



The Future of Microgrids in 4 minutes

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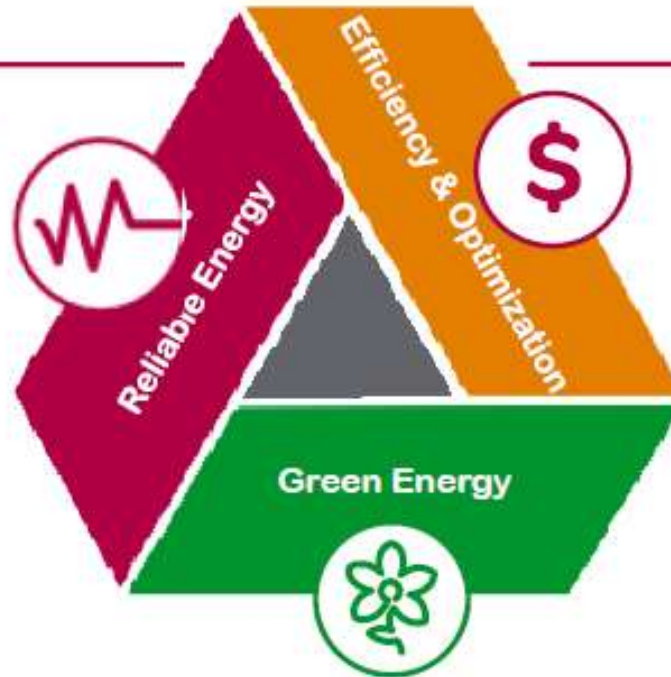
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The Microgrid drivers

Customization of DERs to deliver enhanced reliability; efficiency and optimization; and environmental benefits.

Reliable Energy

- Ability to proactively island from utility and reconnect
- Preserve critical loads 24/7/365
- **Repurposing** grid tied inverters for island mode operation
- Determine root cause of outages and restore power quickly



Efficiency & Optimization

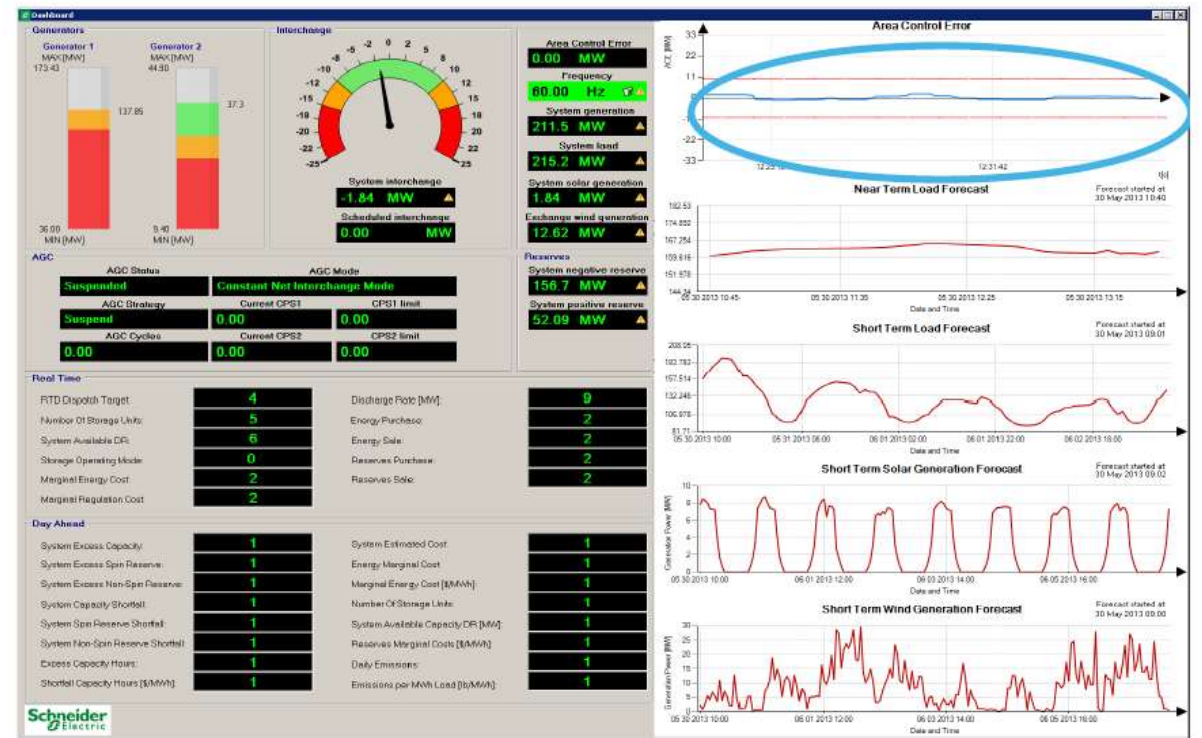
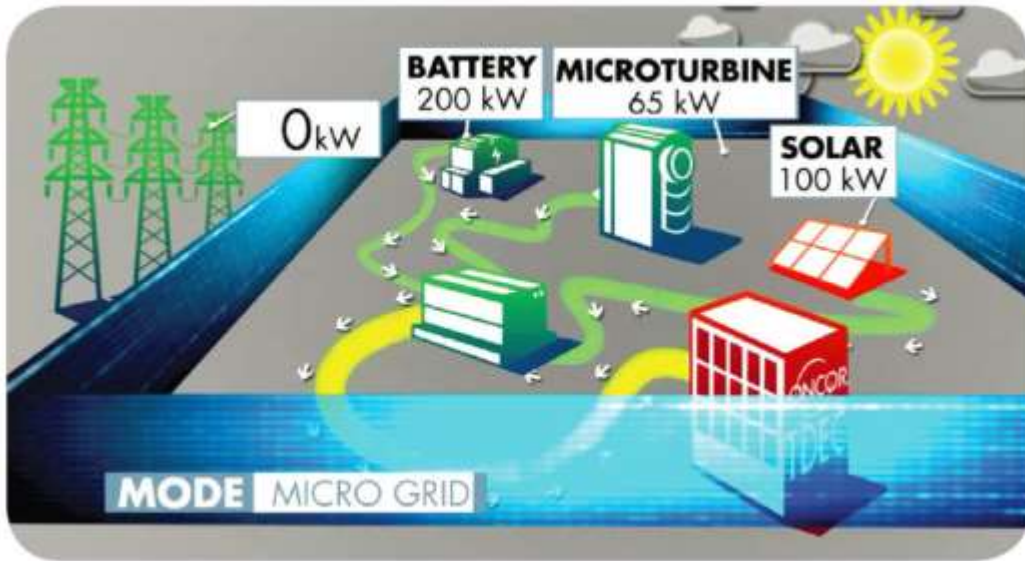
- Minimize energy costs through fuel switching, load control and grid services
- Prioritize most critical loads
- **Have** energy flexibility with the grid
- Harness combined heat and power, maximize incentives

Green Energy

- Incorporate low cost solar, CHP and other Distributed Energy Resources
- Implement net-zero projects, reducing carbon footprint
- Store energy for stability and grid services

Microgrids Today

- ❖ Emergency back up
- ❖ Island mode
- ❖ Diesel Generators
- ❖ Isolated Location or Critical Infrastructure
- ❖ One-way communication



Microgrids of the (near) Future

- ❖ Energy savings in non-emergency mode
- ❖ Operation parallel to the main grid
- ❖ Renewable energy and storage
- ❖ A portfolio of buildings, “nega-watt” powerplants
- ❖ Two-way communication and demand-response

Oncor, Texas Utility Microgrid: good example of a bridge to the future. Please, see the NEMA booth for the video on the groundbreaking Oncor microgrid.

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Demand-response

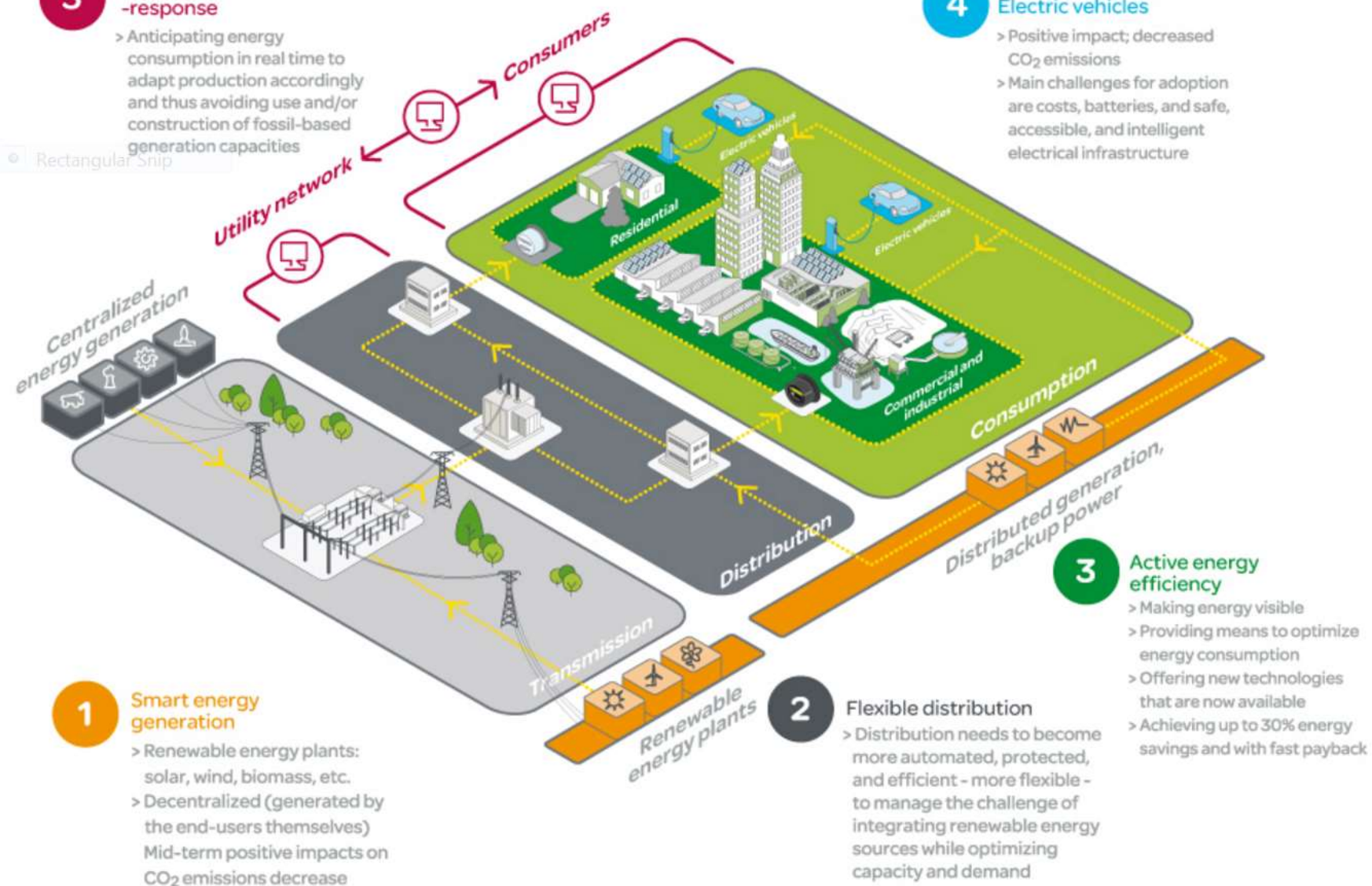
- > Anticipating energy consumption in real time to adapt production accordingly and thus avoiding use and/or construction of fossil-based generation capacities

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Electric vehicles

- > Positive impact; decreased CO₂ emissions
- > Main challenges for adoption are costs, batteries, and safe, accessible, and intelligent electrical infrastructure

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The five main triggers of the Smart Grid

1. With renewable energy, consumers can produce their own energy and access a 'greener' energy mix
2. Flexible distribution enables a more responsive and stable electrical network
3. Active energy efficiency and energy management make energy visible and allow individuals to act on their consumption
4. Electric vehicles are revolutionizing the perception of mobility and, at the same time, access to energy, its use, and storage
5. Real-time grid management enables anticipation of consumption and adaptation of the offer