



Demand Response: An end-to-end View  
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### Trade Secret

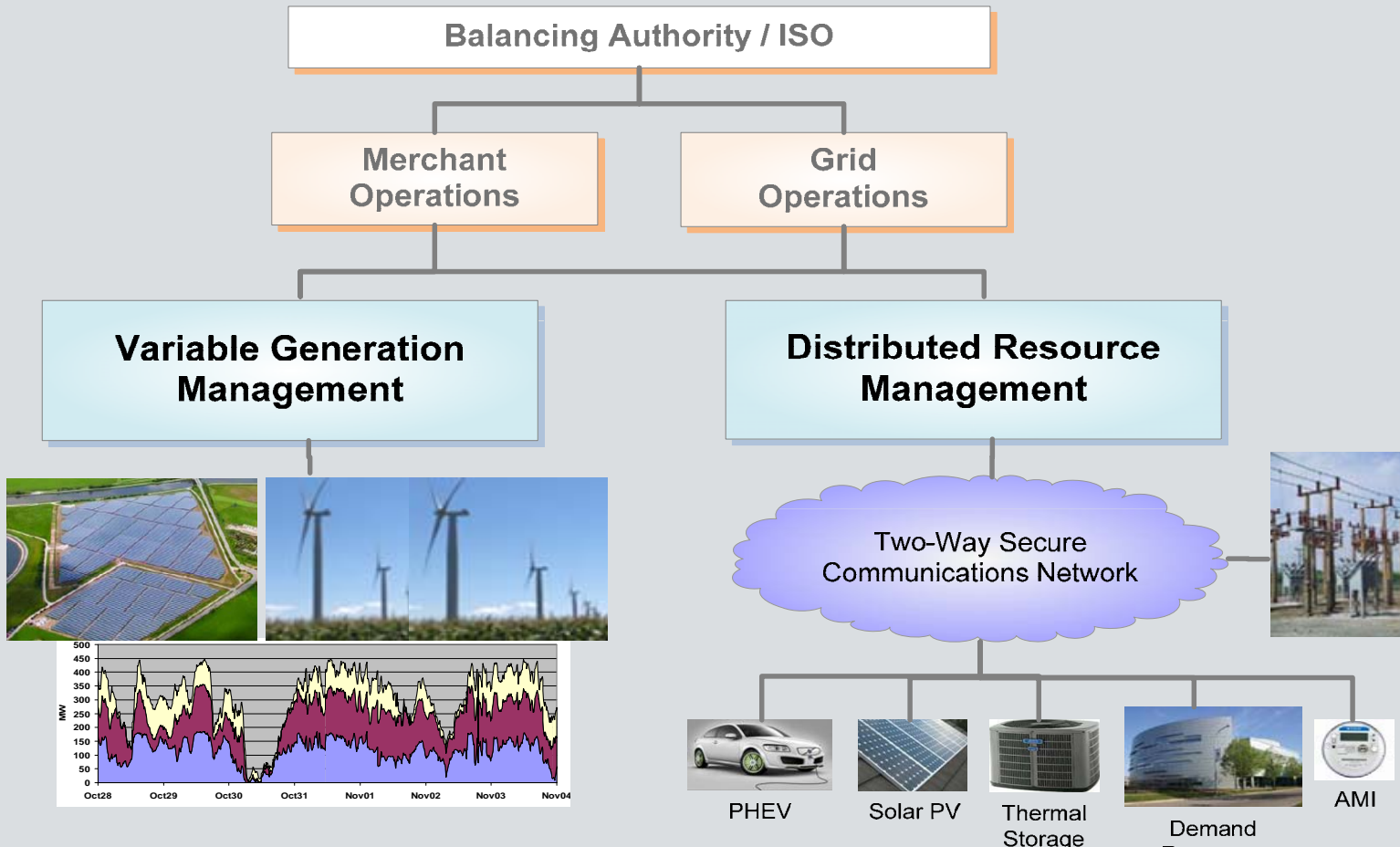
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# A Key System Level Benefit of Demand Response: Provide Some of the Balancing Energy Needed for Variable Generation

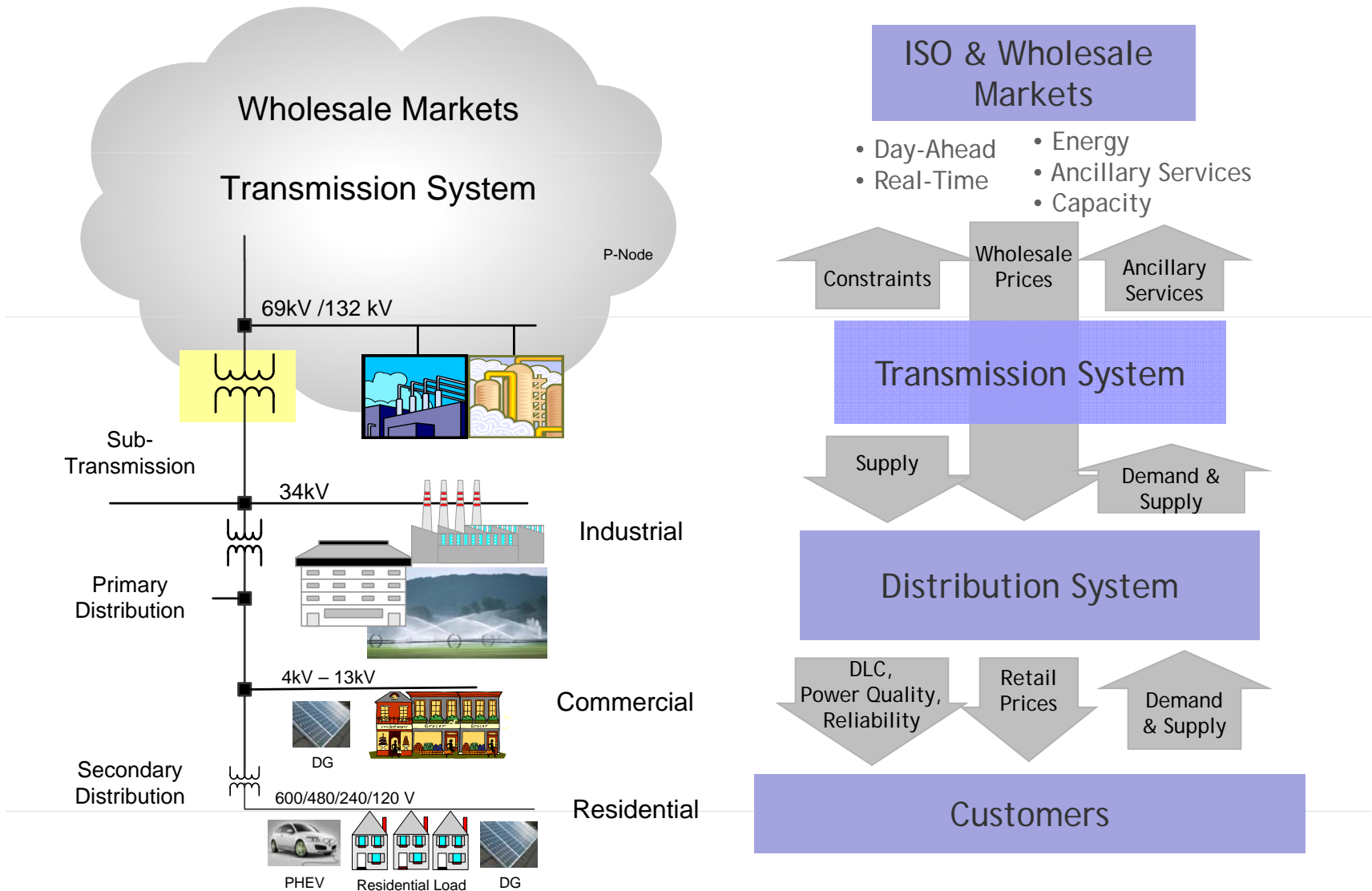


- Over Generation
- Under Generation
- Regulation Requirements

- Non-Spin Reserves
- Spinning Reserves
- Regulation (Future)



# High-Penetration Demand Response





## Definitions and Scope

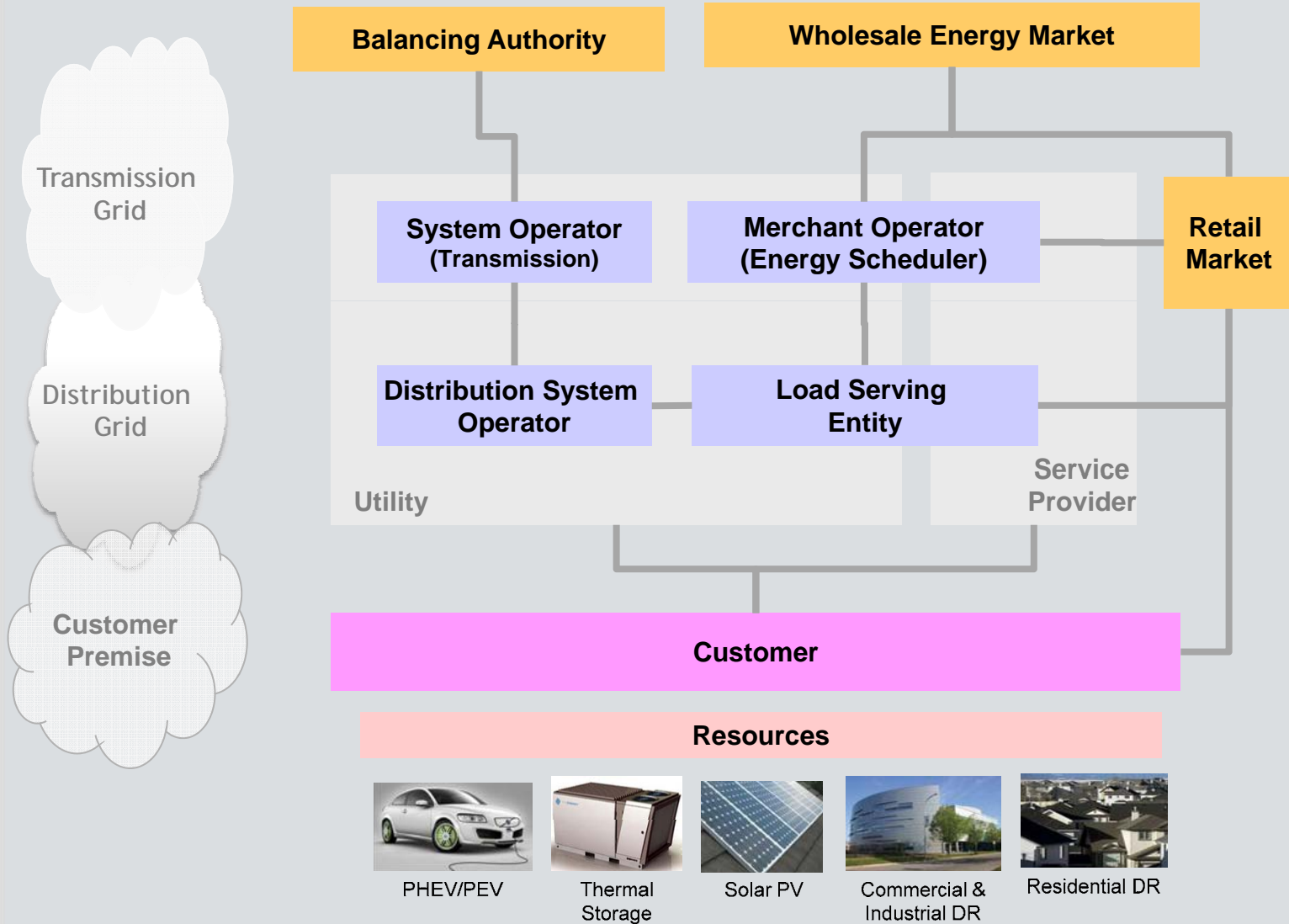
- DR Definition by DOE in its 2/06 report to Congress - subsequently adopted by FERC

*'Changes in electric usage by end-use customers from their normal consumption patterns in response to changes in the price of electricity over time, or to incentive payments designed to induce lower electricity use at time of high wholesale market prices or when system reliability is jeopardized.'*

- Some of the open issues:
  - *Does the scope cover DER*
  - *What is the end-to-end scope of coverage*
    - Definition of actors
      - *NIST definitions may not as comprehensive*
  - *What is the scope of functionality*
    - *Definition of Use Cases*
      - *NIST definitions may not be as comprehensive*

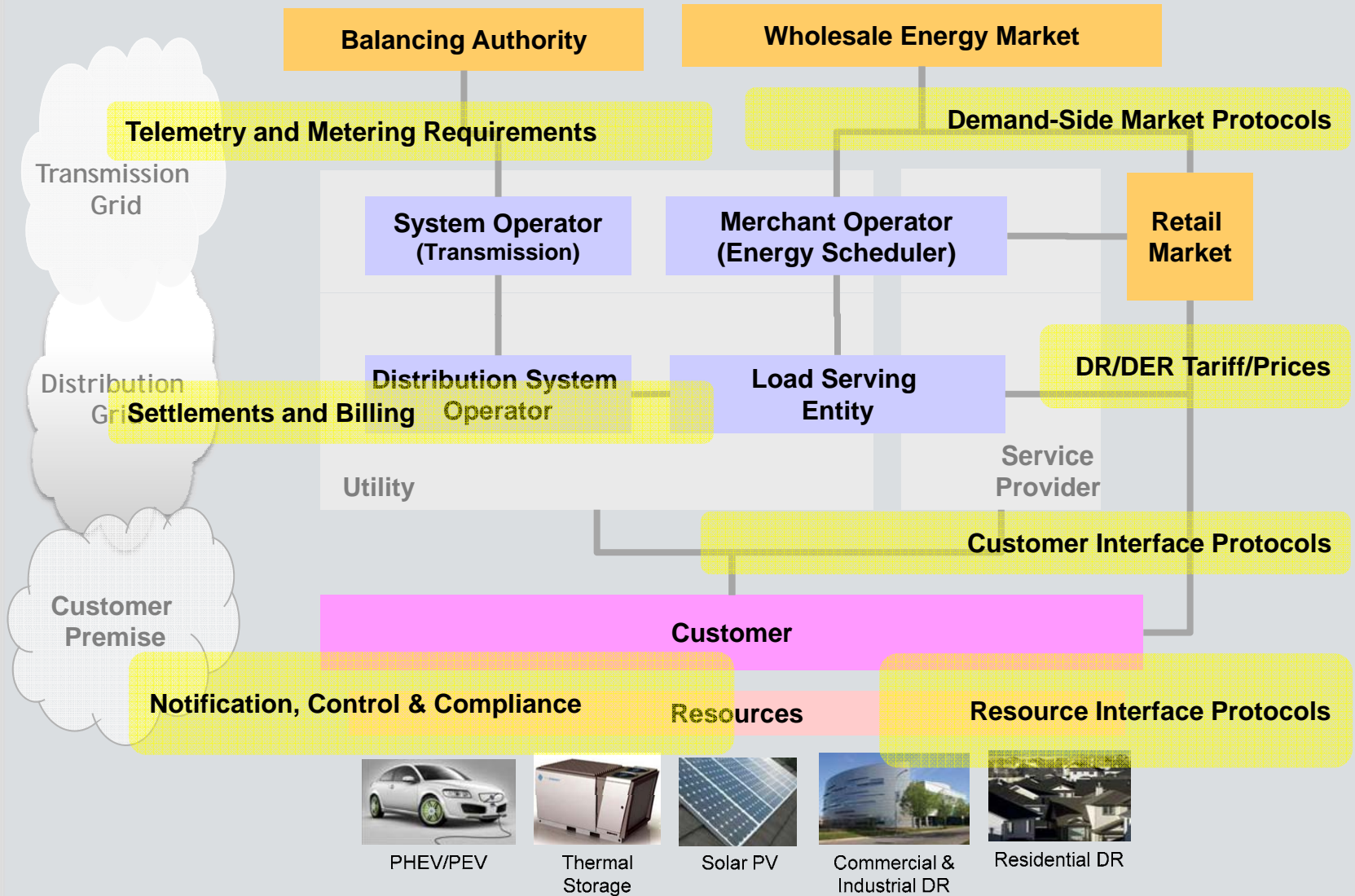


# Key Actors: For an End-to-end Operation





# Protocols and Standards Across the Seams





THANK YOU

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