

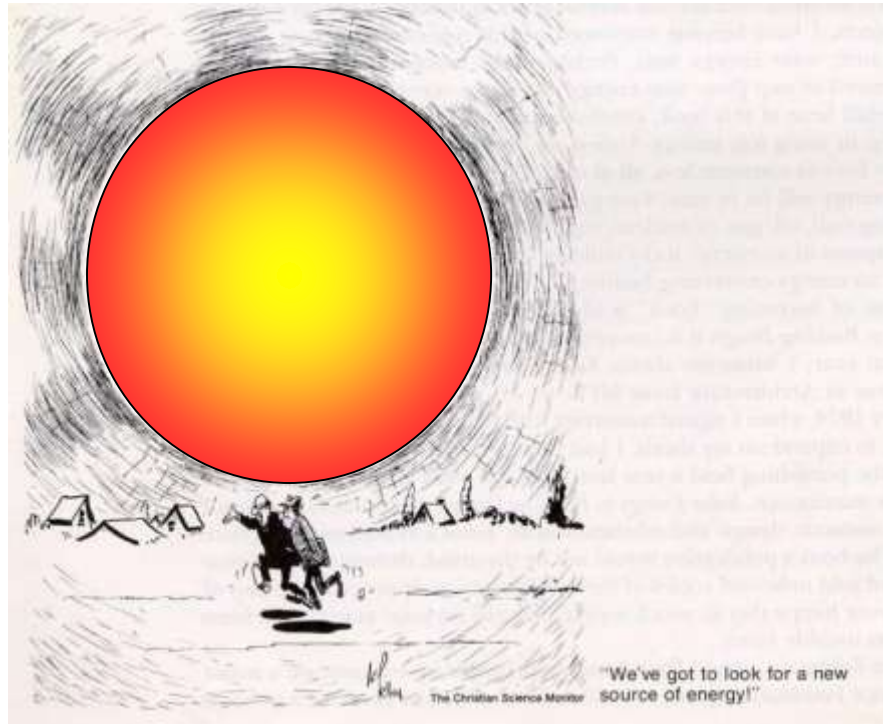
Smartgrid, Storage, EV, & RE generation = Paradigm Shift



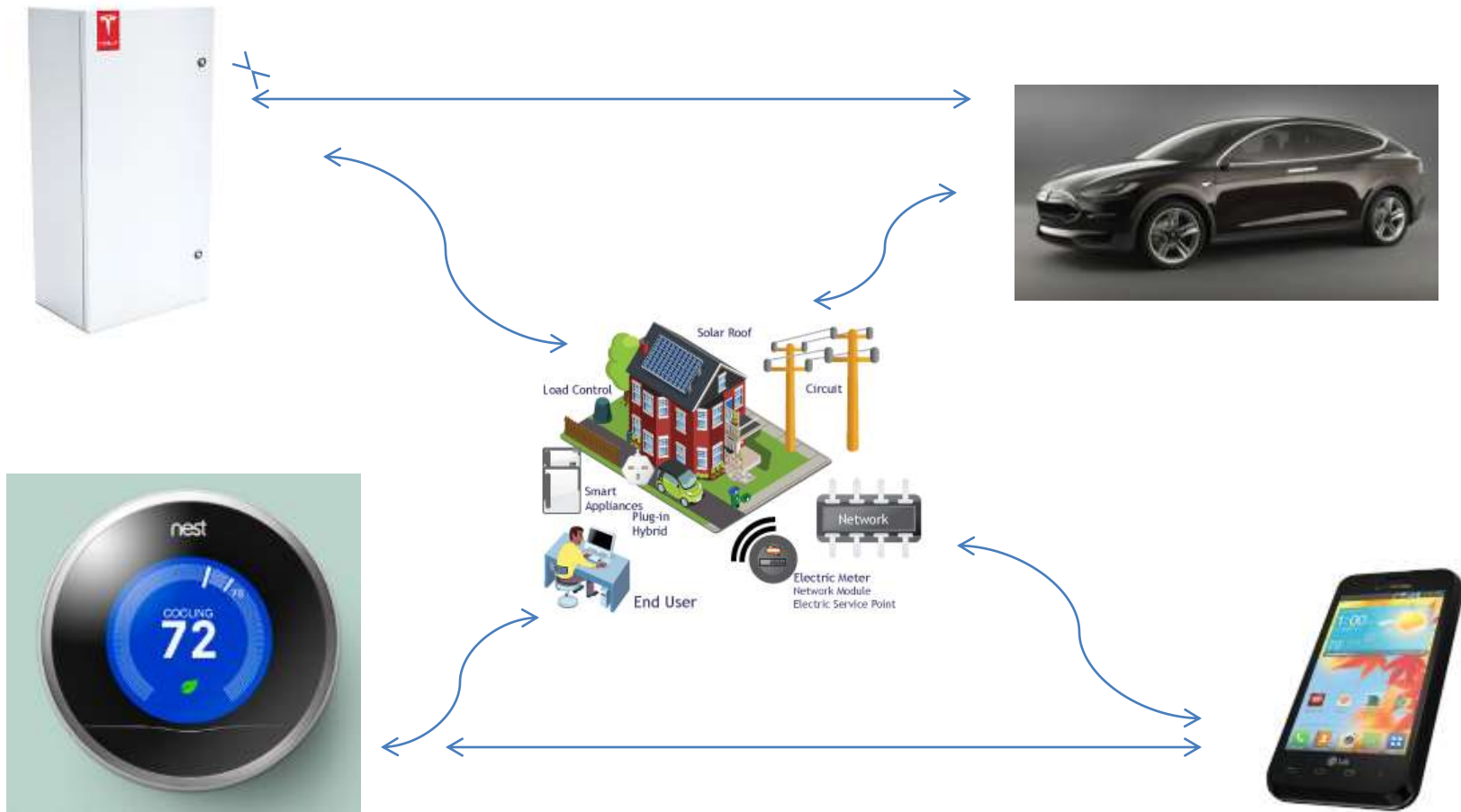
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Bob Leker, RE Program Manager





How are these all connected?



Paradigm Shift

- You, your EV car, your home, and rooftop solar w/ storage – *could soon be your own utility!* (or be integrated into a internet connected grid)
- Commercial micro-grids being demonstrated – VT 2MW solar & 4 MW storage
- Hawaii is integrating RE (wind/solar) w/ battery storage
- CA has a 1200 MW by 2020 battery component as part of its RPS

Smartgrid/Distributed RE/Storage

Challenges

- Intermittency of RE
- Emerging technology – esp batteries
- Cost
- More complex, more data points

Benefits

- Diversified portfolio
- Better damage control
- Cleaner/more efficient
- Better demand control
- More resiliency
- Long term cost stability

NC – smartgrid/storage research/demo

- **NCSU Freedom Center (NCSU)** (Future of Renewable Electric Energy Delivery and Management Systems Center)
 - FREEDM System demonstration lab w/ 1 MW solar, plug & play storage/end use devices
 - Part of a network of Energy Research Centers includes: FSU, Florida A&M, Missouri State, Arizona State
- **EPIC (UNC Charlotte)** - Energy Procurement and Infrastructure Center
 - sophisticated smart grid lab
 - Provides advanced training in grid management and utility operation
 - Networked w/ over 250 organizations including: Duke Energy, Siemens, AREVA, Westinghouse, and the Electric Power Research Institute (EPRI)

Segue to more discussion.....

- Update on electric vehicles at DOD
- Integrating RE and batteries

Thanks

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