RAP Energy solutions for a changing world

How to Address Interactions between Systems in Regulation

Technology Challenges and Regional Approaches for Integrating Renewables and Energy Security

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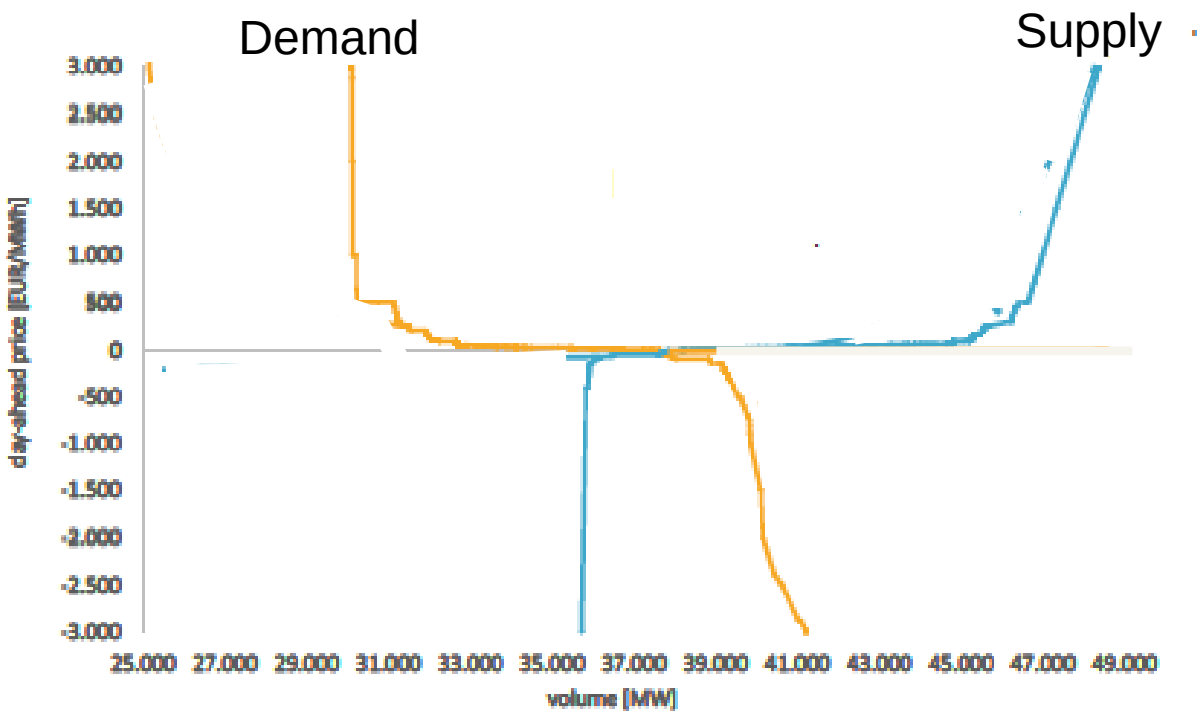
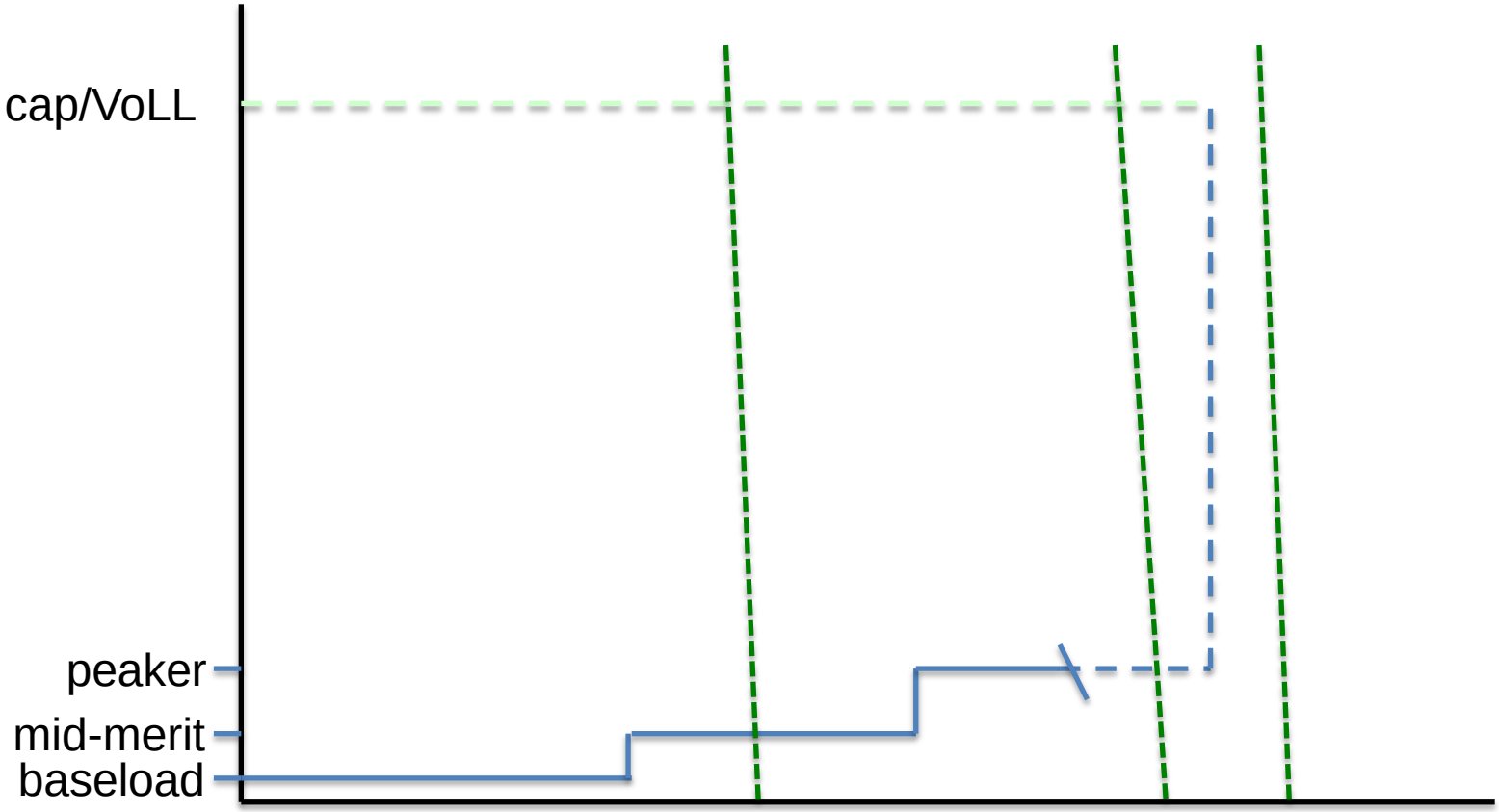
Supply & demand – the status quo…



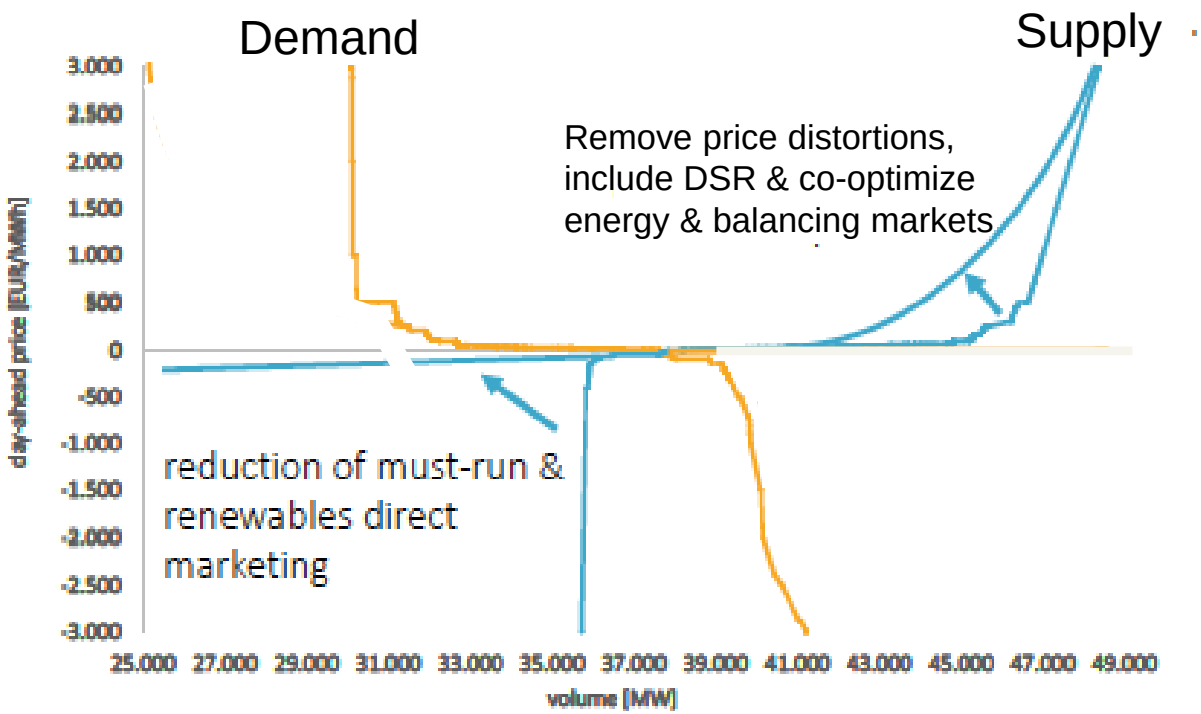
Source: Dr. Marco Nicolosi, Connect Economics

Supply & demand – the status quo…



...since 1929

Supply & demand – with proper energy market pricing…



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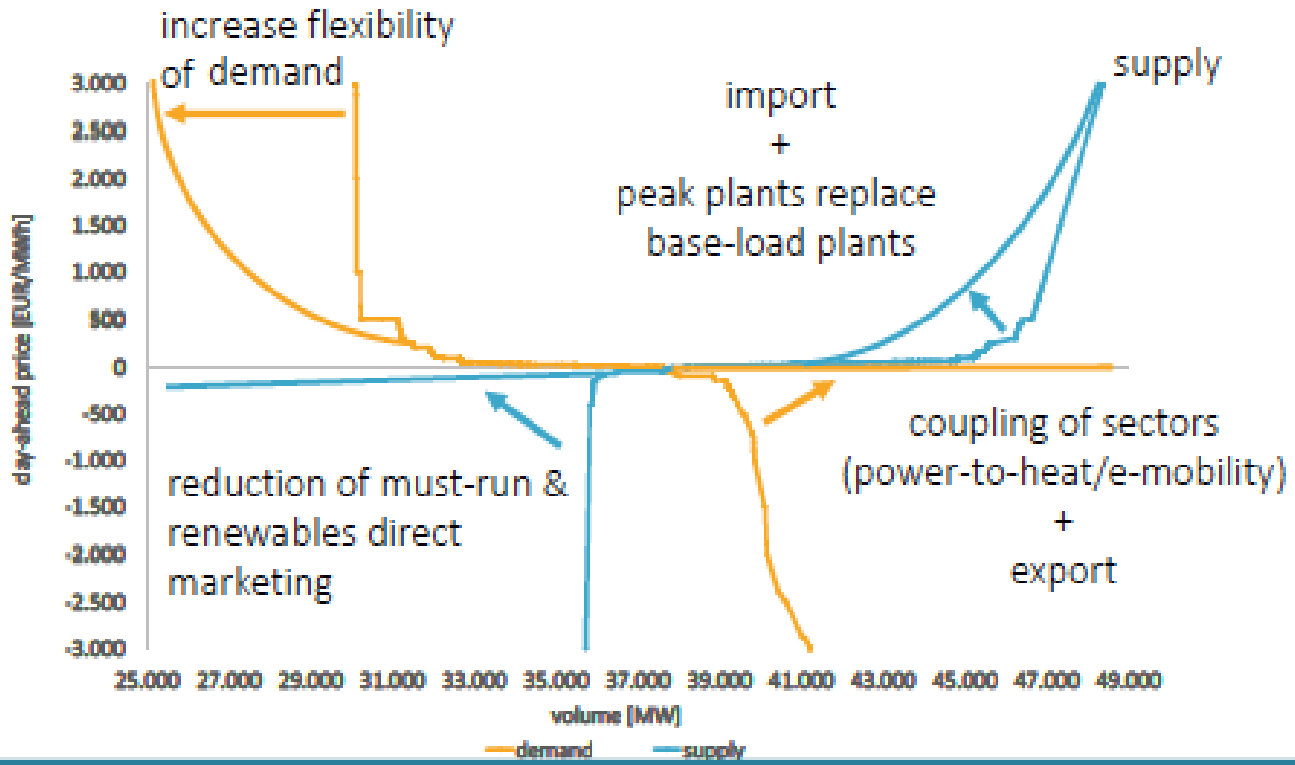
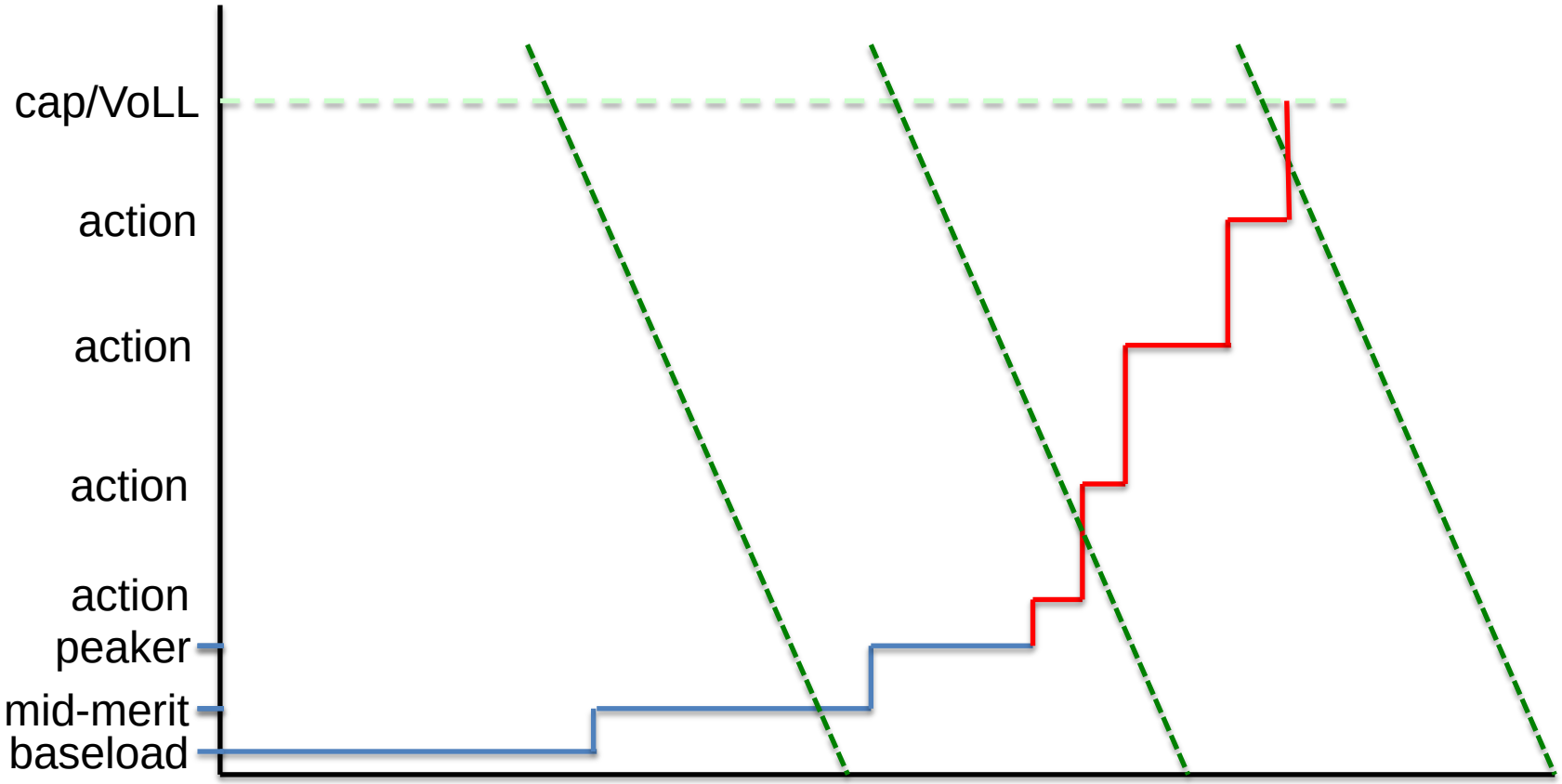
Supply & demand – new paradigm…



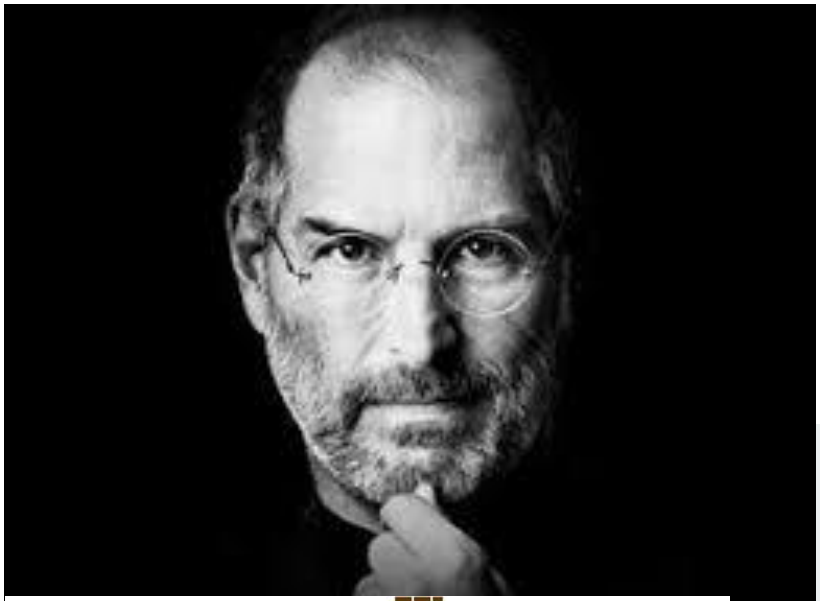
- An increase in flexibility leads to security and more meaningful price signals
- More flexibility options are available than the energy transition requires

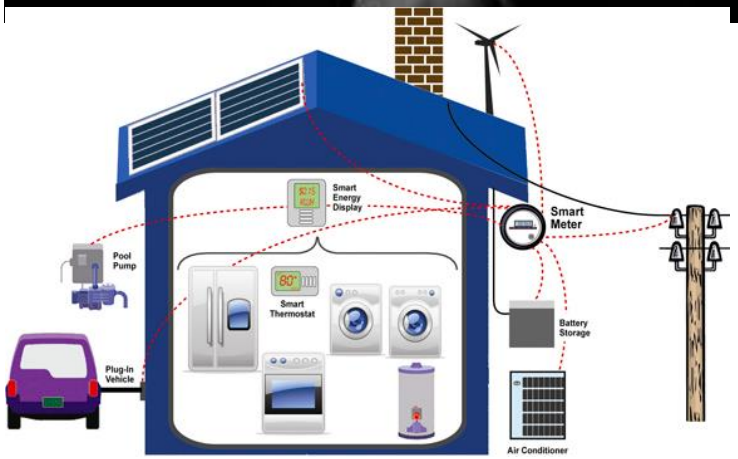
Source: Dr. Marco Nicolosi, Connect Economics

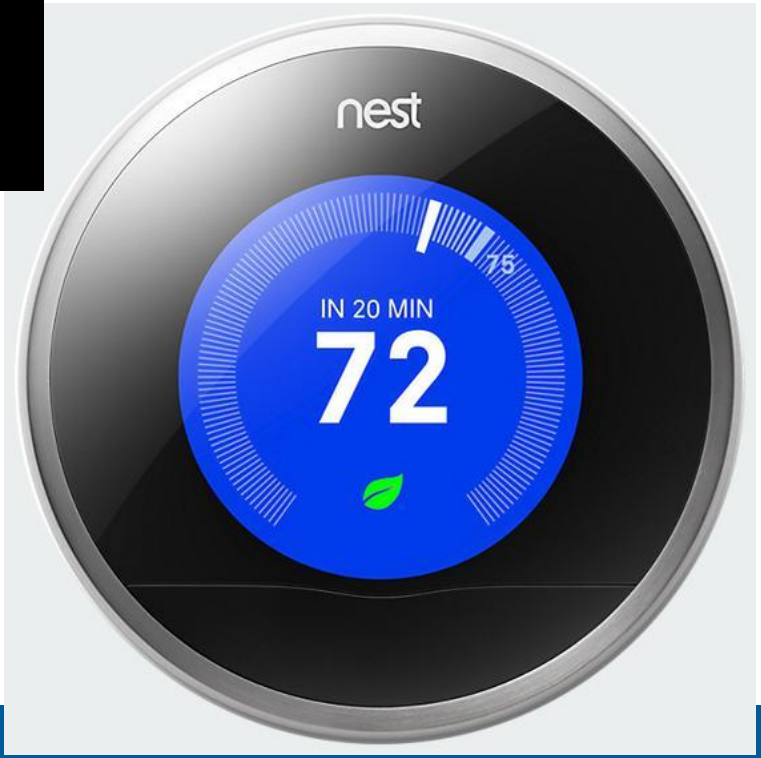
Supply & demand – new paradigm…



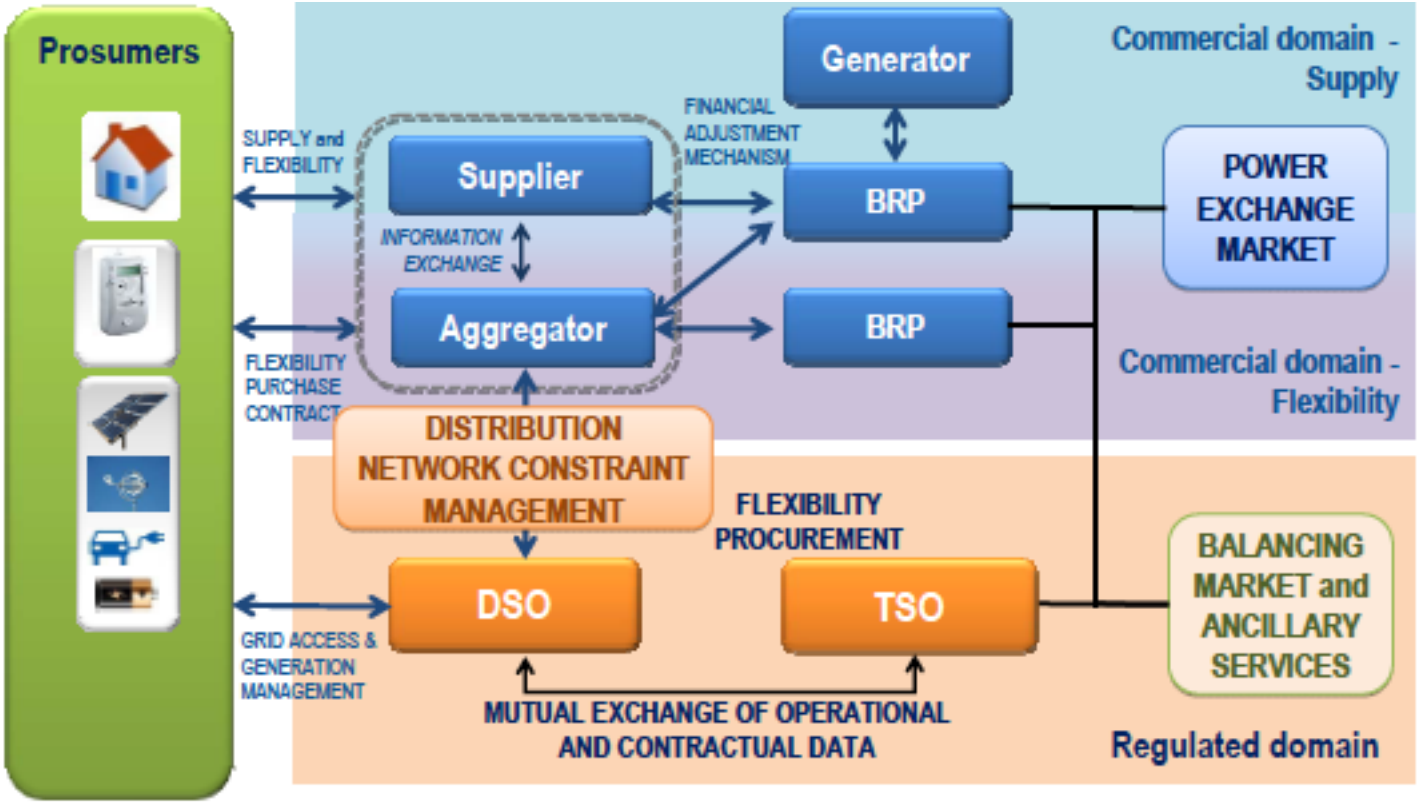
...customers in charge



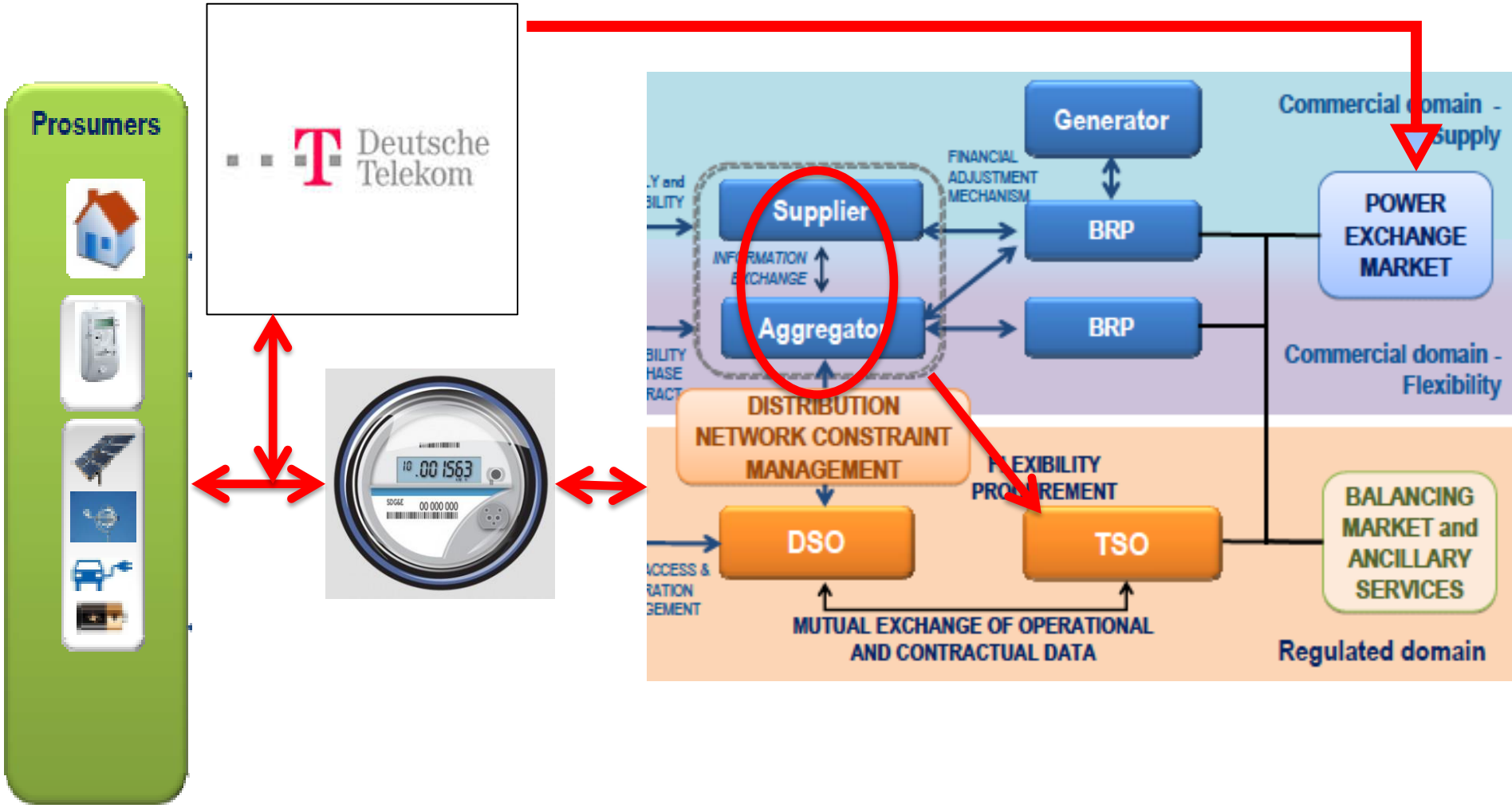




Current Proposal – "Add-on" to status quo

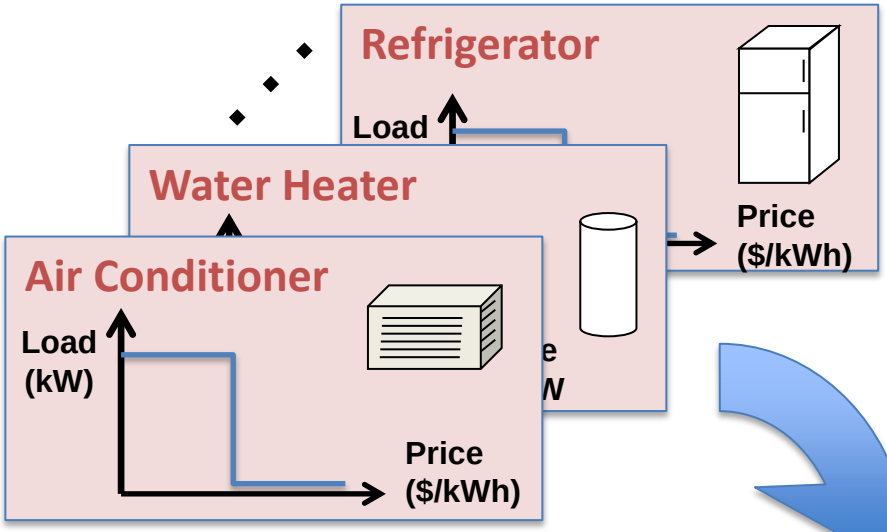


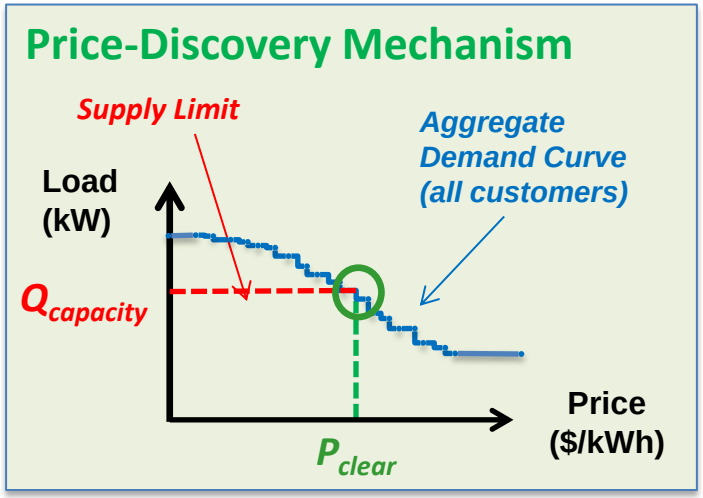
Coming soon – The dawn of the customer



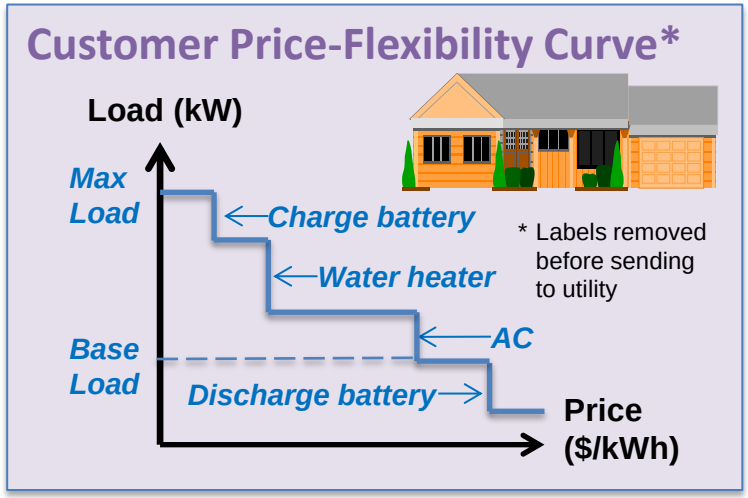
1. Automated, price-responsive device controls express customer's flexibility

4. Utility determines price at which grid objective achieved, broadcasts it to consumers



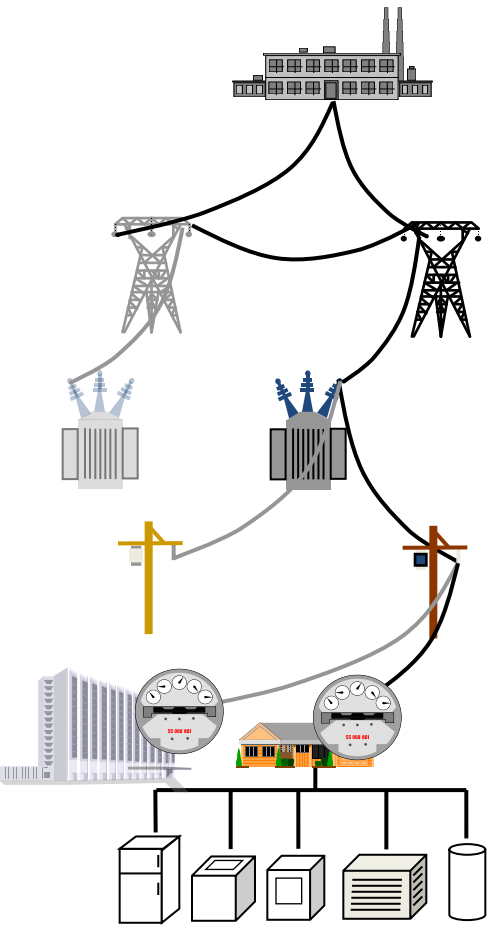


3. Utility aggregates curves from all customers

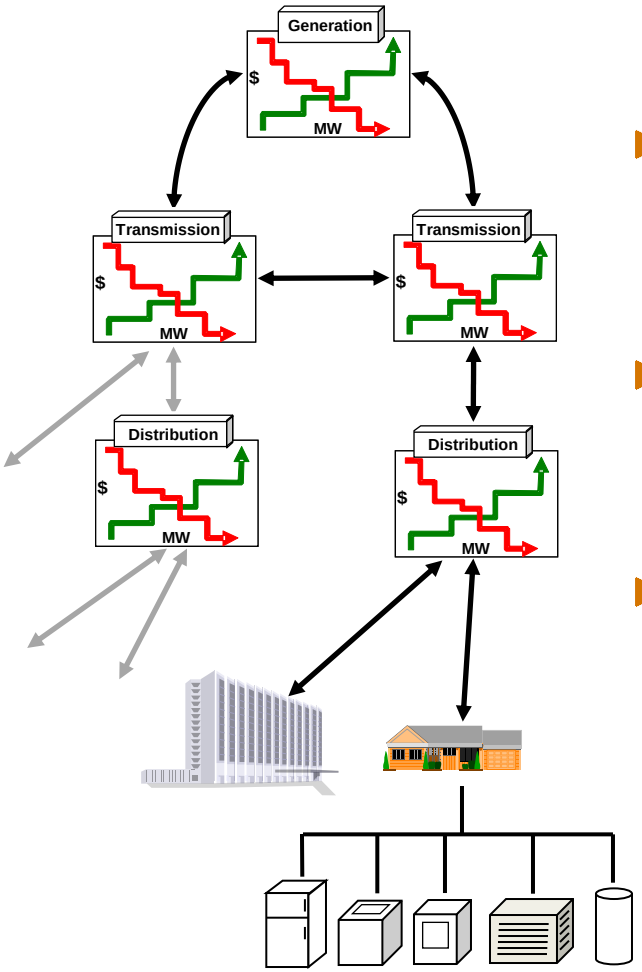


Transactive control concept

Hierarchical, nodal representation of power flow in grid



Transactive nodes localize price/incentive to manage flow of power



Transactive Node:

- Aggregates flexible net demand from nodes beneath it
  - Delivery + Consumption – Production
- Expresses need for supply as feed-back to node(s) above it
  - as function of price/incentive signal
- Quantity & price at each node resolved via price-discovery process
- Implements price-responsive controls for its own flexible assets
  - <u>responsiveness</u> is voluntary, set by owner
  - <u>response</u> is automated on behalf of owner

Transactive control concept

The myth of fixed costs

- Security of supply and RES-integration require flexibility
- Sufficient flexibility potential is available to allow for market-based competition
- Competitive and well connected markets are a great and efficient source of flexibility
- The EOM incentivises the optimal flexibility mix on the basis of reduced market and regulatory barriers
- Capacity markets are likely to create path dependencies and regulatory uncertainty, while reserve mechanisms are reversible, once the market is sufficiently flexible

Source: Dr. Marco Nicolosi, Connect Economics

Breaking down barriers across sectors

- Pry open markets to full competition
  - Adopt short-term auctions & products
  - Adapt qualifications for demand-side to participate
  - Regulate/eliminate incumbent supplier market power
- Remove price distortions, eliminate price caps
- Increase RES involvement in system balancing
- Promote dynamic pricing options
  - Including dynamic allocation of non-energy charges
- Phase out fixed & non-bypassable charges
- Minimize the role of fixed capacity mechanisms
- Promote increased responsiveness of CHP facilities

About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raponline.org

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