

Grid Modernization Challenges and Developments

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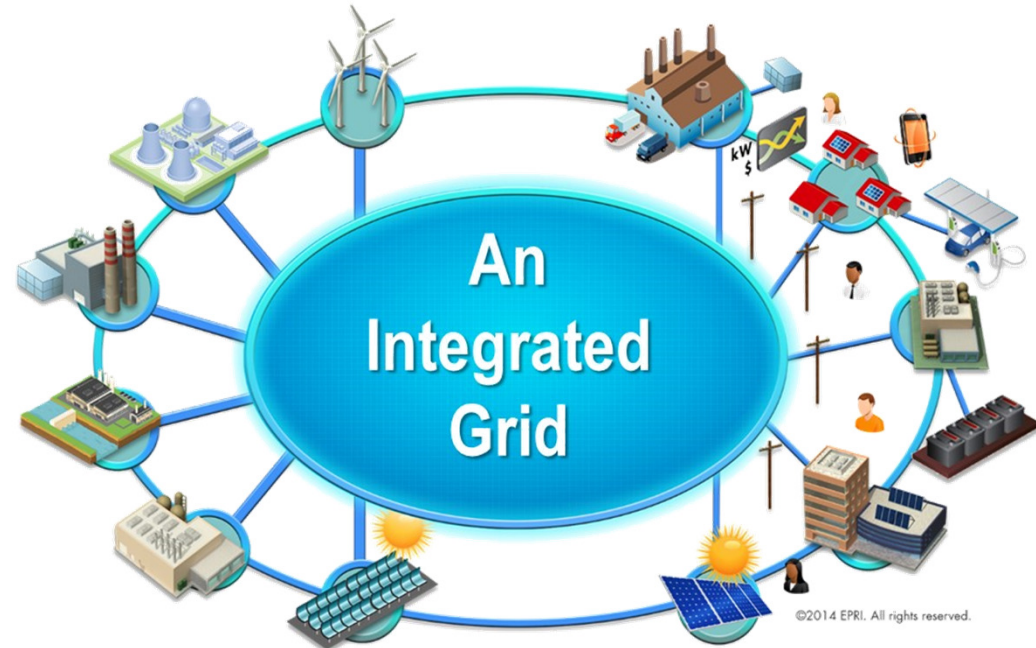


Wednesday 10 May 2017

**Modern Grid Technology and Leading Practices Workshop
State of Modern Grid Panel Session**

Key Challenges for the Integrated Grid

1. Architecture
2. Planning Models and Tools
3. Real Time Operations
4. Integrating Distributed Controls
5. Flexibility – Energy Storage
6. Reliability and Resiliency – Microgrids
7. Integrating the Customer
8. Communications Infrastructure
9. Cyber Security
10. Regulatory and Market Models



Industry Developments - US

REV is a strategy to build a clean, resilient, and affordable energy system for all New Yorkers.

REV is transforming New York State's energy policy and initiatives to make sure energy efficiency and clean, locally produced power are at the core of the State's energy system.

REV is changing the way government and utilities work to make clean energy financially beneficial to everyone. And most importantly, REV is putting customers first by designing new initiatives to impact real people and provide individuals and communities with the opportunity to take an active role in achieving the following State energy goals by 2030.

Why SRP's controversial demand charge unlocks a huge opportunity for solar-plus-storage

The utility wants customers to help with peak demand but they may buy batteries instead of more grid power.

A
VIRTUAL POWER PLANT
IN
GLASGOW, KY

Virtual Peaker

How California's biggest utilities plan to integrate distributed resources

New plans filed with state regulators show where DERs should go and how much they are worth to utilities

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

IEEE Standards

1547™

IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems

Standards Coordinating Committee 21

Sponsored by the Standards Coordinating Committee 21 on Fuel Cells, Photovoltaics, Dispersed Generation, and Energy Storage



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Architecture Council

www.gridwiseac.org

European Coordination



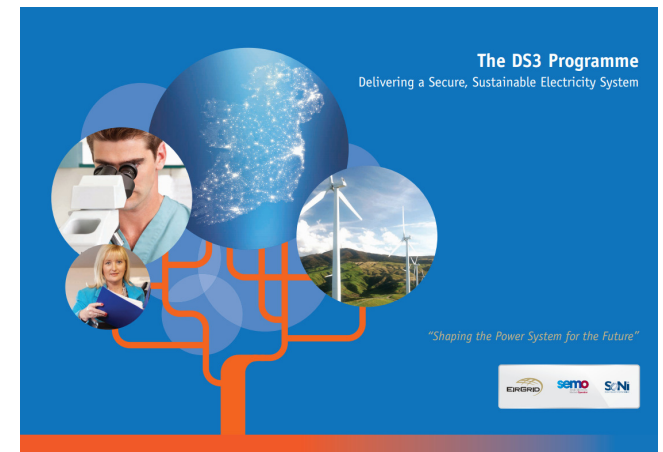
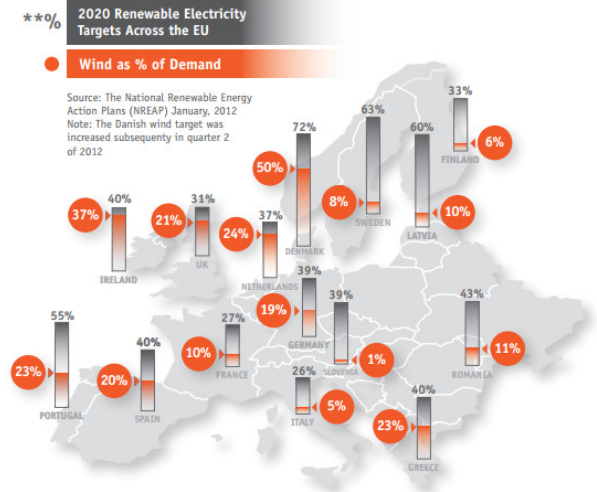
- BRIDGE (29 Projects)**
- Customer Engagement
 - Business Models
 - Regulations
 - Data Management



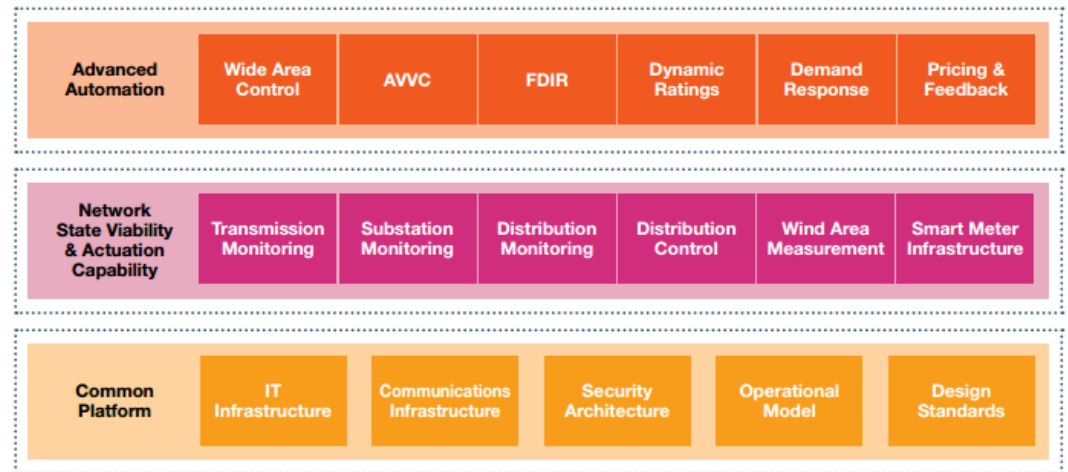
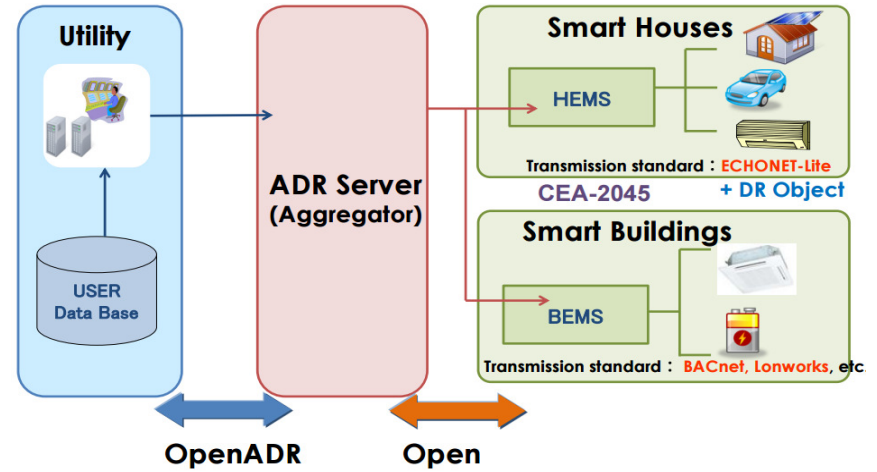
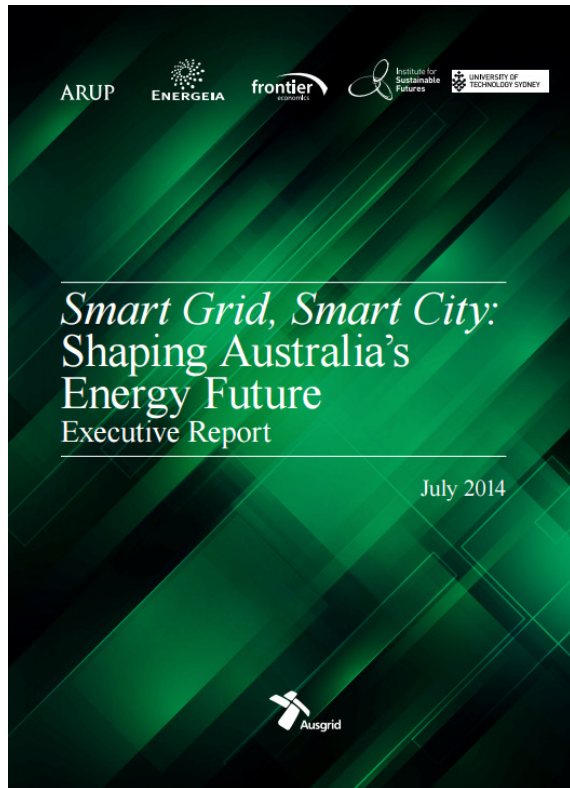
FLEXICIENCY



2020 Renewable Electricity Targets Across the EU



Japan and Australia





Together...Shaping the Future of Electricity