

Transactive Energy



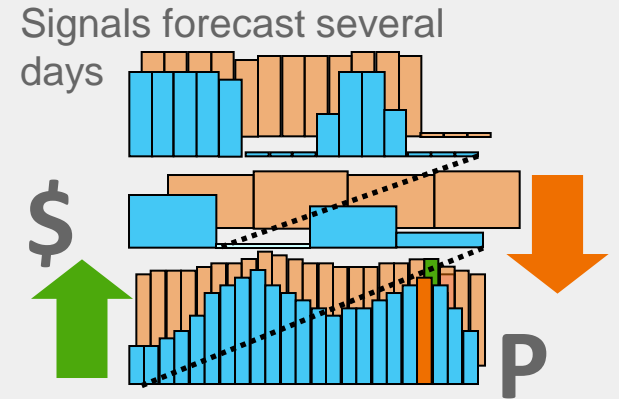
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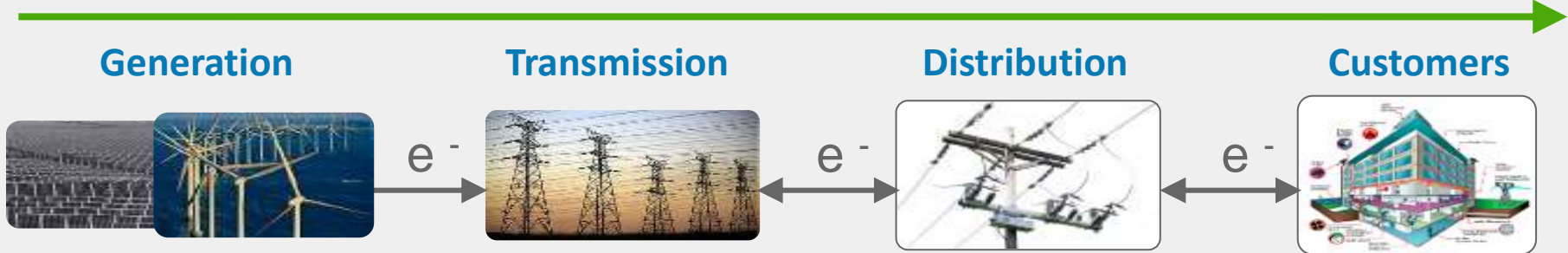
Project Introduction – Transactive Energy

An overlay approach utilizing economic value as a distributed control signal (don't assume it's a price signal!)

- All *business* and *operational* objectives and constraints can be assigned a value, and thereby incorporated into the signal



Transactive Incentive Signal (TIS): Reflects true cost of electricity at any given point



Transactive Feedback Signal (TFS): Reflects anticipated consumption in time

Transactive Energy

Challenge

Introduce technology to manage diverse devices and systems to manage Distributed Energy Resources along the electricity supply chain to increase energy delivery and consumption

Problem

- Need for increased reliability due to aged grid infrastructure
- Managing Green House emissions from coal powered plants
- Technology changes resulting in centralized to distributed power generation and management
- Lack of interoperability due to one way power deliver systems and architectures

Solution

- Real-time grid device automation
- Renewable generation incentives and mandates
- Distributed Energy Resources – Micro generation, distributed energy storage, EV, solar, wind generation and demand response
- Transactive Energy feedback signal (TES) to maximize power delivery and consumption

Benefits

Societal

- Consumer engagement
- Empowerment and control
- Environmental Sustainability

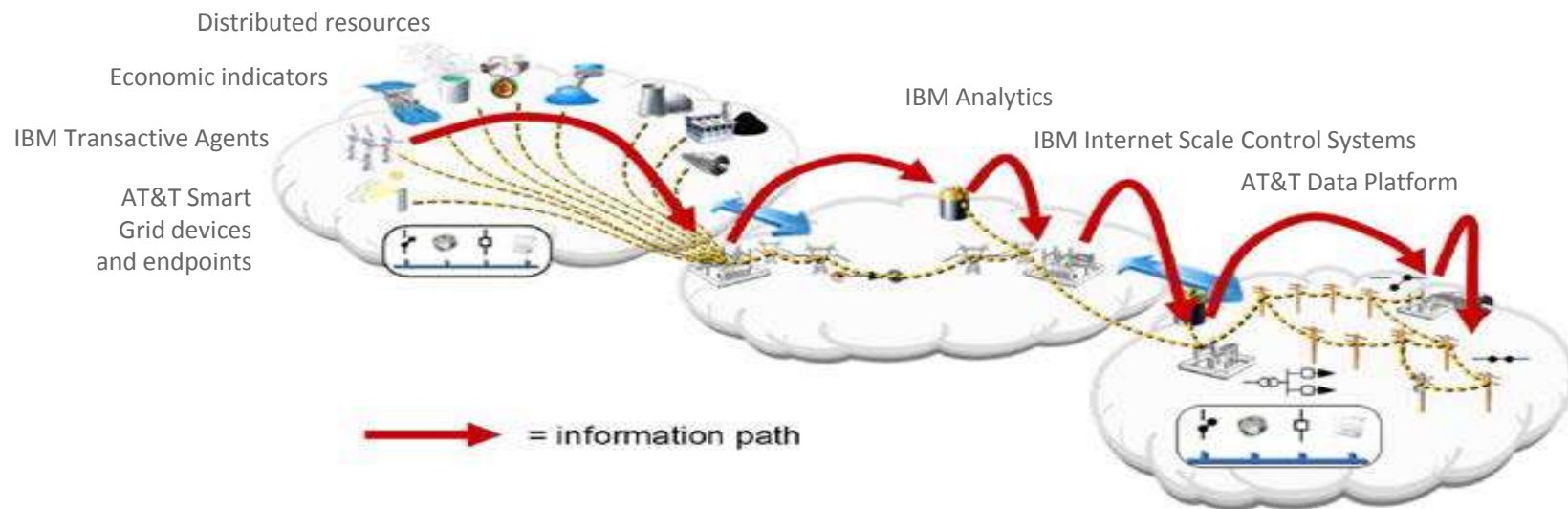
Commercial

- Support 30% carbon reduction by 2030
- Renewable job growth of ~15%
- Utility / Carrier Public Private Partnership

Goal

Overlay Transactive Control Nodes (intelligent software agents) in smart grid devices to manage Transactive Incentive and Feedback Signs to manage DER assets in electricity supply chain

Transactive Energy Management

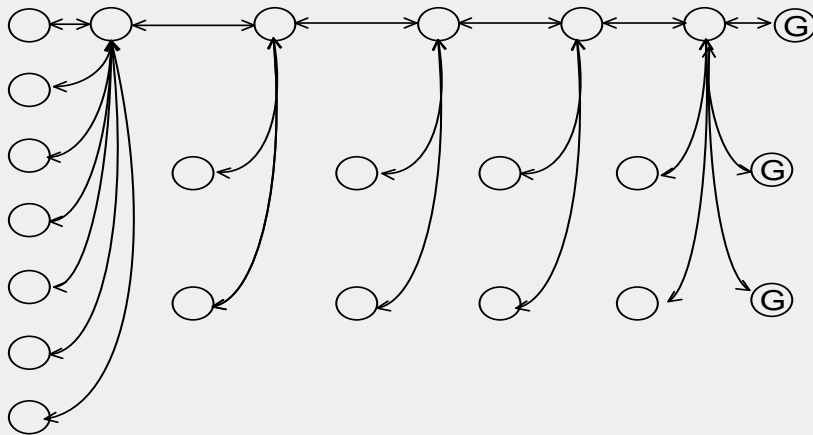


Manage diverse devices, systems and control signals along the electricity supply chain

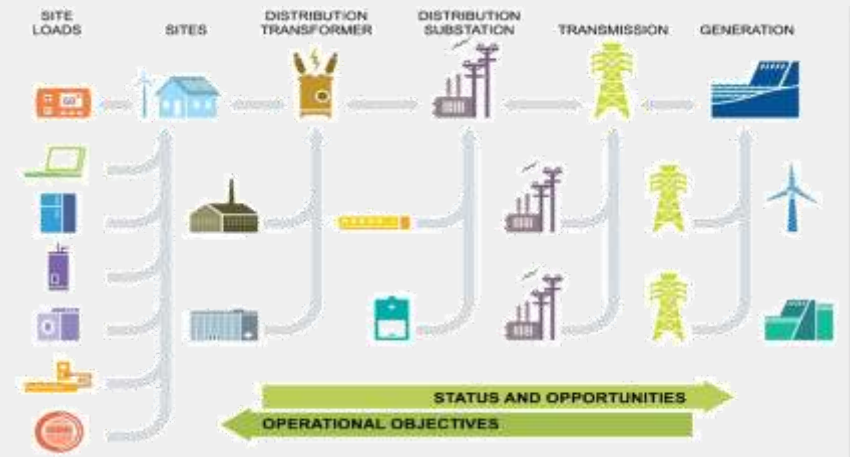
- Environmental sustainability
- Reduce carbon footprint
- Interoperate across systems
- Reduce outages
- Reduce outages
- Empower consumers
- Improve reliability and efficiency of electric system

Propagation of the Incentive and Feedback Signals

Incentive and feedback signals propagate through an information network (the Transactive Control System) that overlays the electrical network; the signals are modified by Transactive Control Nodes (software agents) that manage assets in the electric system or customer premises

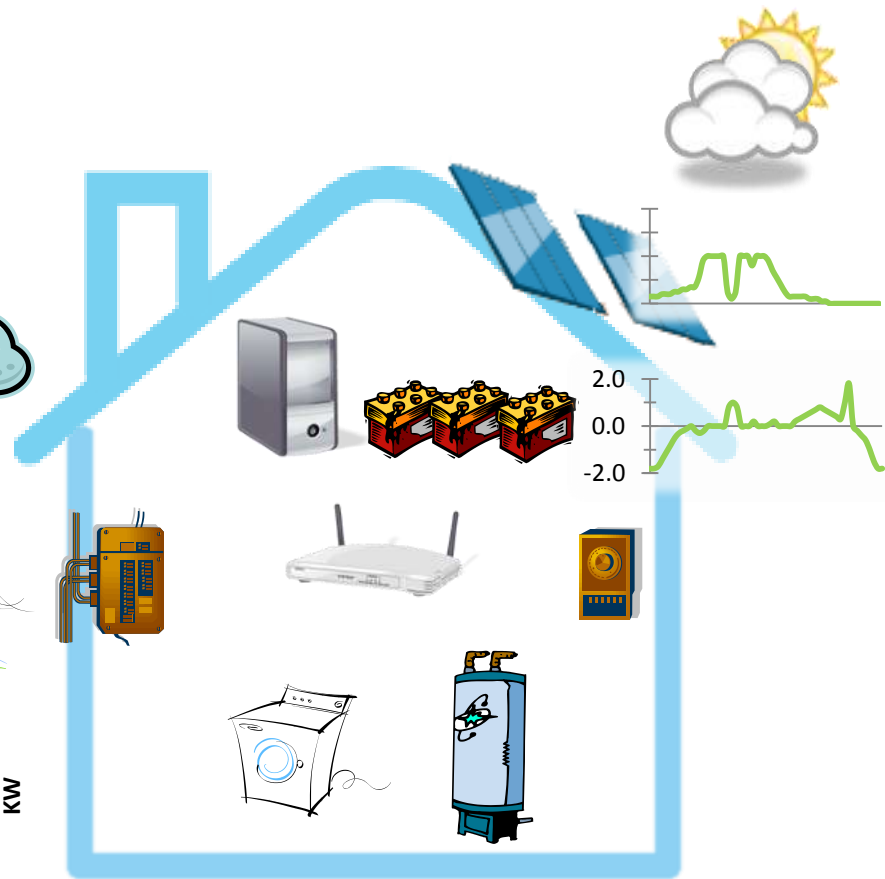
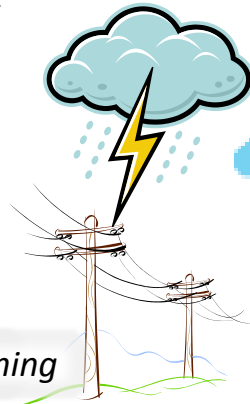
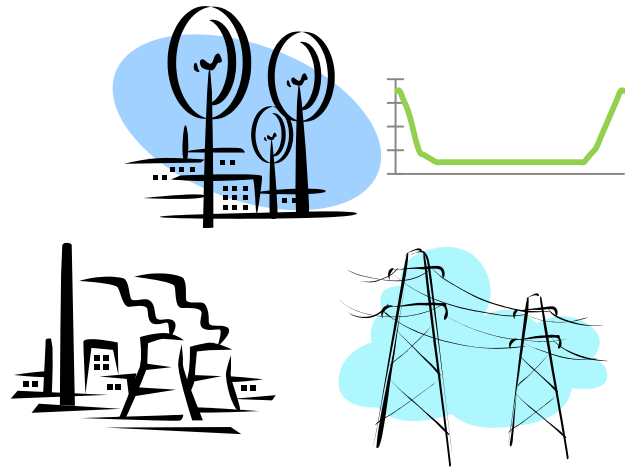


Information Network



Physical Network

Transactive Energy Scenario



Wind returns and load tails off in late evening

