution System Transformation Architecture & Design

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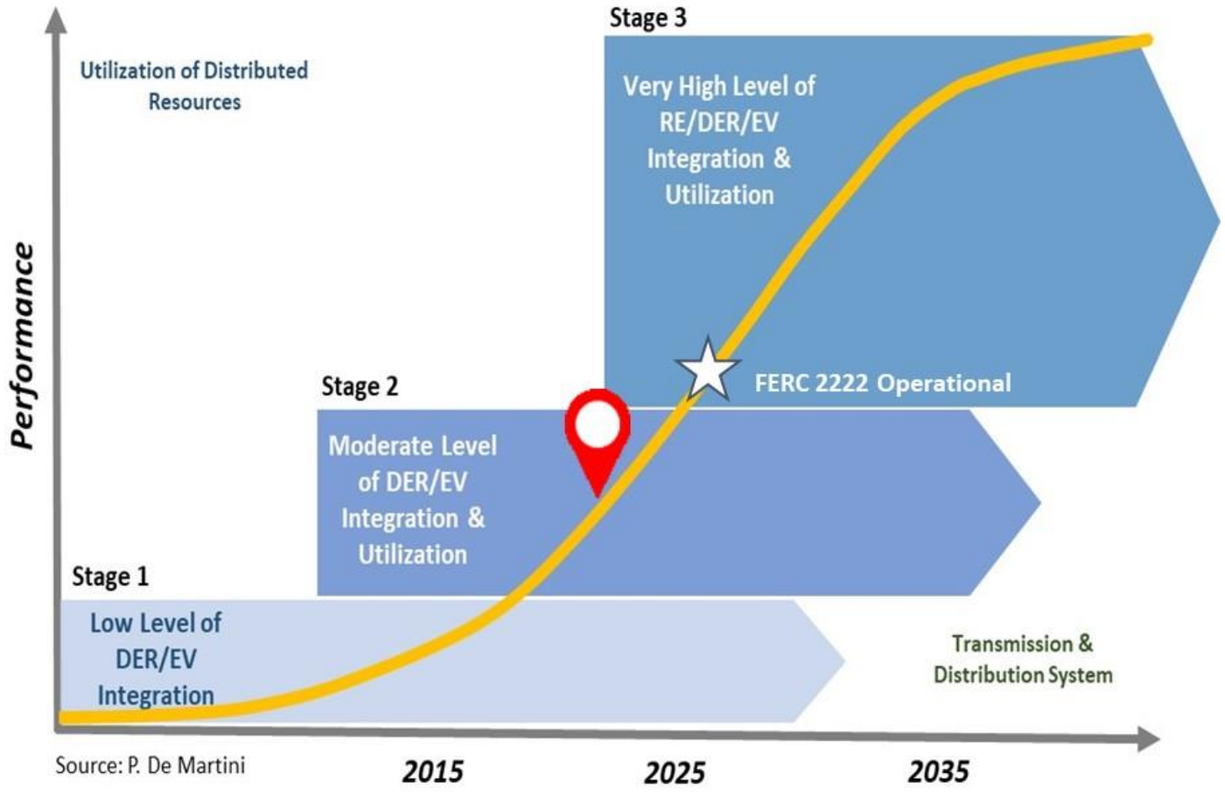
The Grand Challenge & Opportunity

How to navigate from today's grid to tomorrow's?



Grid Transition Characteristics

Scale

Complexity

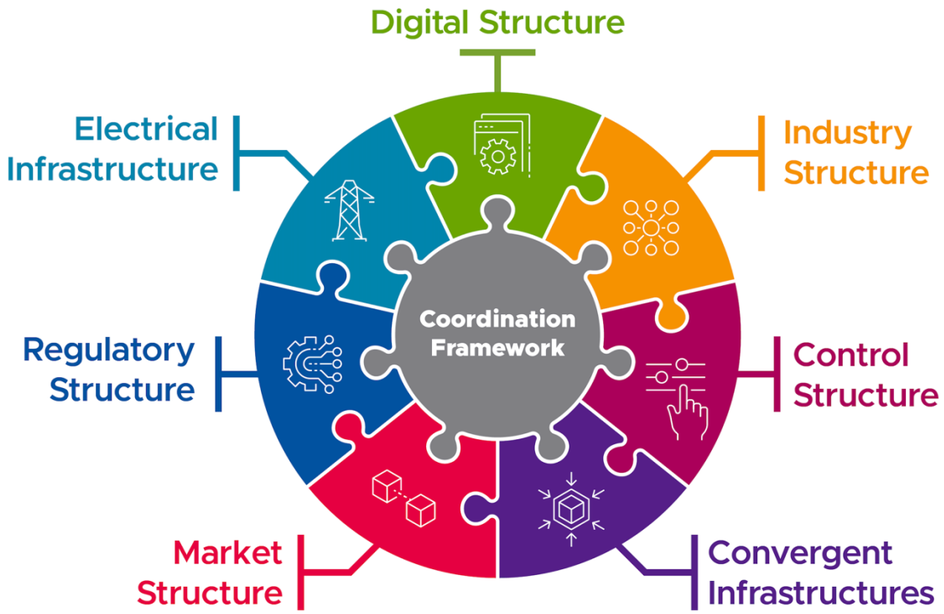
Pace

The grid needs to undergo significant change across all dimensions at an unprecedented pace.

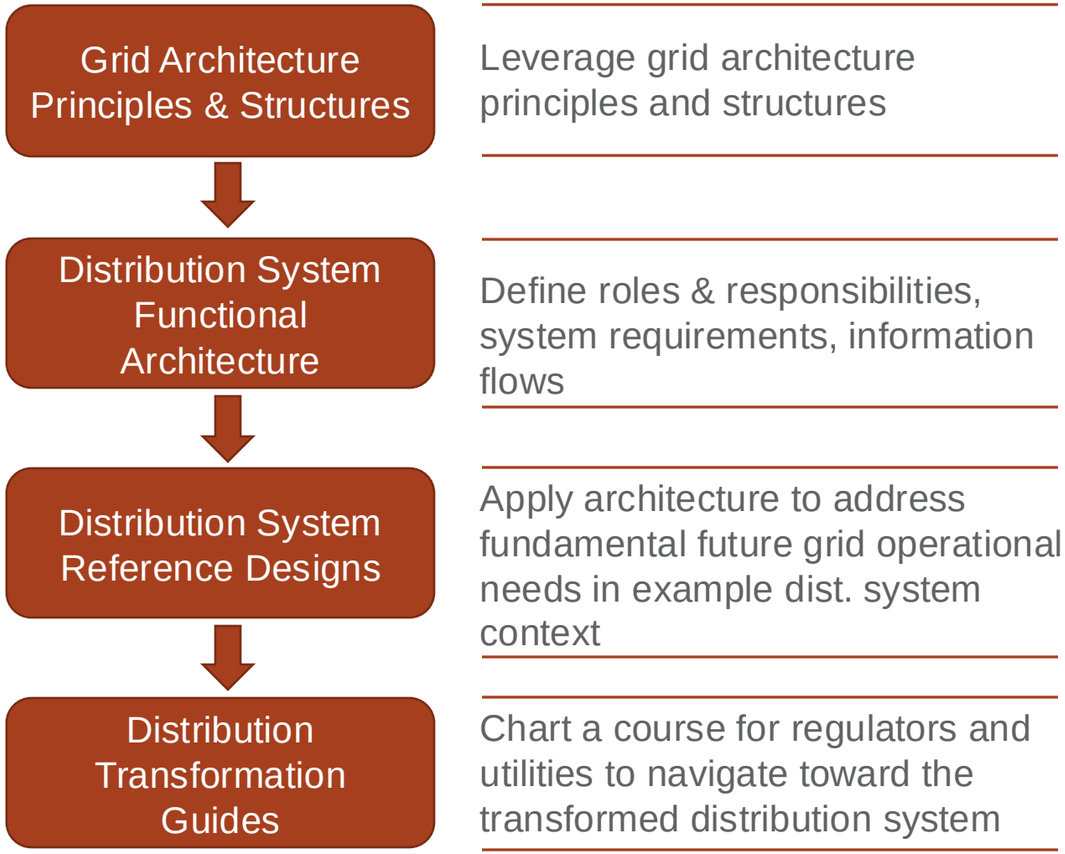
Distribution System Transformation Project Approach

Objective:

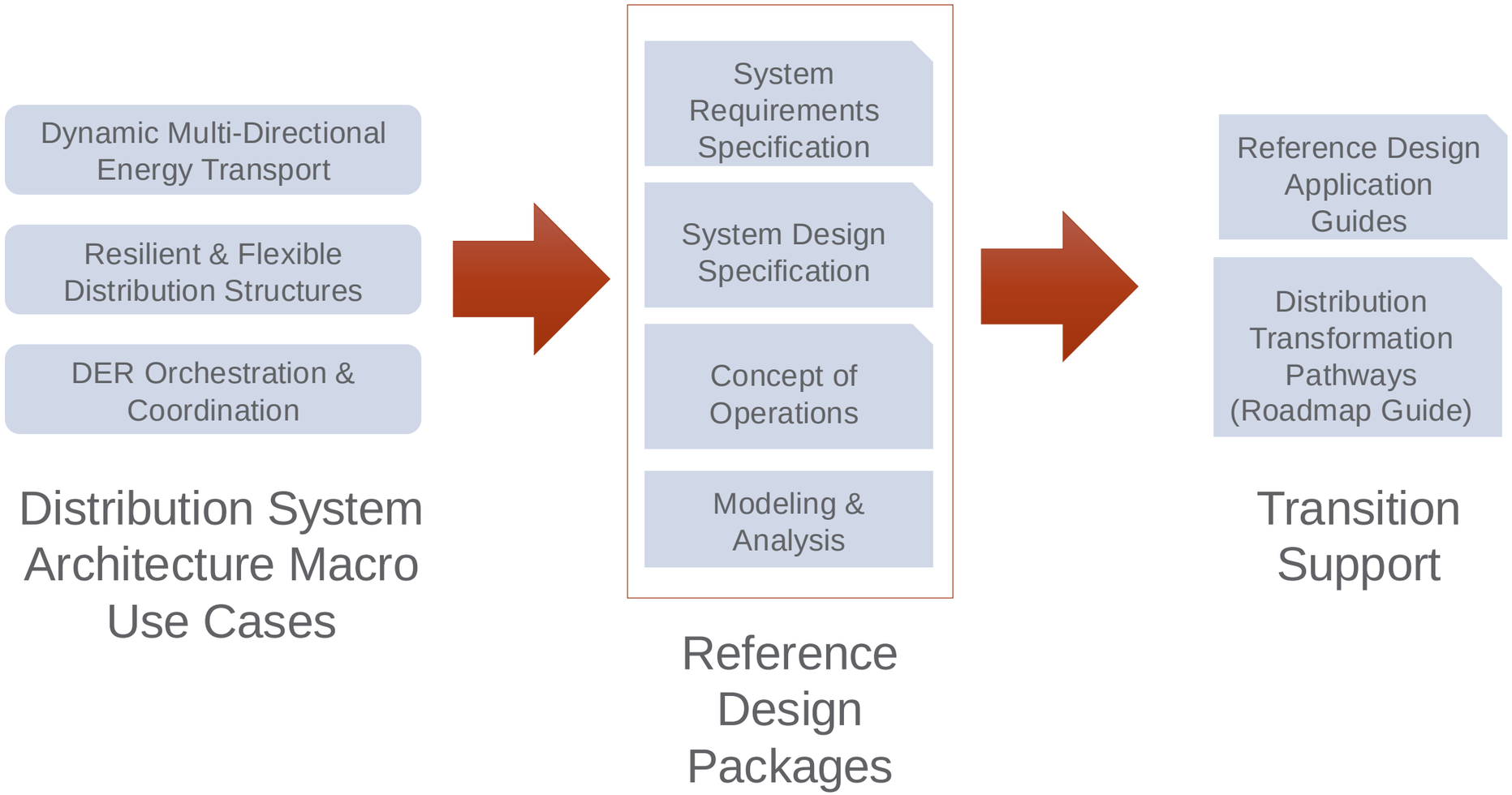
Provide regulators and utilities architectural driven design guides to navigate transformation from today's distribution system to a future decarbonized, secure, reliable, resilient, and affordable future grid



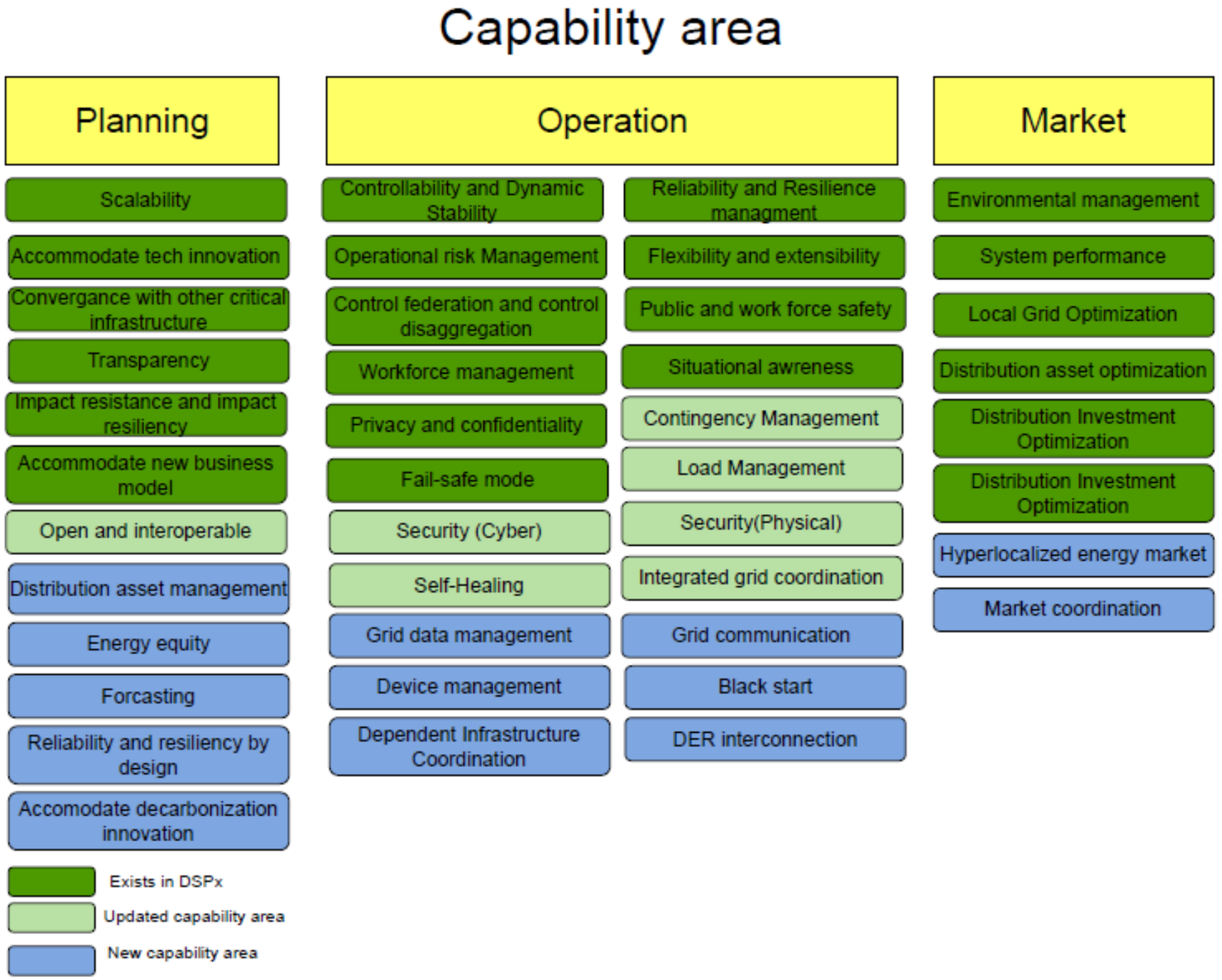
Grid Architecture



Distribution System Reference System Designs



Refresh DSPx Distribution System Capabilities Analysis



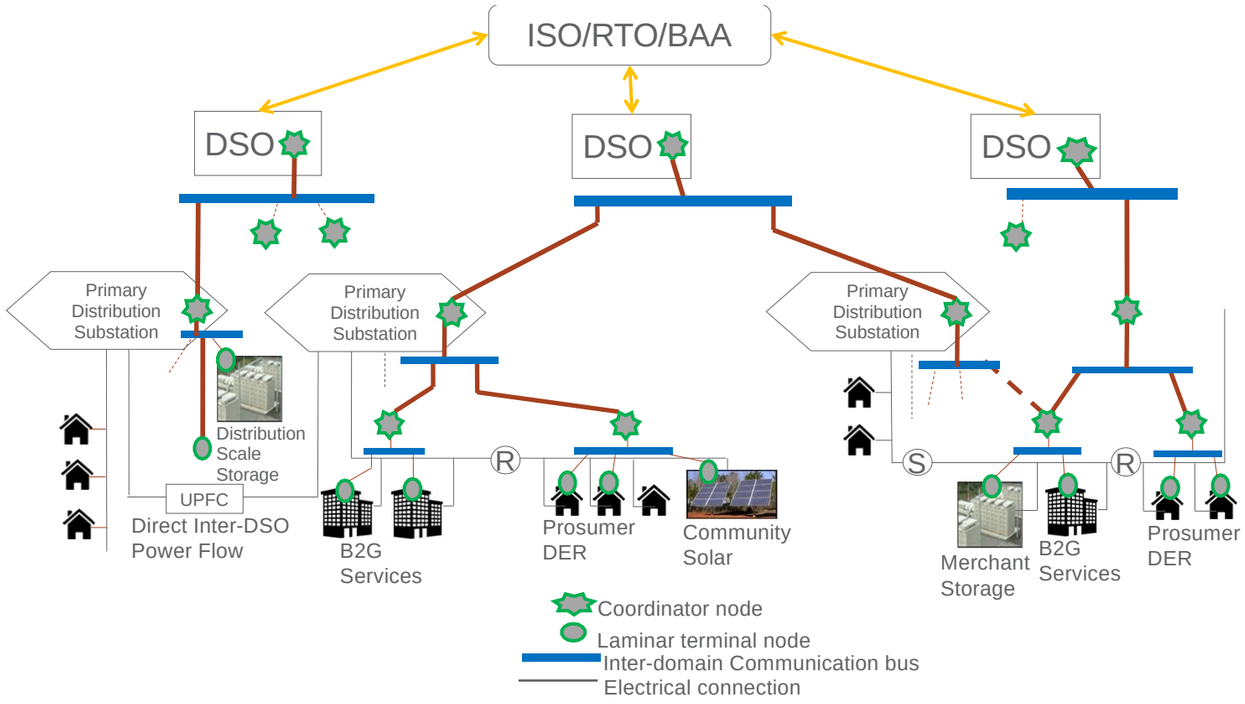
Derived from: U.S. Department of Energy, “Modern Distribution Grid (DSPx), Volume 1”, Nov 2019. Available at: https://gridarchitecture.pnnl.gov/media/Modern-Distribution-Grid_Volume_I_v2_0.pdf

New Structures for New Distribution System Capabilities

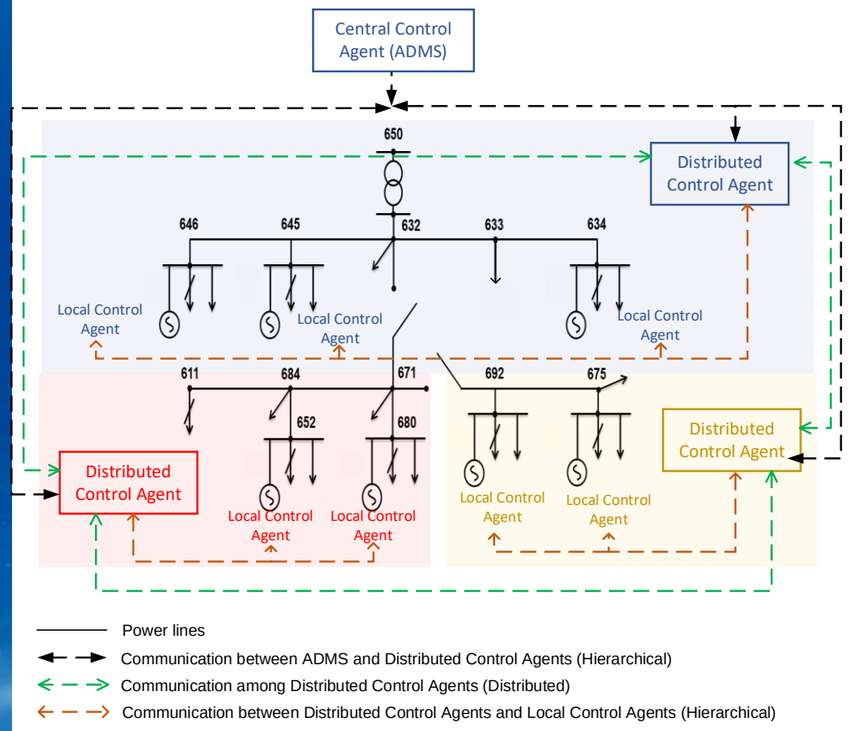
Capabilities of a Future Distribution System Architecture

- Distributed reliability & resilience
- Multi-directional energy flow management
- Enable flexibility from edge resources
- Coordinate scheduled and real-time energy flows at T&D interface
- Distributed Balancing

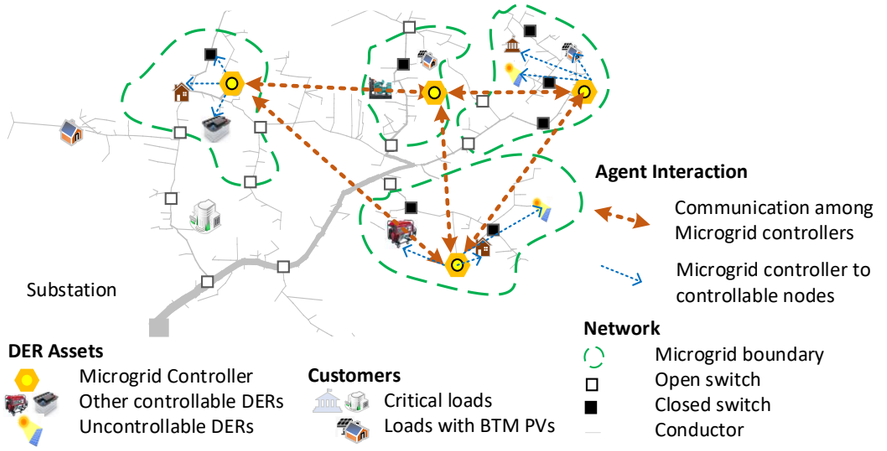
Grid Architecture Structure For Future Distribution System



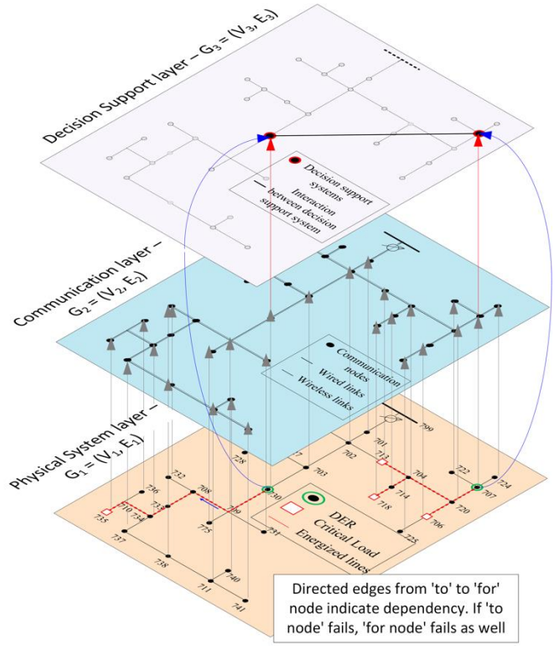
Distribution System Reference Design Work Products



System Design



Operational Models



Validation & Demonstrations

Thank you

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