

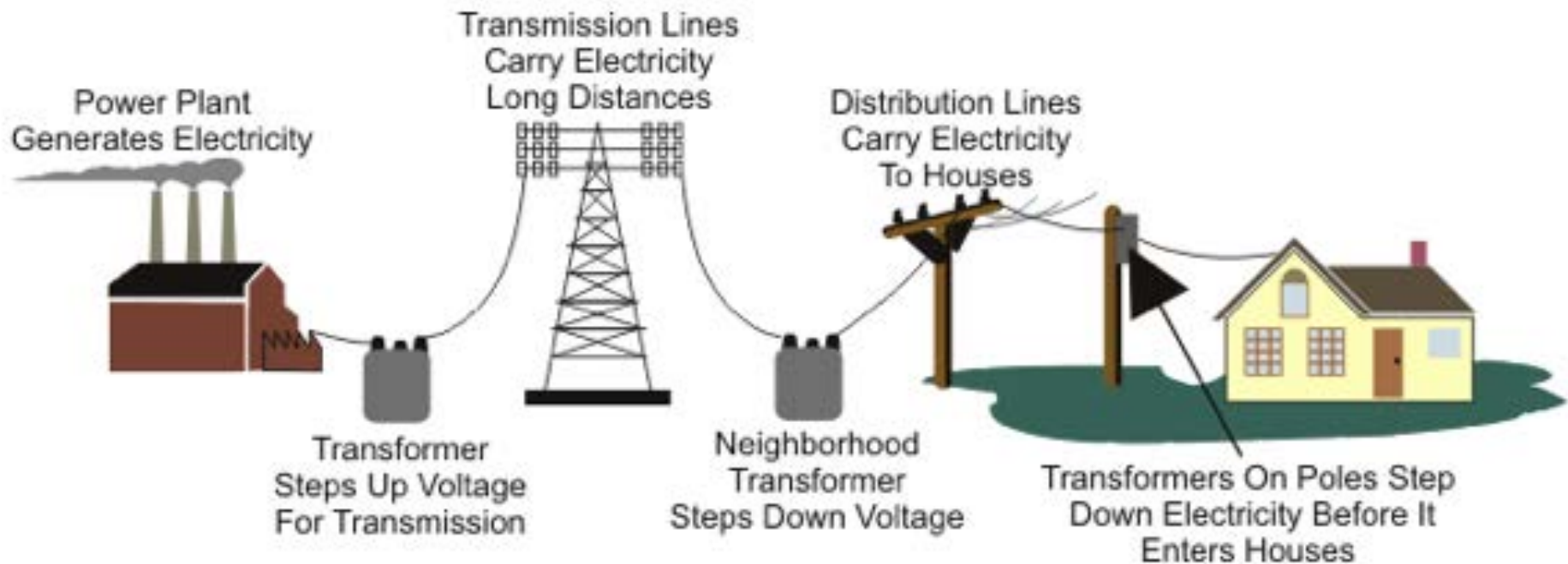
# Spheres of Influence in Energy

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*Wisconsin Academy of Science, Arts and Letters*  
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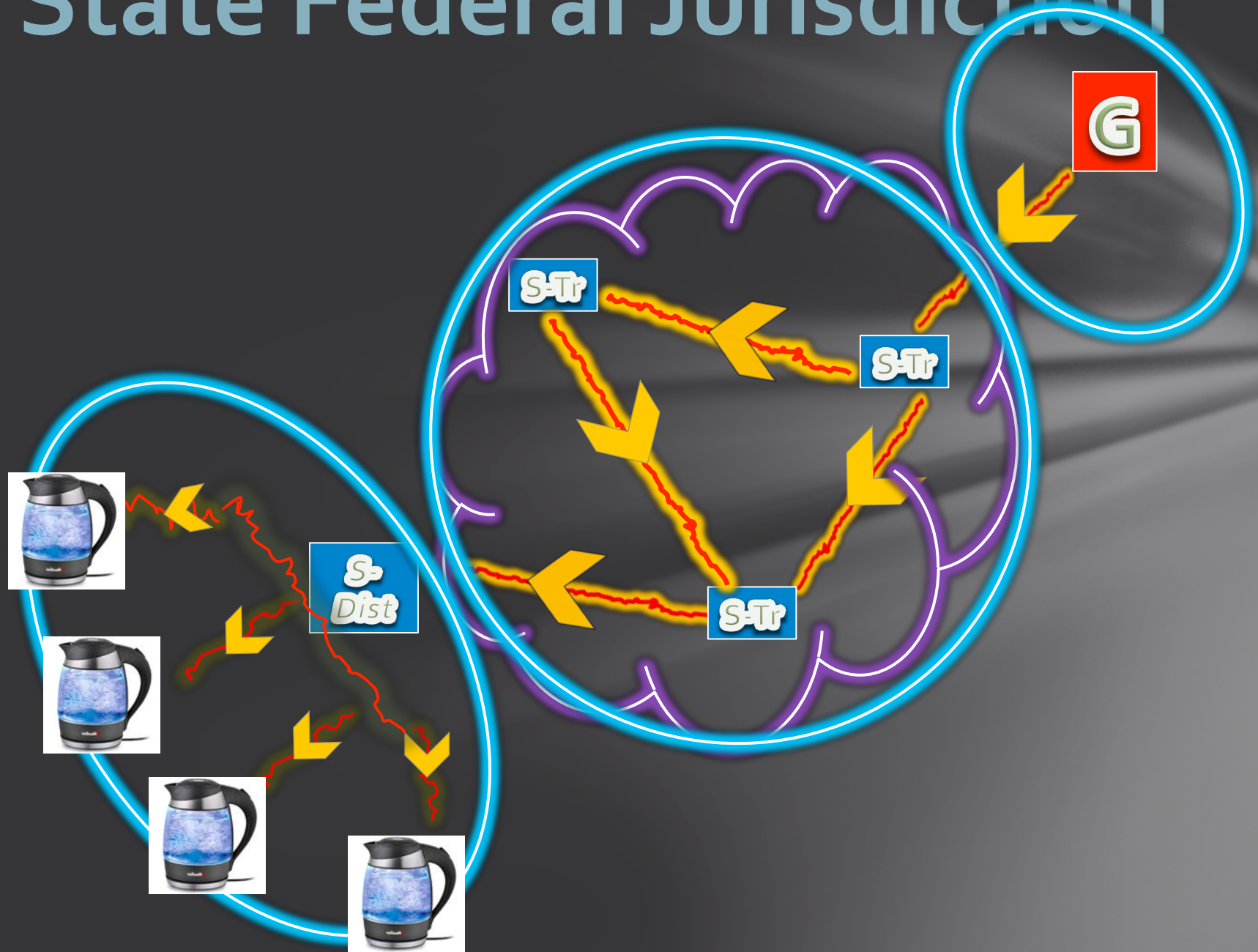
# Thomas Edison's Electric Industry



# Electricity: Just-In-Time Commodity

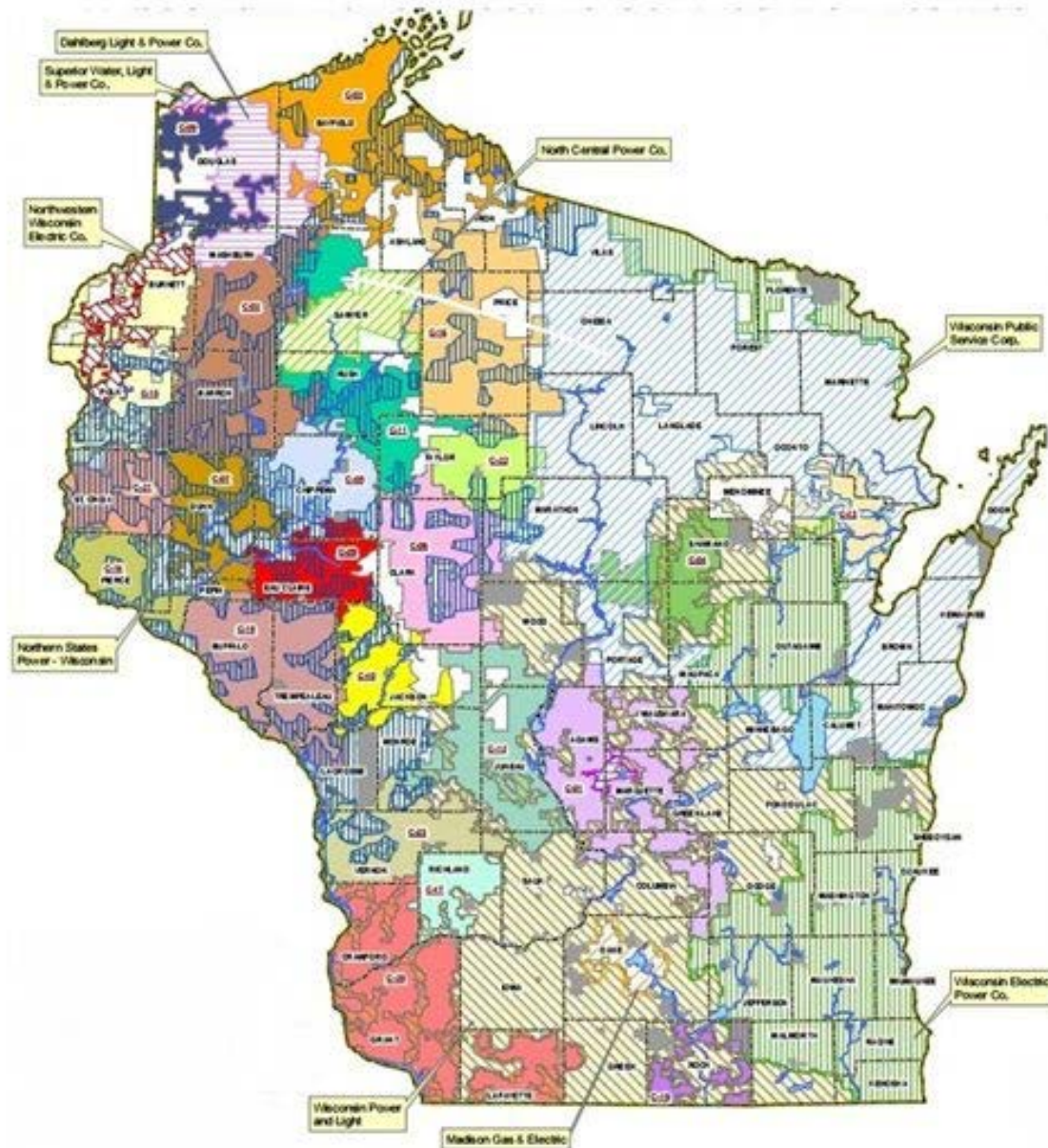


# State Federal Jurisdiction





# Wisconsin 2016 Electric Service Territories



Source: Public Service Commission of Wisconsin

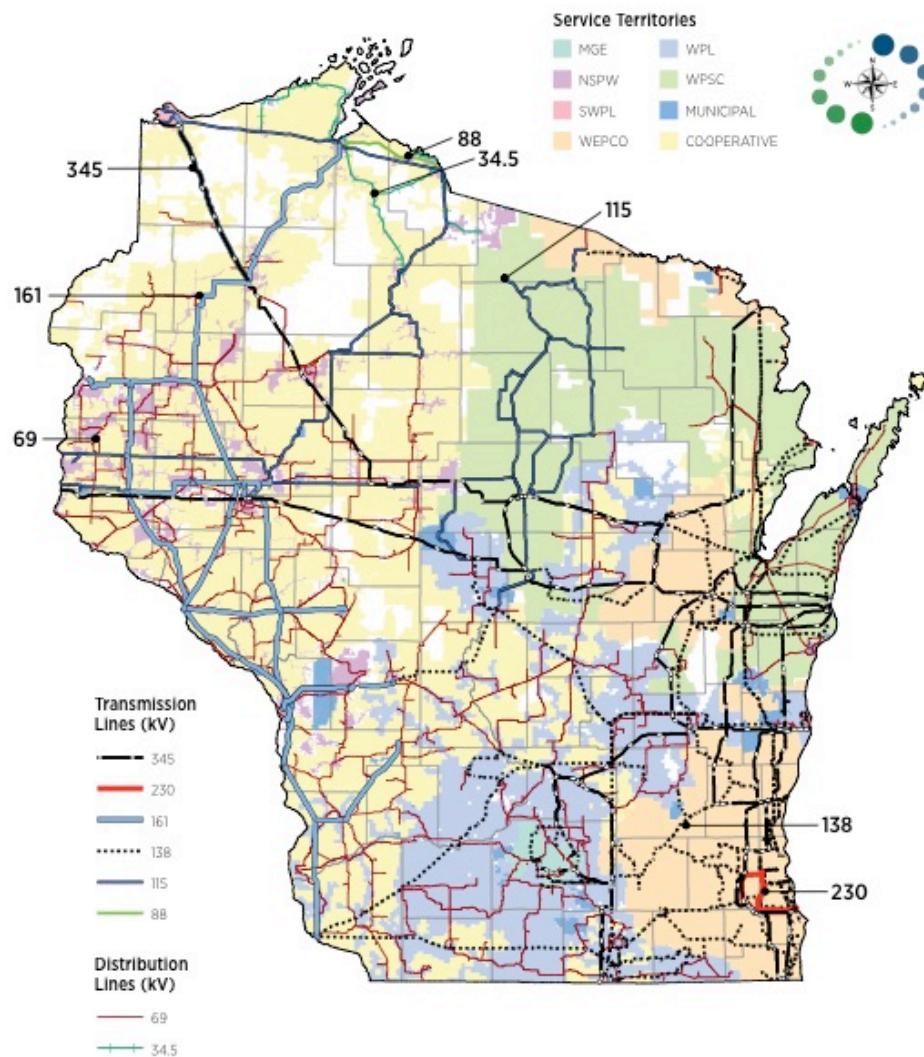
Minnesota



Source: ATC

# Wisconsin Electric Utility Service Territories and Overhead Transmission and Distribution Lines

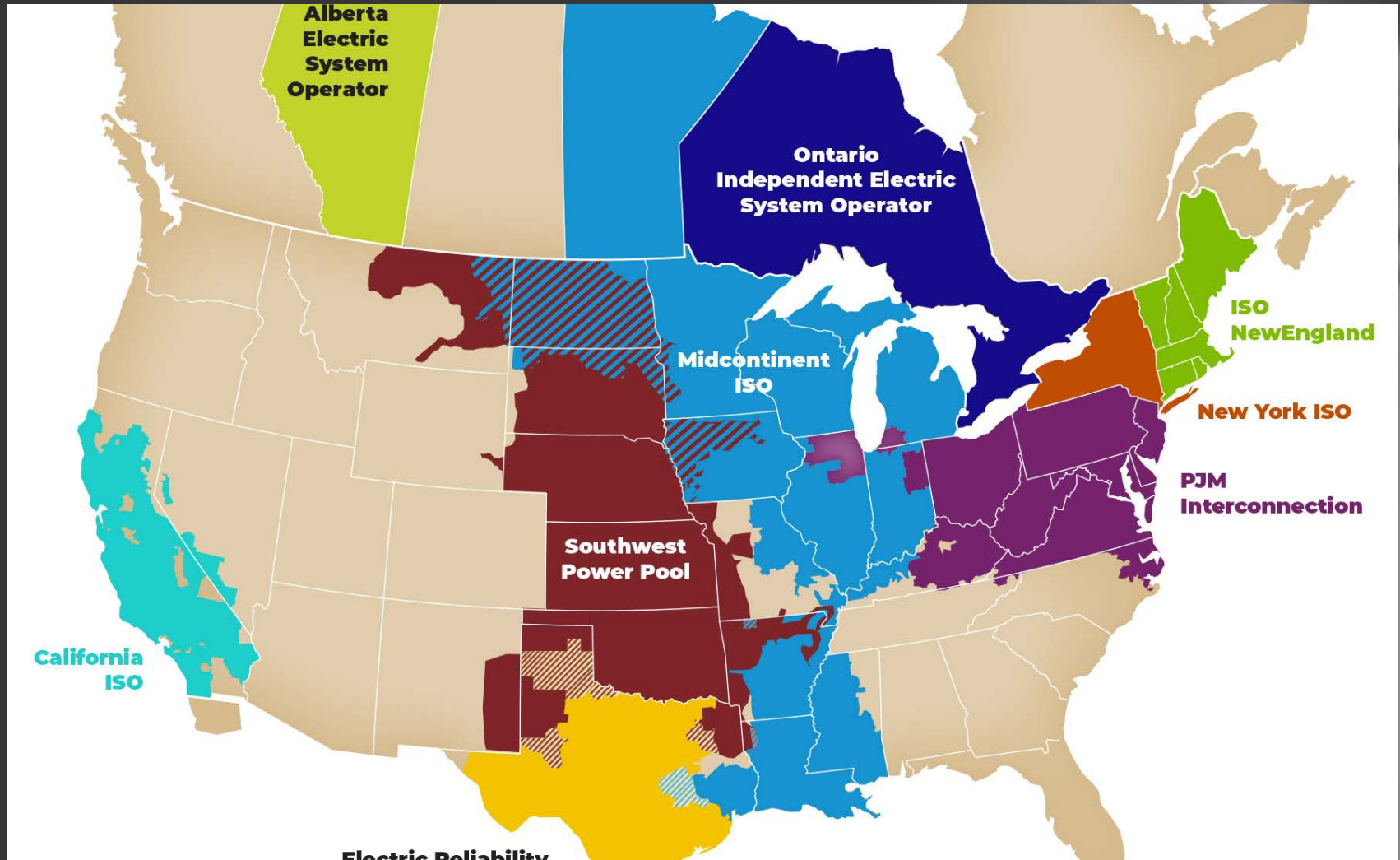
2015



Source: Public Service Commission of Wisconsin.



# RTOs and ISOs





# MISO Control Room



# GAME CHANGERS

*Say goodbye to  
Thomas Edison's Electric Industry*



# Demand Response and Efficiency





# Smart Appliances



# Solar PV - Residential





# Solar PV - Commercial





# Electric Vehicles and Solar PV



Source: NREL



# Battery

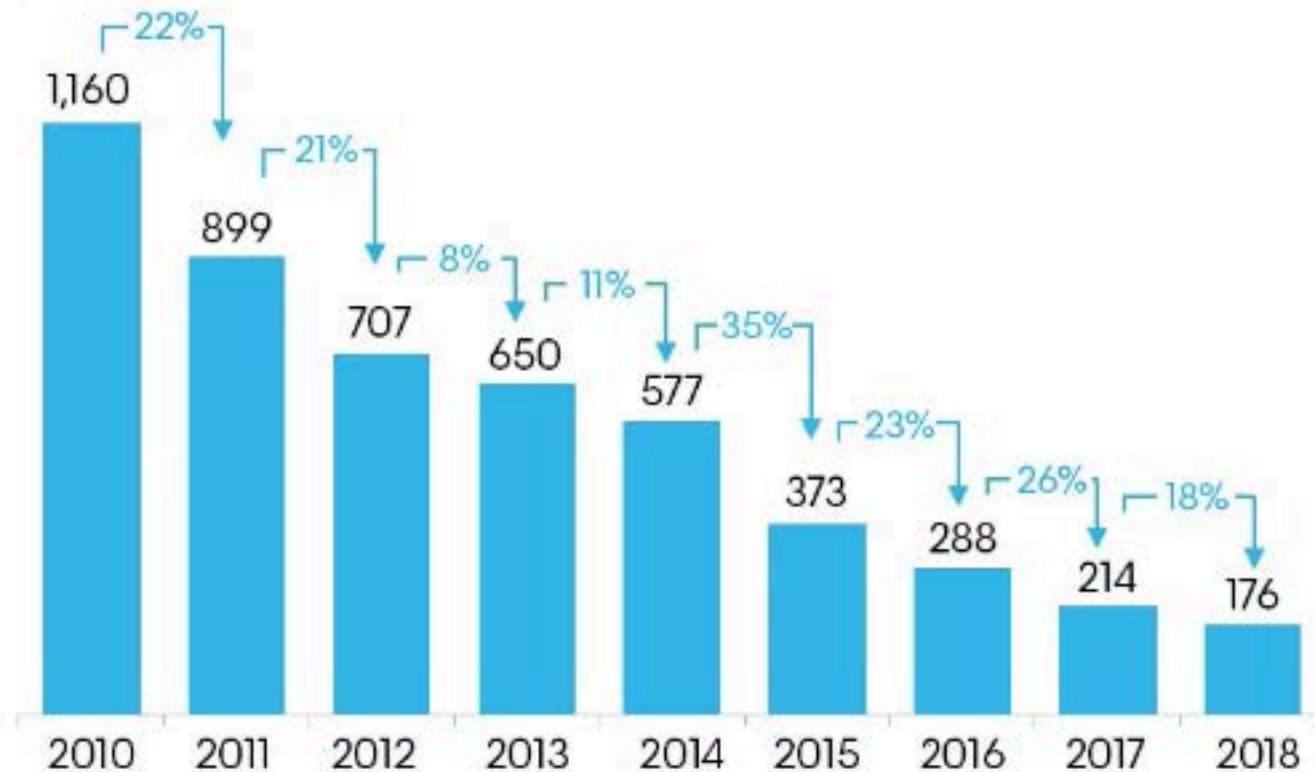


Source: NREL

## Battery Price Drop Since 2010 = 85%

### Lithium-ion battery price survey results: volume-weighted average

Battery pack price (real 2018 \$/kWh)



**GIF**

Source: BloombergNEF. Note: The data in this chart has been adjusted to be in real 2018 dollars.



# What is a Microgrid?

A microgrid is a local energy grid that can operate independently of the traditional energy grid, making it more efficient and reliable. It can be powered by generators, batteries and renewable resources like solar, wind, biogas or biomass.

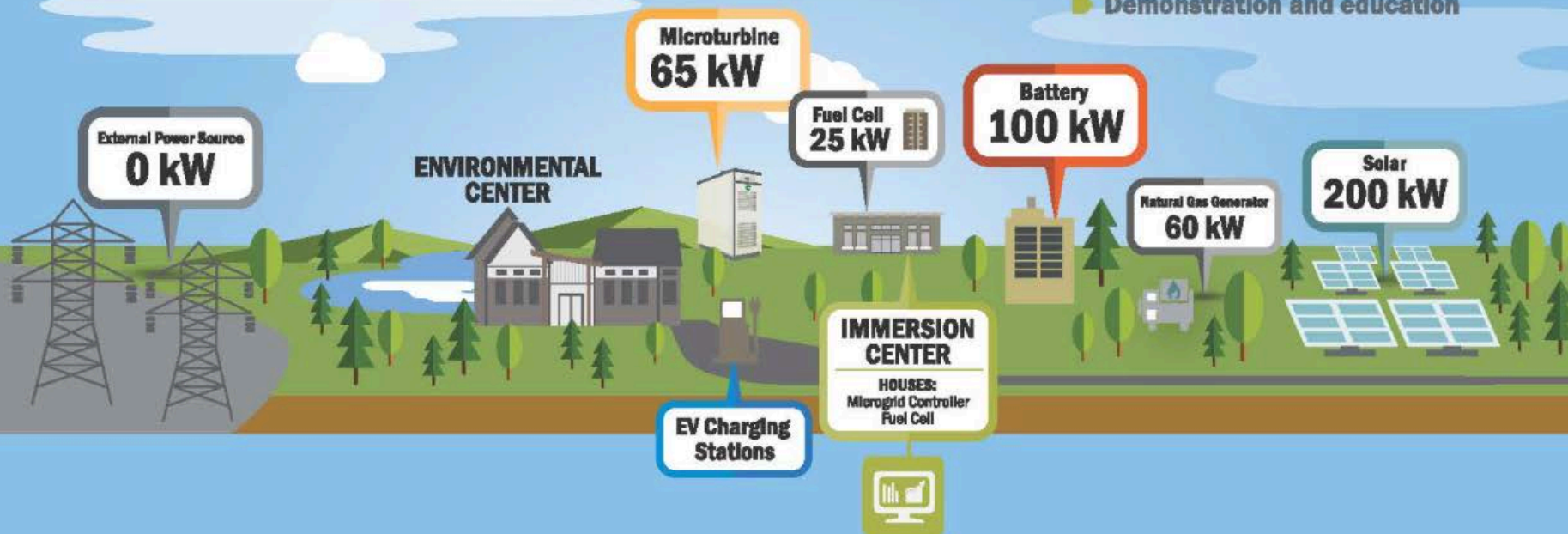
In Partnership with:

**FAITH**  
TECHNOLOGIES

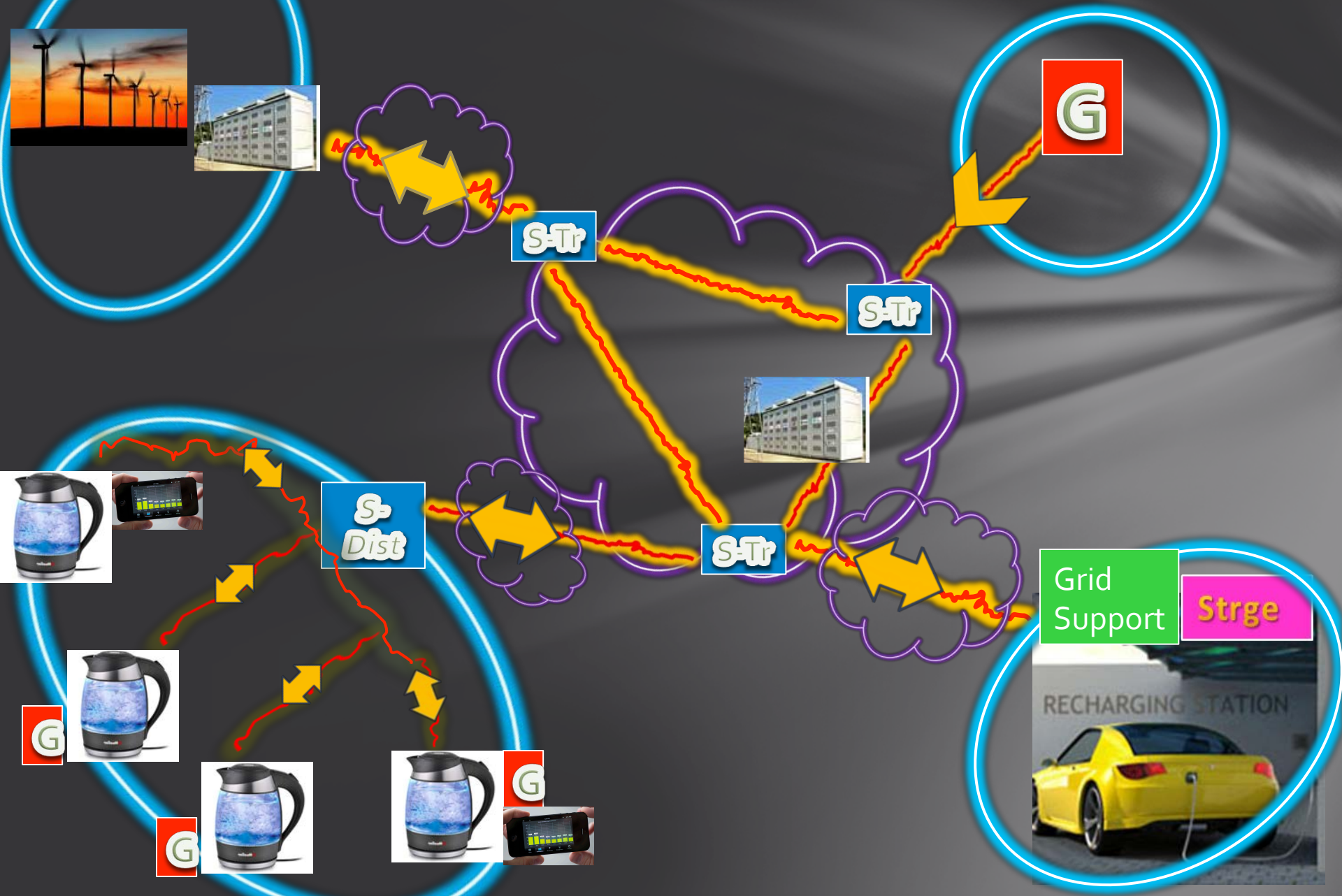
**Schneider**  
Electric

## Why a Microgrid?

- More reliable than traditional grid
- Conserves and stores energy
- Self-sufficient and sustainable
- Carbon-free solutions
- Uses clean energy
- Energy system of the future
- Demonstration and education



# State Federal Jurisdiction



# Communities Take Action

## Behind the Meter: hard power

Municipal facilities

Citizenry – incentive, educate

Coordinated procurement programs

## IOUs and Coops - soft power

Municipal Utilities – lots can be accomplished

Resilience – ask hard questions and demand action

Economic Development – attract energy-related businesses



# *The End ...& the Beginning*

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