

Transactive Energy

June 16, 2014

Presentation for the

DOE Electricity Advisory Committee

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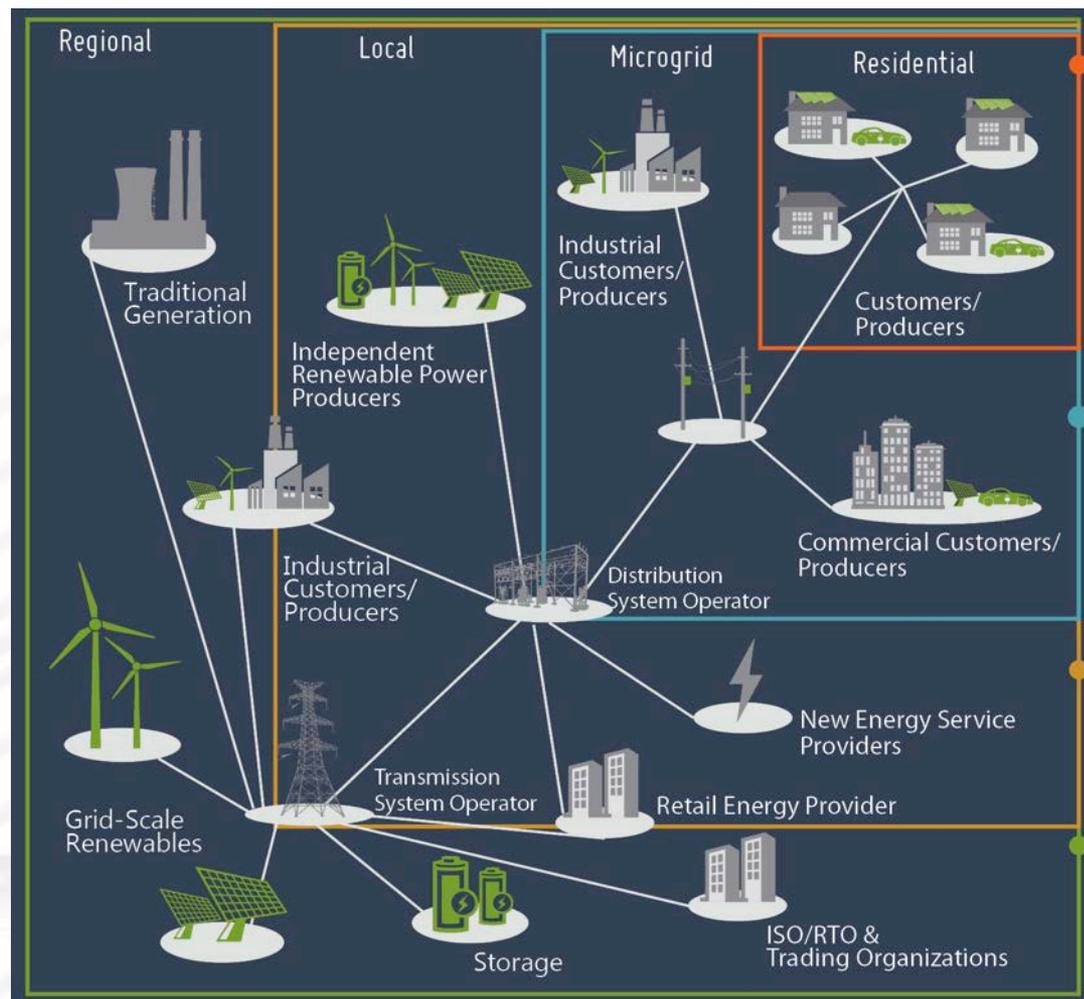
Administrator, GridWise Architecture Council

Motivation for Transactive Energy

The changing nature of the electric power system:

- Increased penetration of distributed energy resources
- Increased variability
- Intelligent devices – internet of things becoming our reality

TE responds to the need to manage such a system



Transactive Energy

Transparent energy prices enable customers of all sizes to join traditional providers in producing, buying, and selling electricity – using automated control – to drive a reliable and cost-efficient electricity system

Why it's important:

Customers can choose to produce, buy, and sell

energy while using dynamic prices and contracts to decide when to sell, when to buy, and when to adjust energy use for the most benefit

Clean energy resources are here to stay

on both small-scale customer sites and in large-scale production

Customers can prioritize what matters to them

—be it cost, reliability, profitability, or sustainability—using automated energy interactions

Resilient microgrids speed recovery from outages

in an increasingly complex and dynamic electric power system

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Provides speed and agility

Complex and dynamic system

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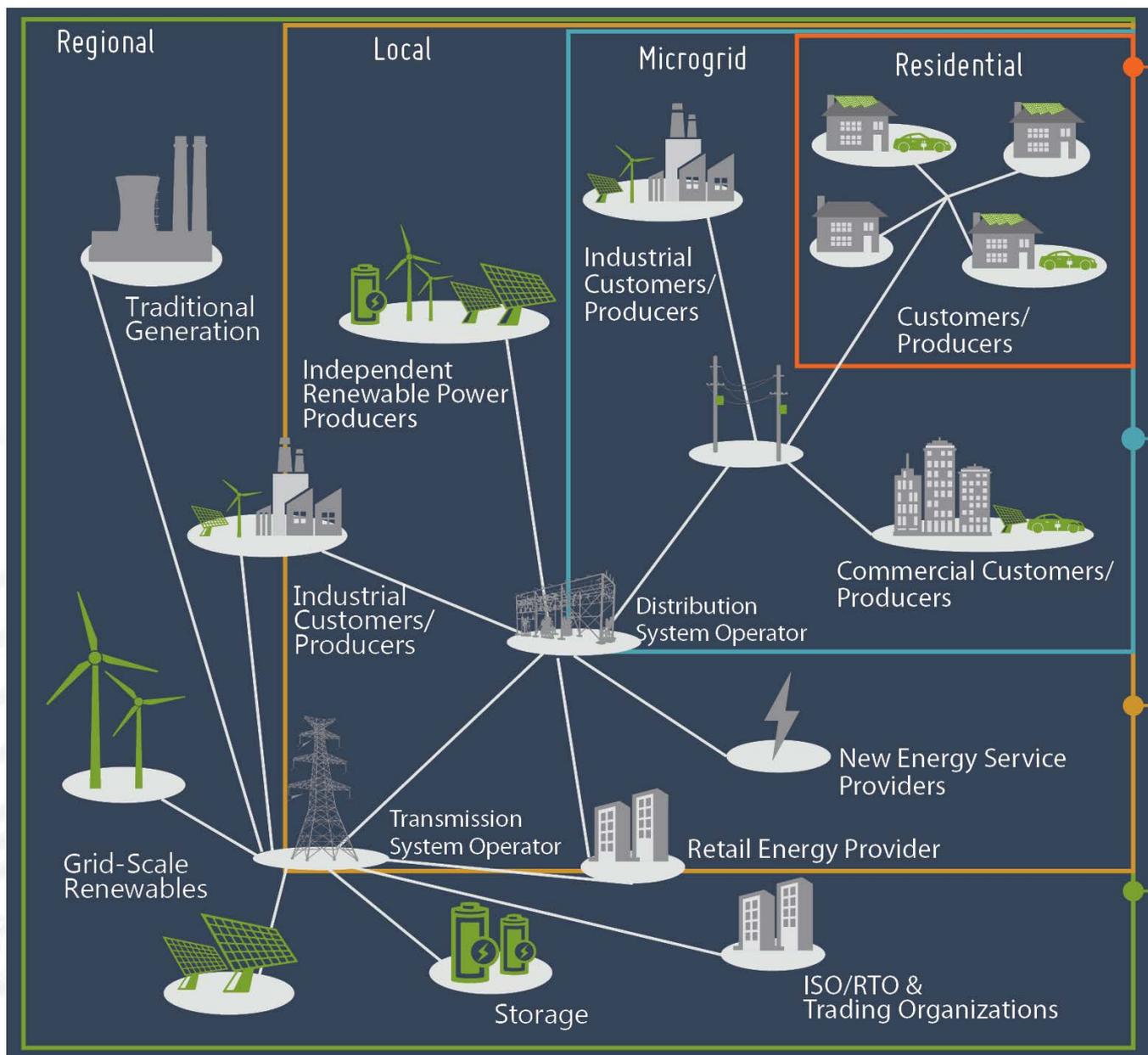
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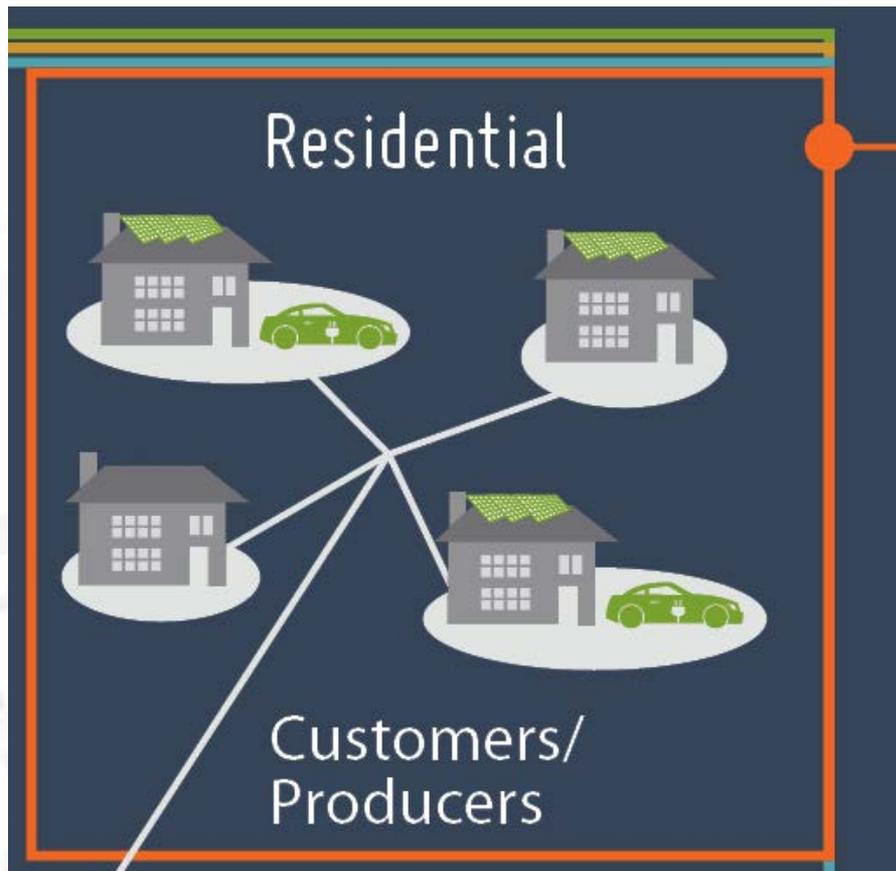
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Microgrids speed outages
complex and
power system

How it works:



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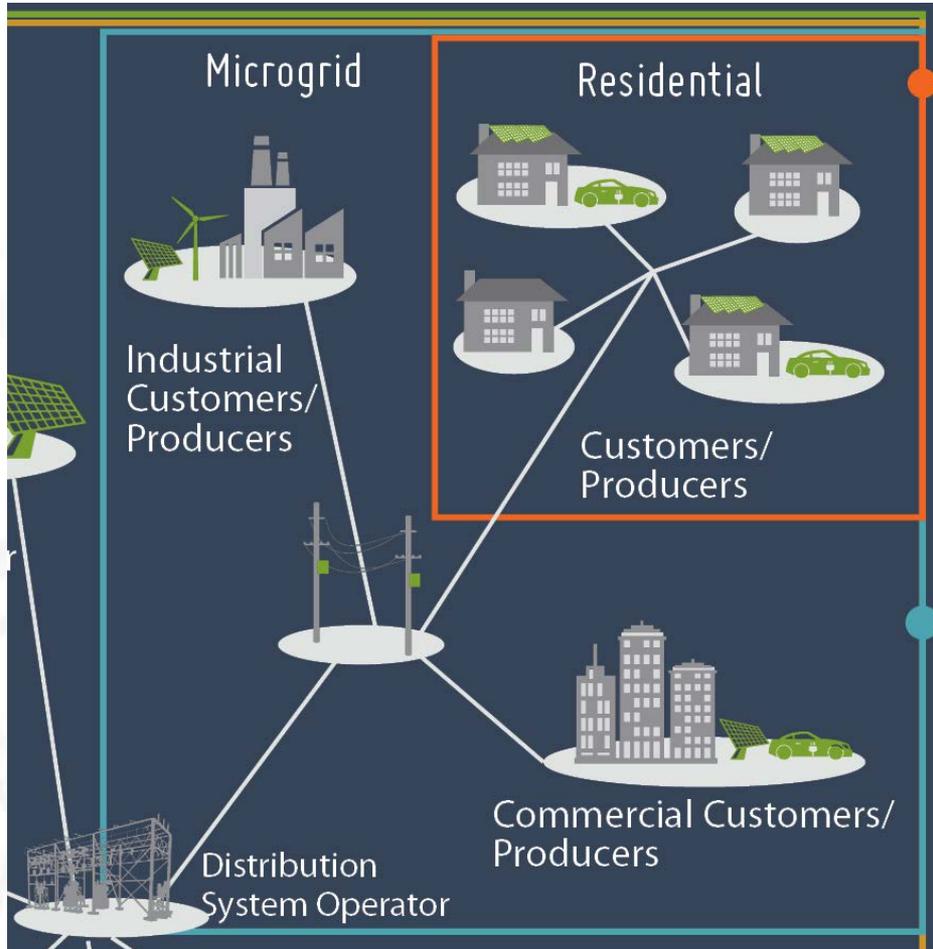


New customer choices

Customers can *choose* to:

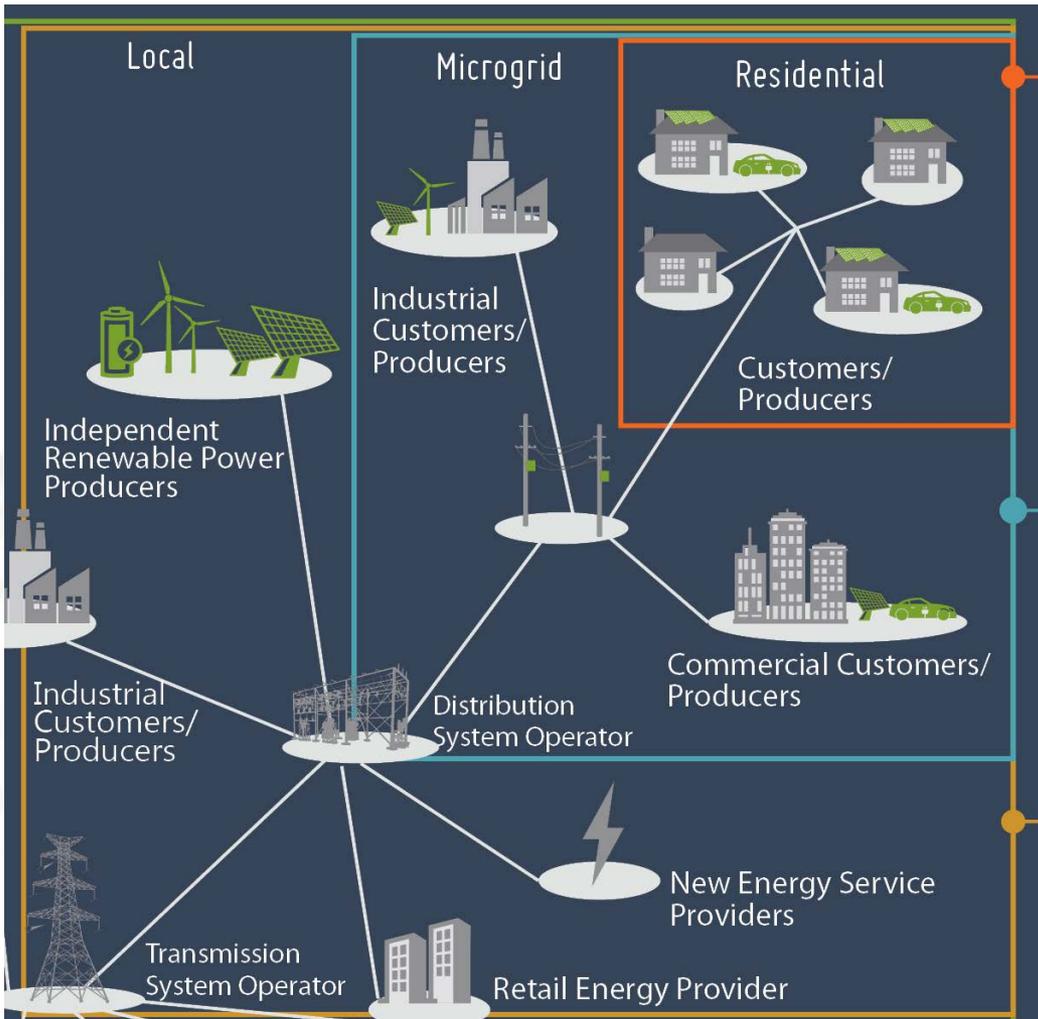
- Participate in responsive demand to reduce overall energy costs
- Produce and sell excess energy and services
- Buy energy from multiple sources based on cost and value
- Take advantage of new energy services

How it works



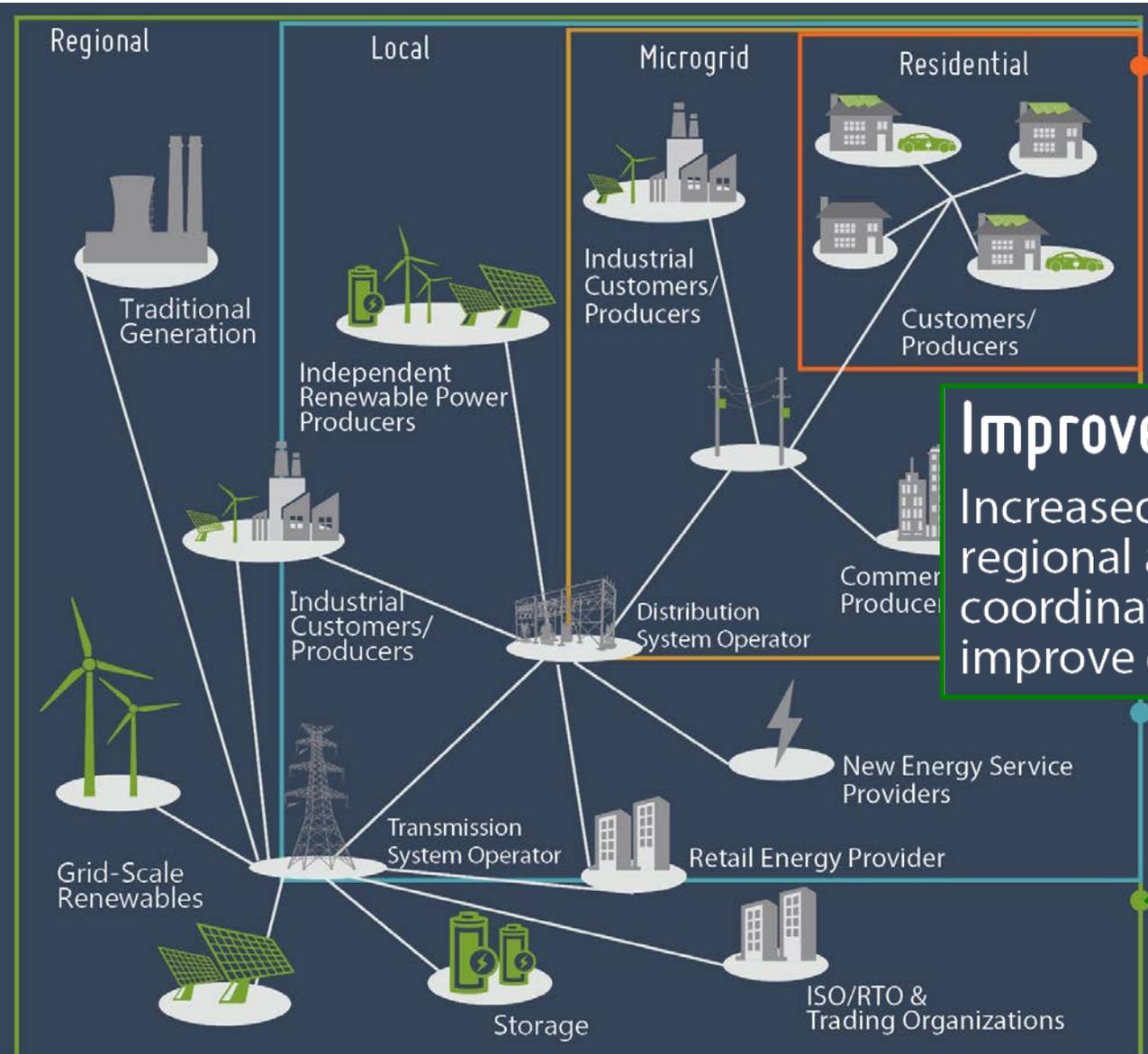
Resilient electric networks
 Advanced automation and control—from substations and wires to homes, buildings, cars, and appliances—allow flexible microgrids that enhance local and regional resilience

How it works



Expanded services
 New and wider data exchange unlocks opportunities for new services to customers

How it works



Improved regional integration
 Increased interoperability between regional and local markets coordinates energy resource use to improve efficiency and reliability

The benefit

Reliability

Integrates smart control and automation to manage renewables and balance local energy requirements without disruption

Affordability

Customers can choose to buy and sell energy using price information to best manage cost and priorities

Sustainability

Permits incremental grid modernization with secure, interoperable technologies while integrating renewable resources

Efficiency

Economic signals for conventional and distributed energy encourage the most reliable, energy-efficient production and delivery of electricity

The benefit

Reliability

Integrates smart control and automation to manage renewables and balance local energy requirements without disruption

Affordability

Sustainability

Efficiency

Integrates smart control and automation to encourage energy-efficient use of electricity

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The benefit

Reliability

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Affordability

Affordability

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Sustainability

Efficiency

Conventionally encourage energy-efficient use of electricity

The benefit

Reliability

Integrates smart automation to and balance load requirements

Affordability

Sustainability

Efficiency

Conventional encourage energy-efficient use of electricity

Sustainability

Permits incremental grid modernization with secure, interoperable technologies while integrating renewable resources

The benefit

Reliability

Integrates smart automation to meet and balance load requirements

Affordability

Sustainability

Efficiency

Conventional energy production encourages energy-inefficient production of electricity

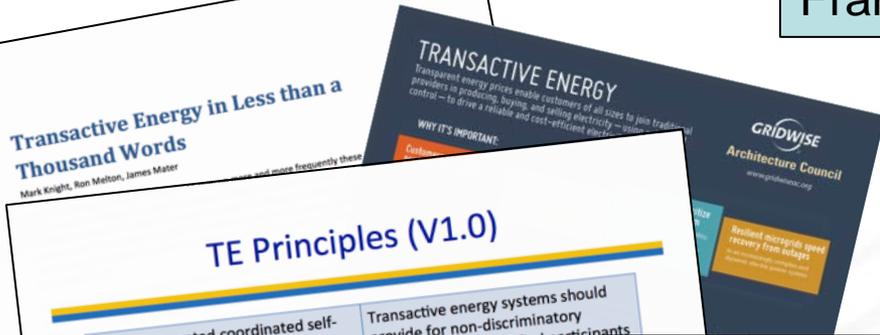
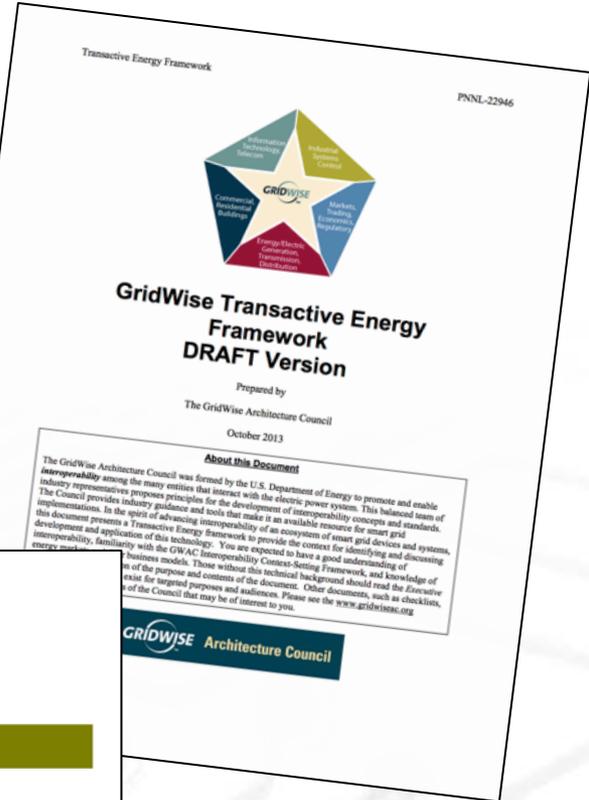
Efficiency

Economic signals for conventional and distributed energy encourage the most reliable, energy-efficient production and delivery of electricity



Next steps

Update and expand TE Framework



TE Principles (V1.0)

Highly automated coordinated self-optimization	Transactive energy systems should provide for non-discriminatory participation by qualified participants
Transacting parties are accountable for standards of performance	Transactive energy systems should be observable and auditable at interfaces
Maintain system reliability and control while enabling optimal integration of renewable and distributed energy resources	Transactive energy systems should be scalable, adaptable and extendable across a number of devices, participants and geographic ex

Principles: High level requirements for TE systems that provide additional point of reference for communicating with stakeholders, identifying common ground within the transactive energy comm




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Continued outreach to regulators and policy makers

Continue to build the community