

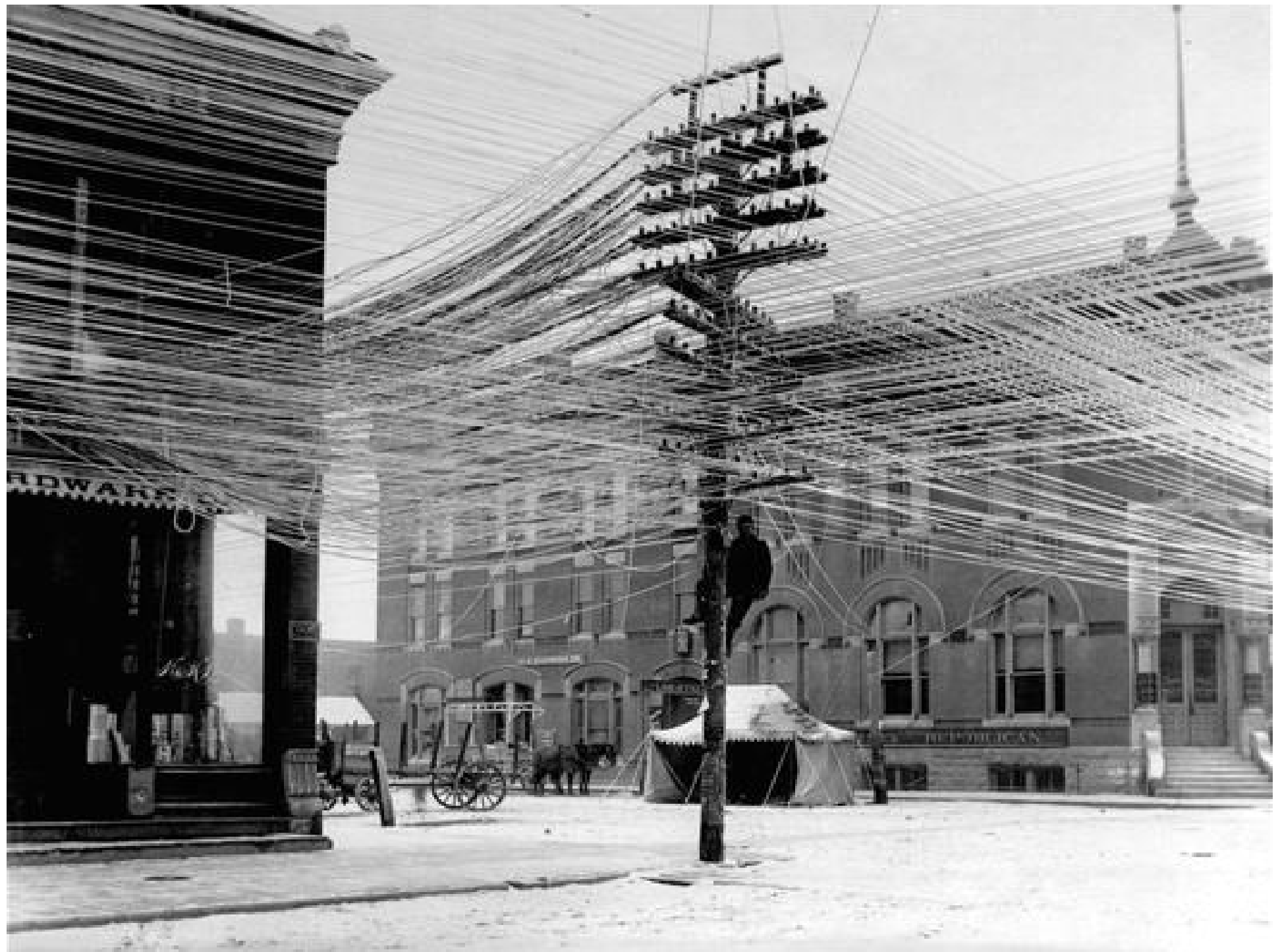
The Changing Utility Business Model & Challenge For Energy Efficiency

Mike Weedall, Senior
Advisor

IEEE SusTech Conference
August 2, 2013



E Source

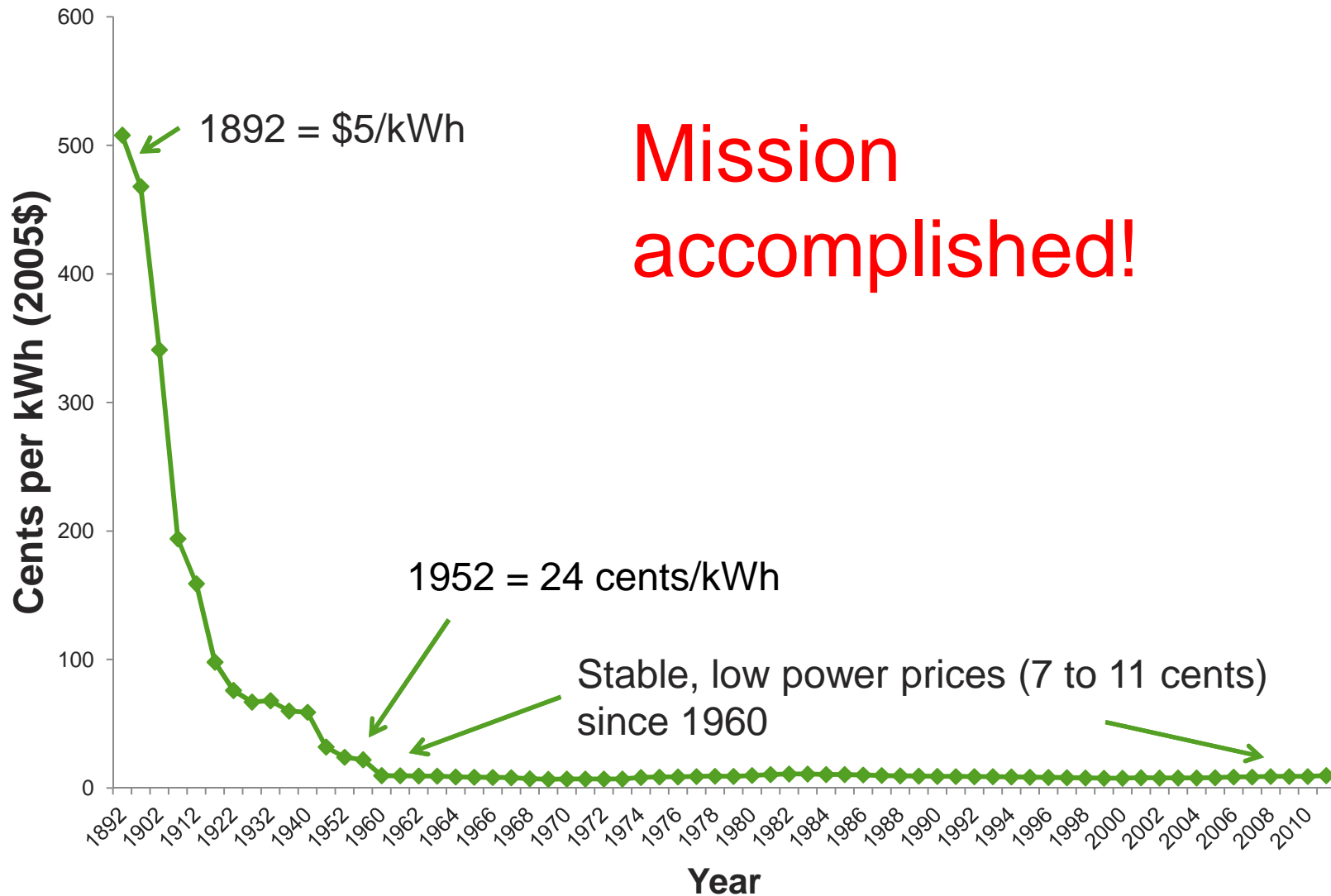


Utility Mission for the Past Century

To deliver reliable, inexpensive energy everywhere



Average Price of U.S. Electricity 1892 to 2011 (in constant 2005\$)



Source: Hirsh and the U.S. Energy Information Administration



A Perfect Storm of Challenges . . . and Opportunities

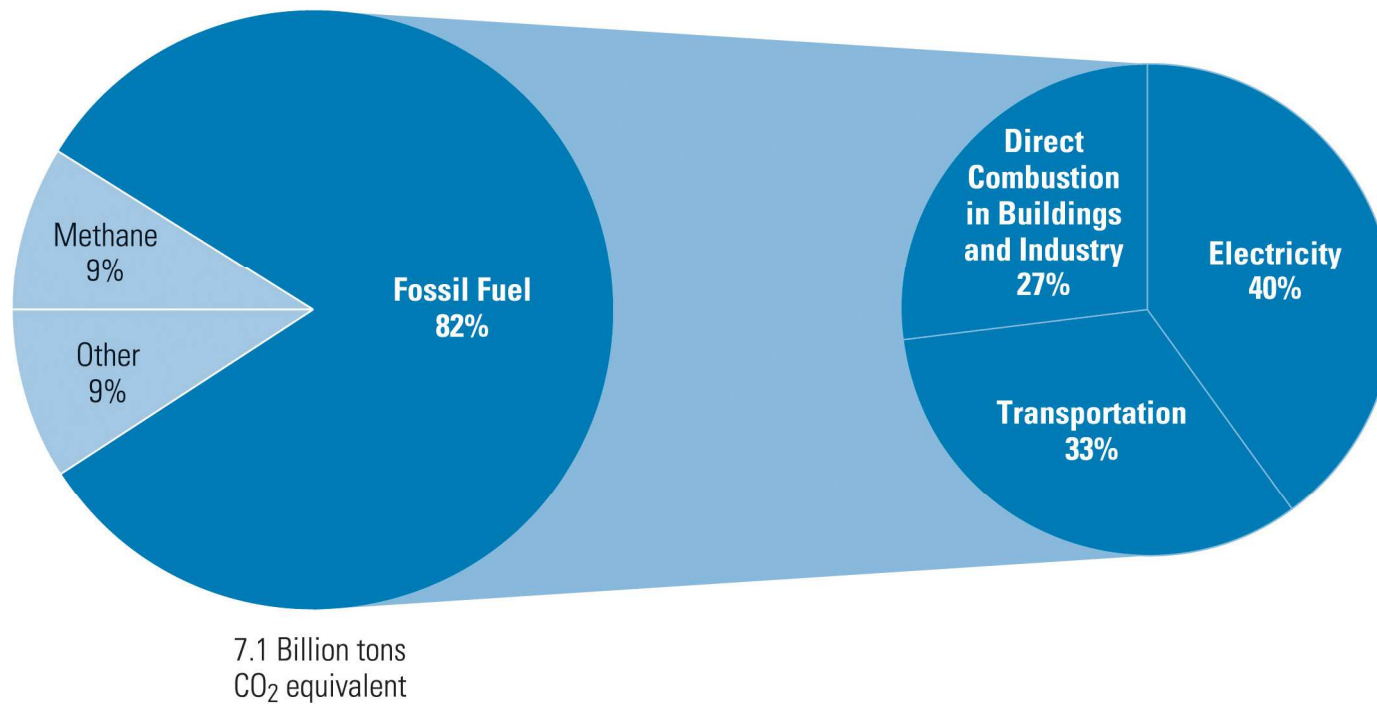
- Environmental
- Financial
- Disruptive technologies
and new entrants



80%

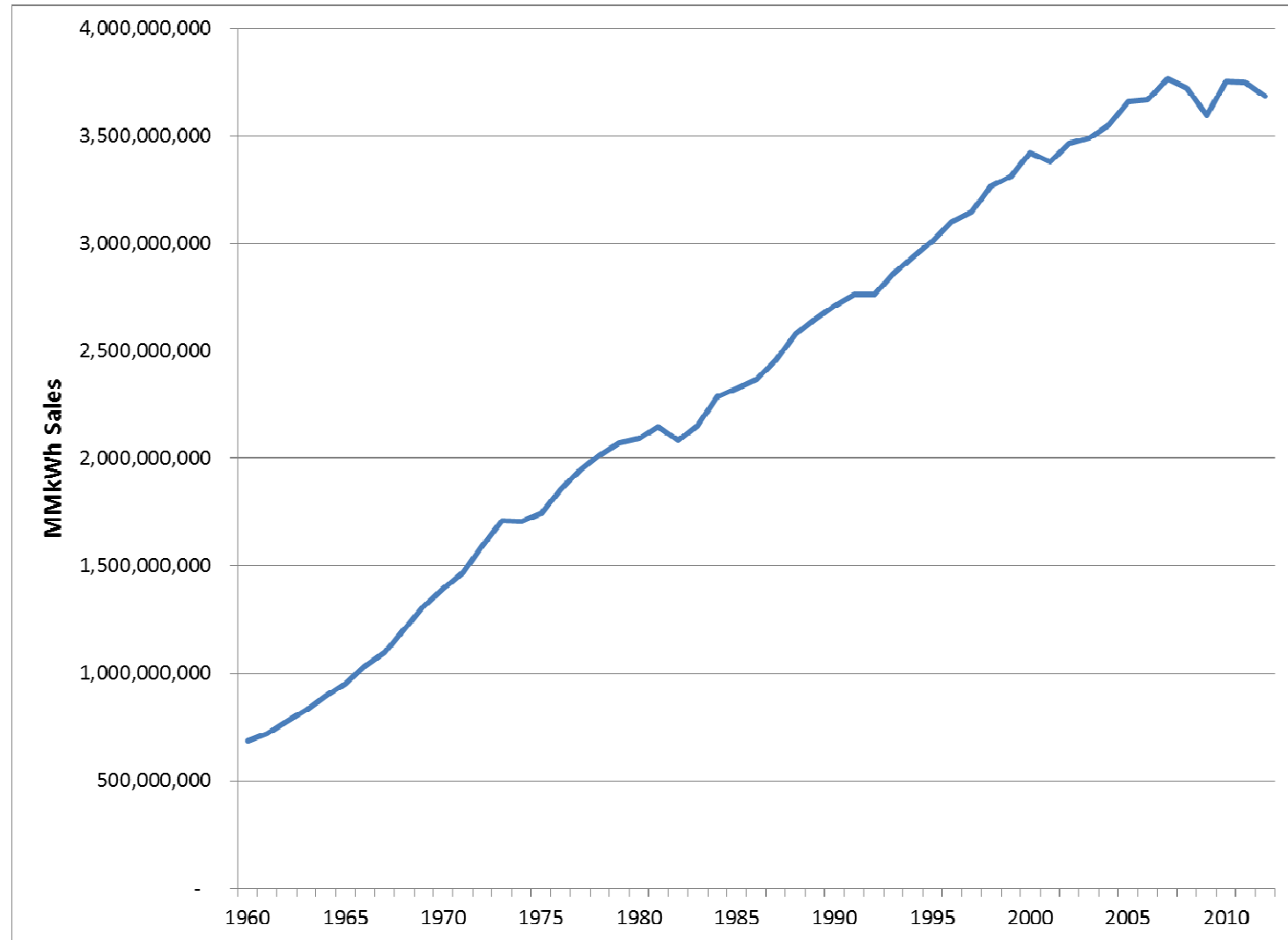
Reduction in global greenhouse gas
emissions needed to stabilize climate

U.S. Greenhouse Gas Emissions

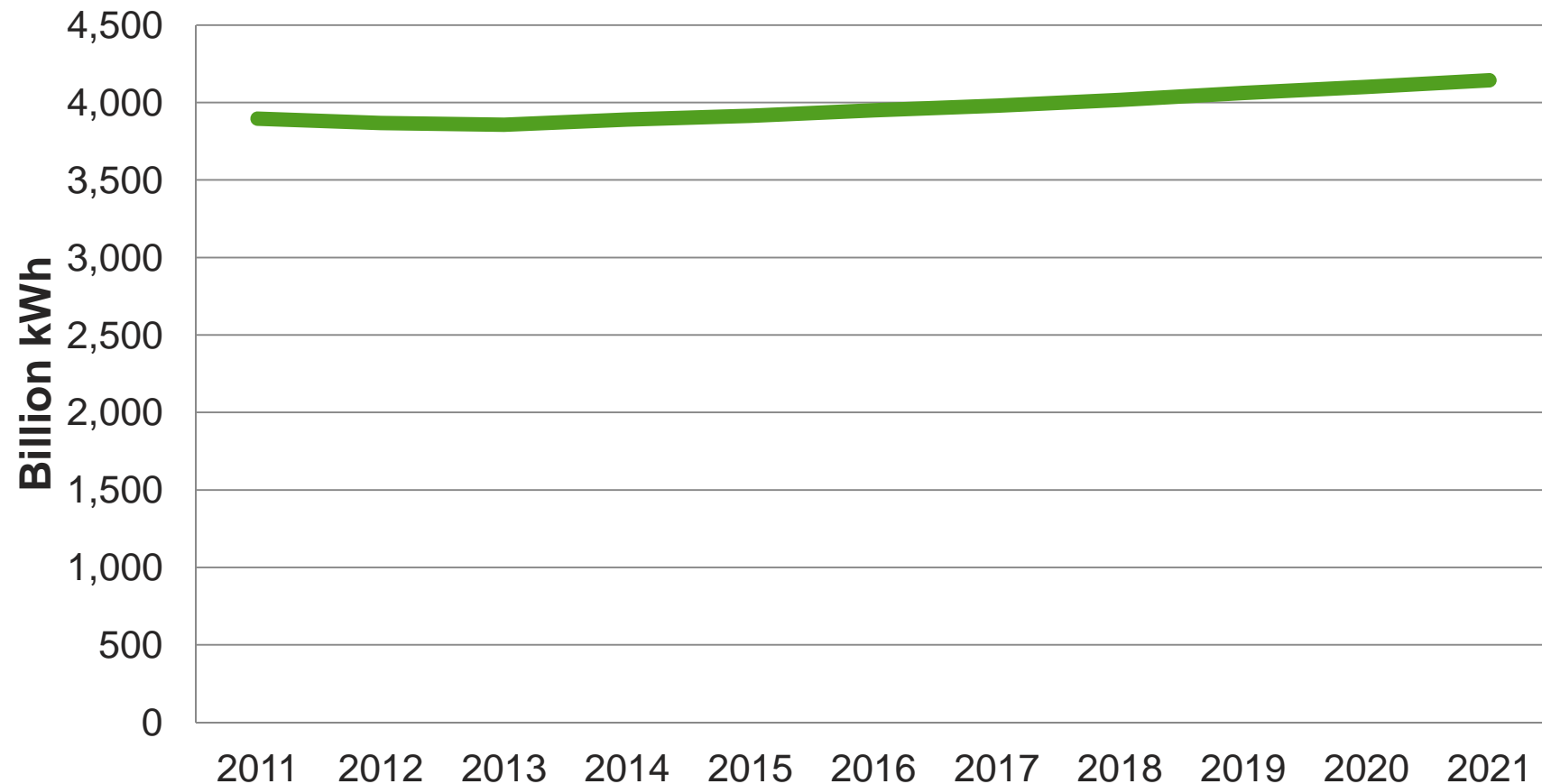




Those Were the Days: U.S. Electricity Sales 1960-2012



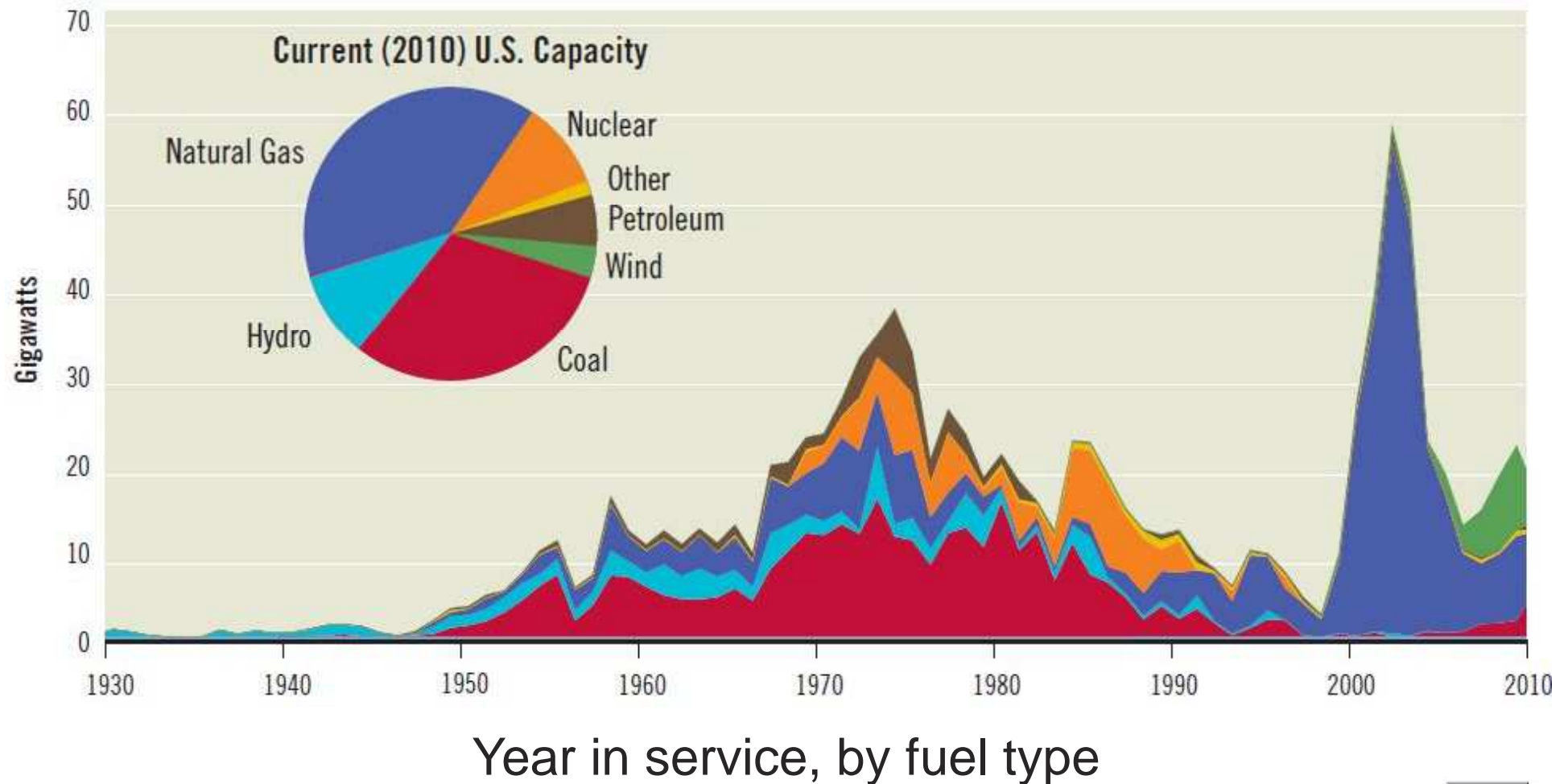
Flatlined: Projected U.S. Electricity Use 2011 to 2021; Similar Story for Natural Gas



Source: U.S. Energy Information Administration



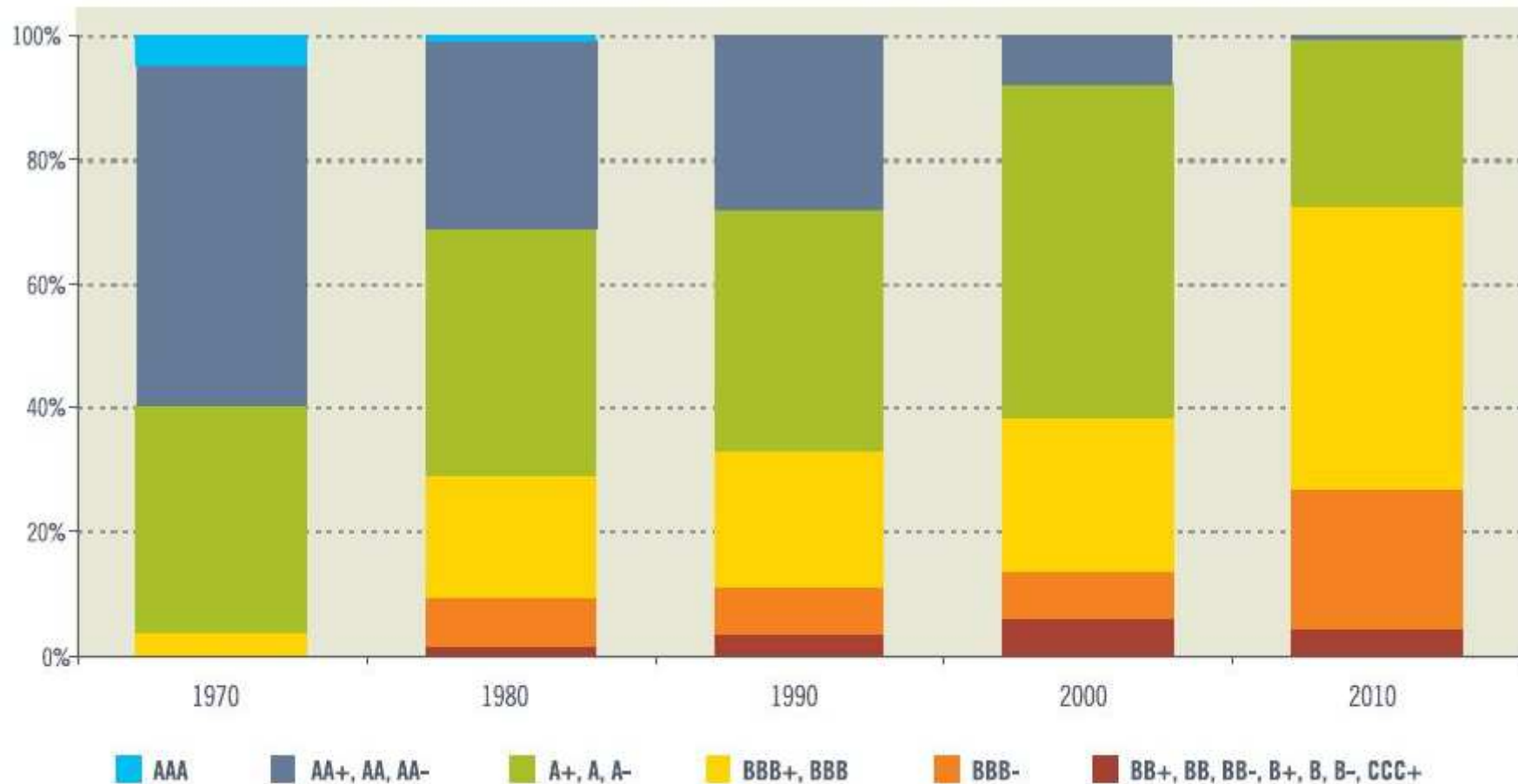
An Aging Fleet: 70% of U.S. Generation Is More Than 30 Years Old



Source: Ceres, Standard & Poor's



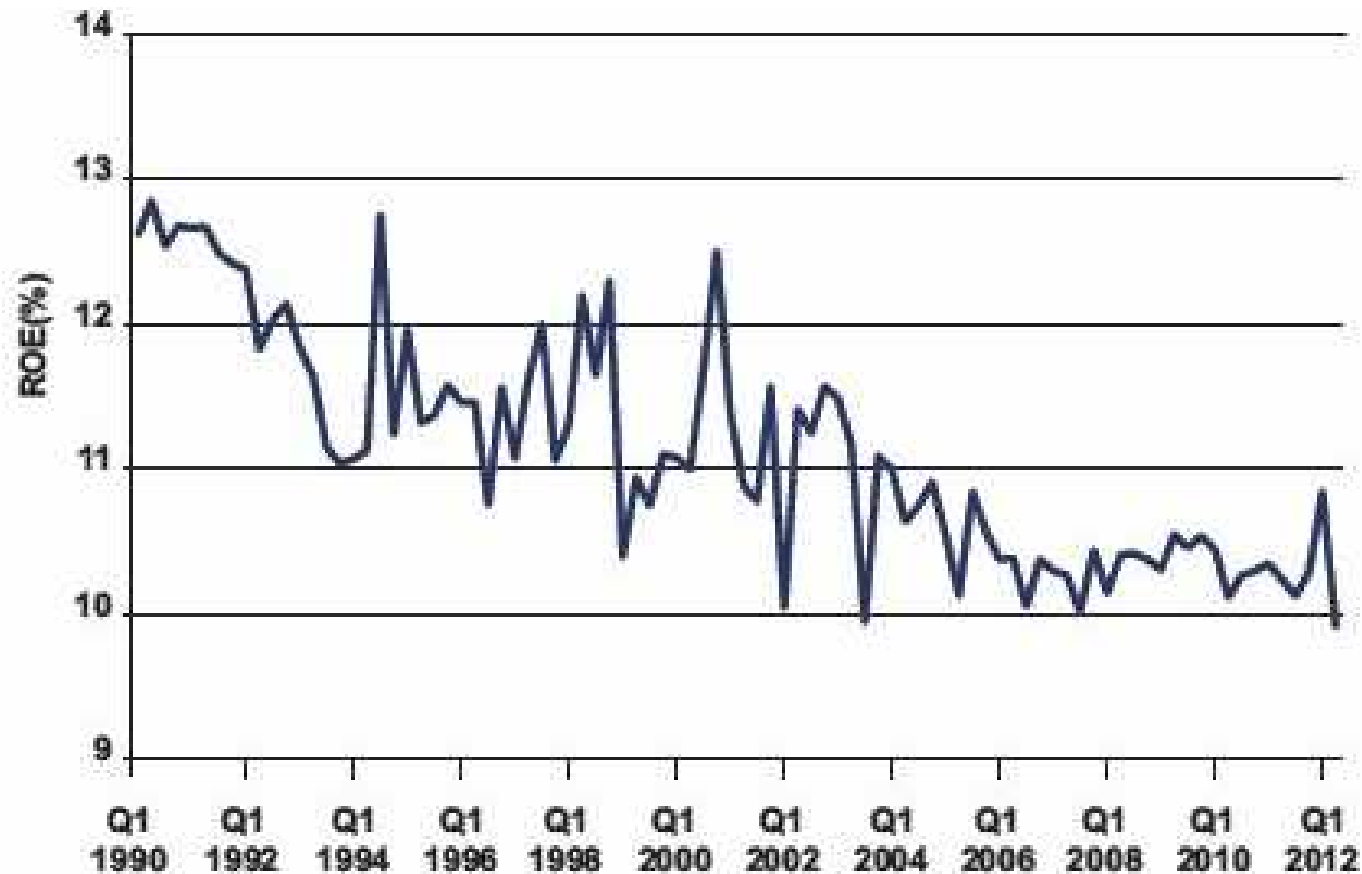
Decline in U.S. IOU Credit Ratings (1970 to 2010)



Source: Ceres, Standard & Poor's



Allowed Return on Equity for U.S. Investor Owned Utilities (1990-2012)



Source: SNL Financial/Regulatory Research Associates (RRA), EEI Rate Department



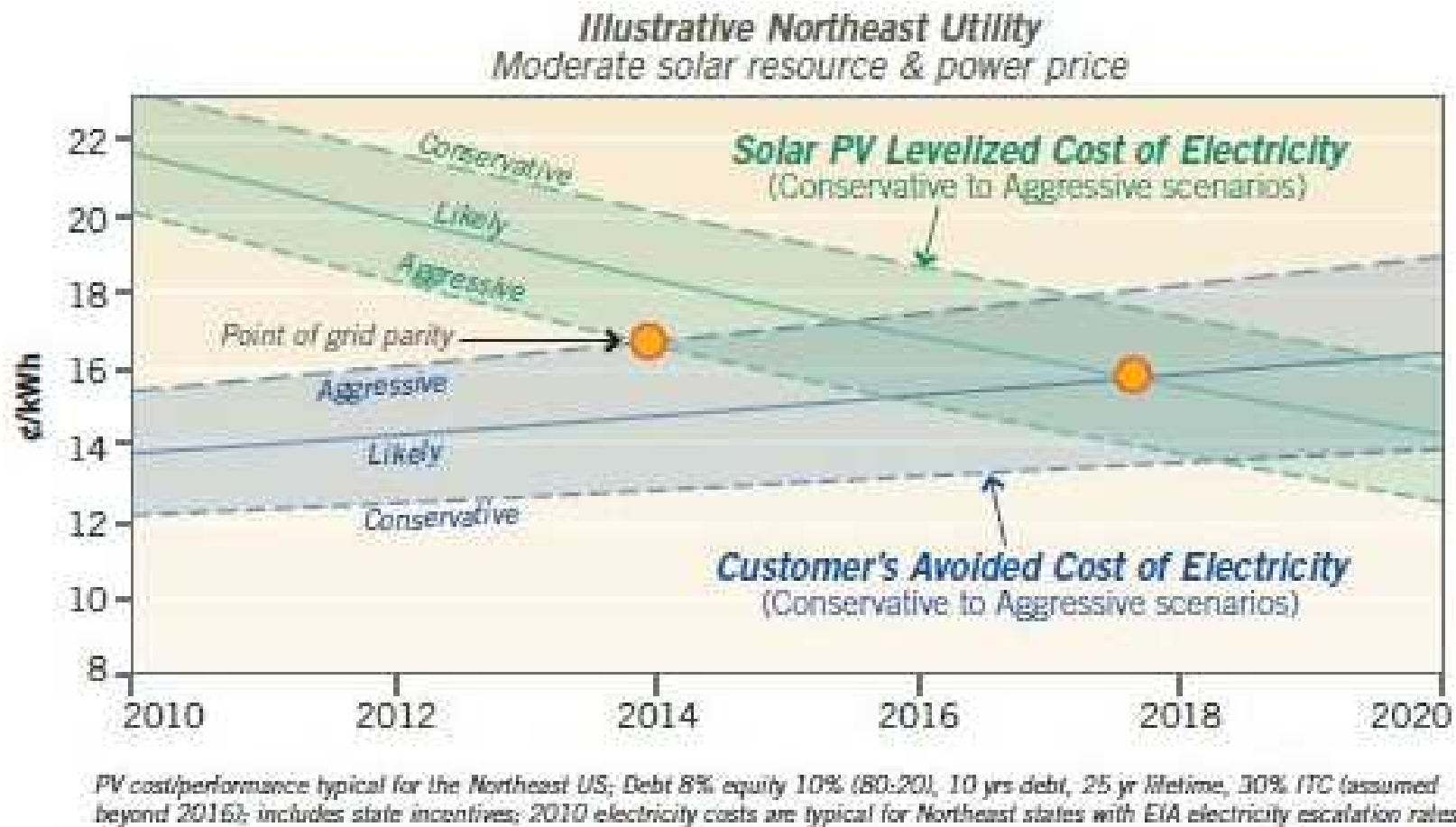
“The real price of electricity has been flat for 50 years. It’s going to rise dramatically in the next 20 to 30 years.”

—Jim Rogers, Chairman and
CEO, Duke Energy

As if that weren't bad enough, here comes . . .

“Socket Parity” for Distributed
Renewables

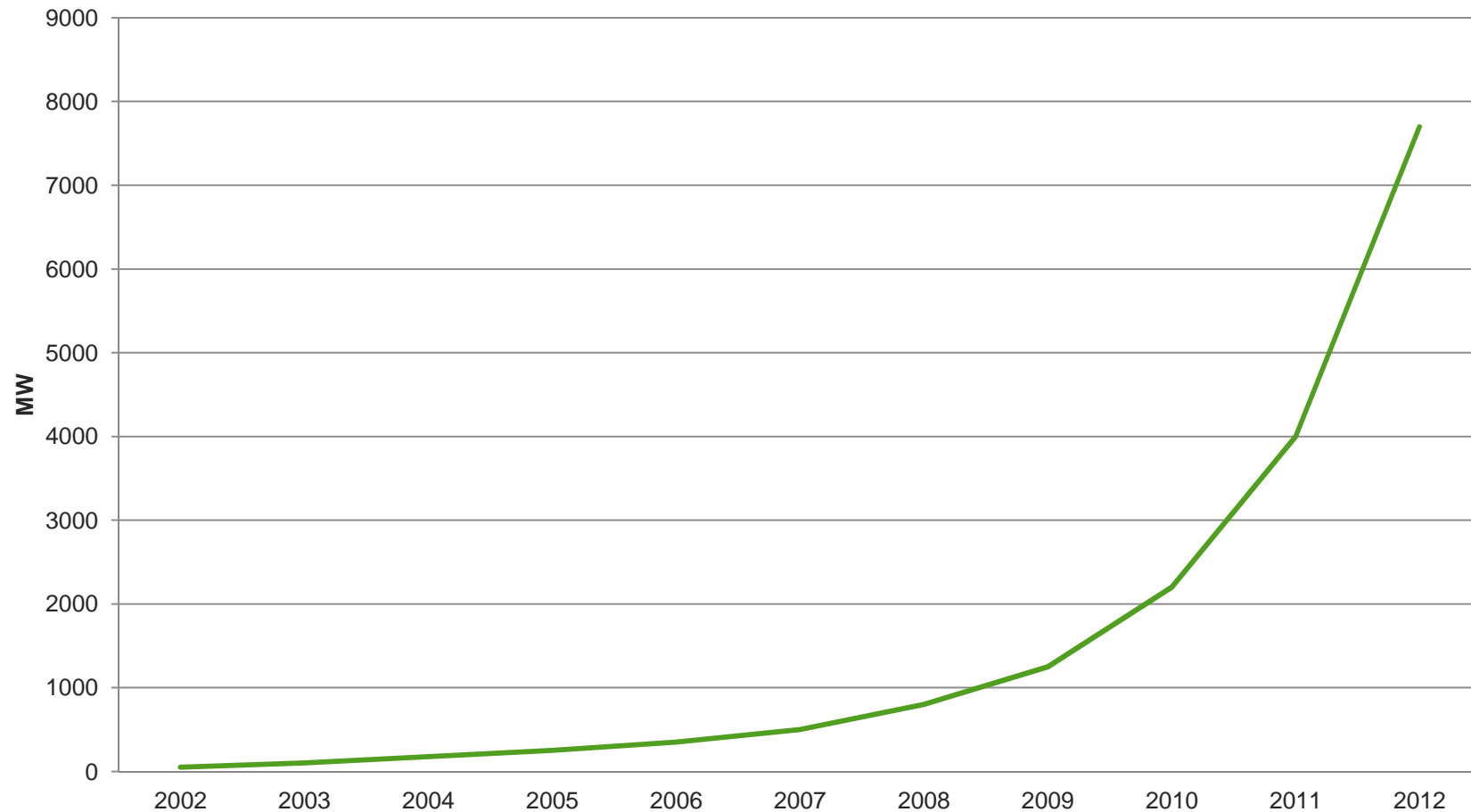
Likely Socket Parity By 2017 in Northeast



Source: Ceres, Navigant



Cumulative U.S. Grid-Tied PV Capacity (2002-2012)



Source: IREC, SEIA



“I’d put my money on the sun and solar energy.
What a source of power! I hope we don’t have to
wait ’til oil and coal run out before we tackle that.
I wish I had more years left!”

—Thomas Edison

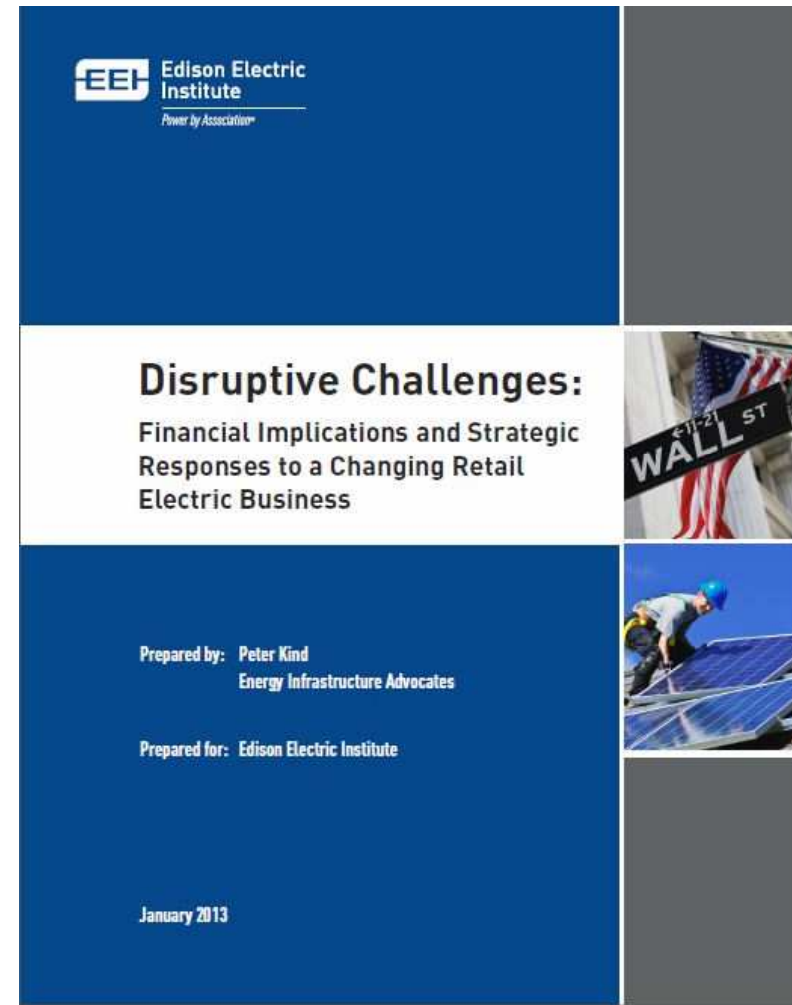
Wal Mart to Get ALL of its Power From Renewables By 2020 . . . To Save Money

- Installing PV on 1000 stores
- Their power purchase agreements already beat utility rates

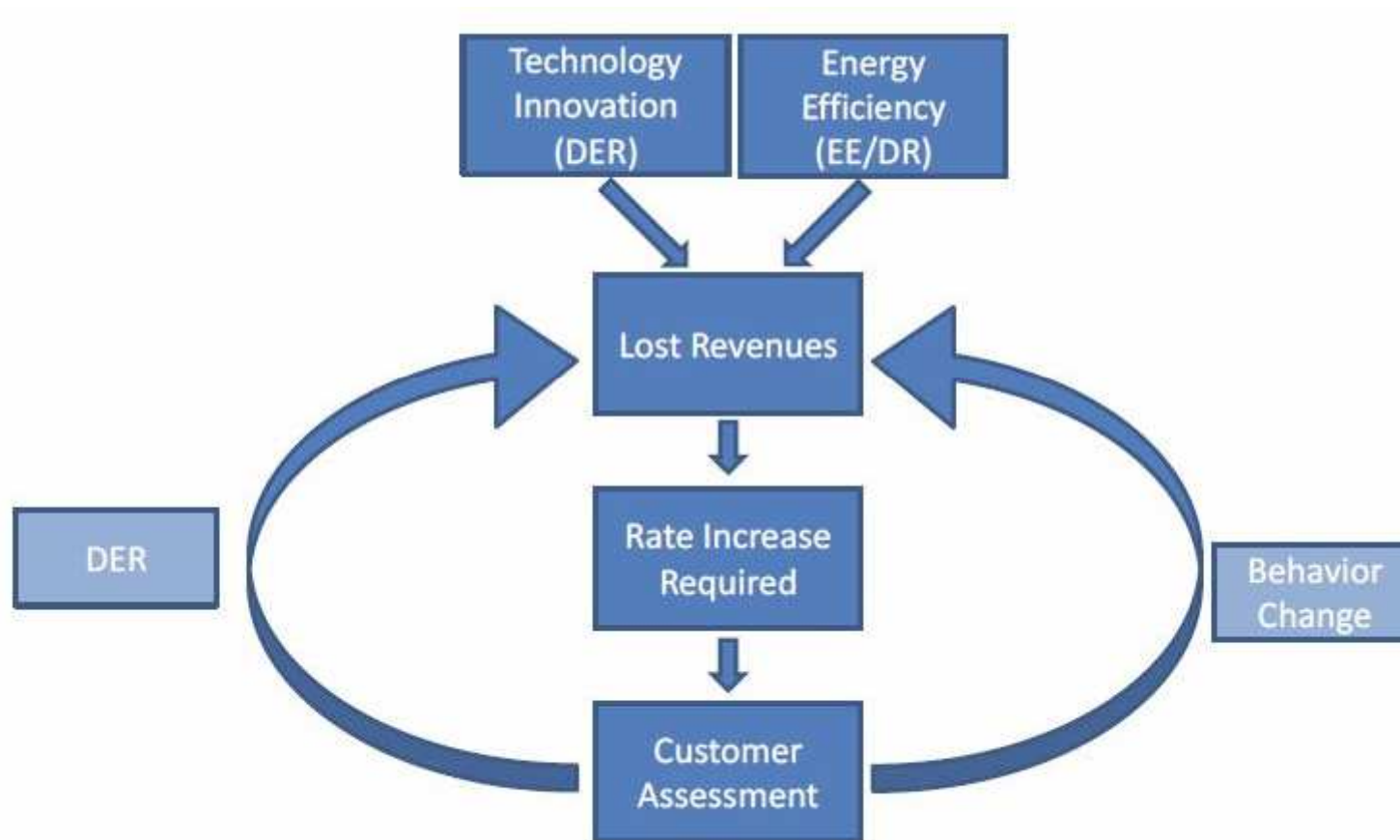


EEI Sounds the Alarm

- PV is at socket parity today for 16% of U.S. electric market where power costs >15 cents/kWh
- Socket parity for one-third of market by 2017



EEL's Assessment: “Vicious Cycle from Disruptive Forces”



Disruptive Market Entrants and Technologies Will Challenge the Status Quo

- Will you try to beat 'em or join 'em?
- Can we find a model that aligns the interests of utility shareholders, customers, and the environment so that utilities prosper by promoting these disruptive alternatives?



Big Bang Disruption

- “. . .doesn't follow Clayton Christensen's classic model, entering the market as a cheap substitute to a high-end product and then gradually increasing in quality and moving up the customer chain. Instead, the innovation beats incumbents on both price and quality right from the start and quickly sweeps through every customer segment.”
- “Big-bang disruptions often come out of the blue from people who aren't your traditional competitors.”

Downes and Nunes, *Harvard Business Review*, March 2013



SolarCity just raised \$500 million from Goldman Sachs to fund solar projects and has a \$65 million deal with Honda to promote solar to Honda owners

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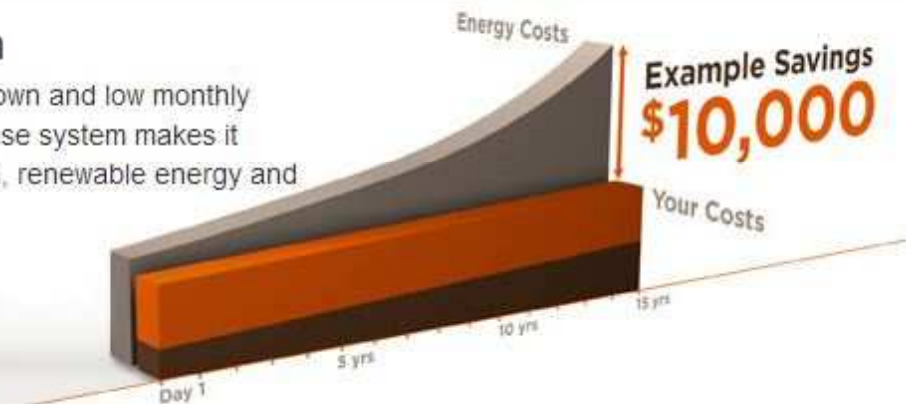
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Energize Your Home With Solar



“ . . . one can imagine a day when battery storage technology or micro turbines could allow customers to be electric grid independent. To put this into perspective, who would have believed 10 years ago that traditional wire line telephone customers could economically ‘cut the cord?’ ”

Edison Electric Institute 2013

David Crane Says “Change or Die”



“The individual homeowner should be able to tie a machine to their natural gas line and tie that with solar on the roof and suddenly they can say to the transmission-distribution company, ‘Disconnect that line.’ ”

NRG CEO David Crane



GM and ABB Testing Modular Package of Used EV Batteries That Can Power Several Homes for Two Hours





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SolarCity and Goldman
Sachs Create Largest
U.S. Rooftop Solar Lease
Financing Platform

City of Sacramento and
SolarCity Announce
Completion of Solar
Projects at Two City
Water Treatment Plants

SolarCity, Forest City
Team to Install Solar on
up to 6,500 Homes in
Project at Navy, Marine
Corps Bases in Hawai'i

Home > Residential > Home Energy Storage

Home Energy Storage

SolarCity's new battery system can help you keep the lights on and fridge cold in a power outage or natural disaster while potentially saving you even more on your monthly utility bills.

Our battery systems are currently offered in selected California markets. We hope to offer the service nationwide by the end of the year.

Compact, Safe and Durable

SolarCity is making the latest advancements in battery technologies available to you through our partnership with Tesla Motors. Only SolarCity's home backup system uses technology engineered by Tesla, leveraging their expertise in developing battery technologies for premium electric vehicles.

Tesla's long history of research and development has enabled a cost-effective, wall-mounted storage appliance that is small, powerful and covered by a long lasting full 10 year warranty.

The actual battery unit is about the size of a solar power inverter, and will be mounted on the wall in your garage or near your electrical panel.



Nest Acquires My Energy

- Nest provides web-enabled smart control and DR capability for HVAC and other loads
- MyEnergy enables users to track electricity, gas and water use
- They have users in all 50 states, gathering data from more than 1,500 energy providers



How to Avoid the Post-Officization of Utilities?



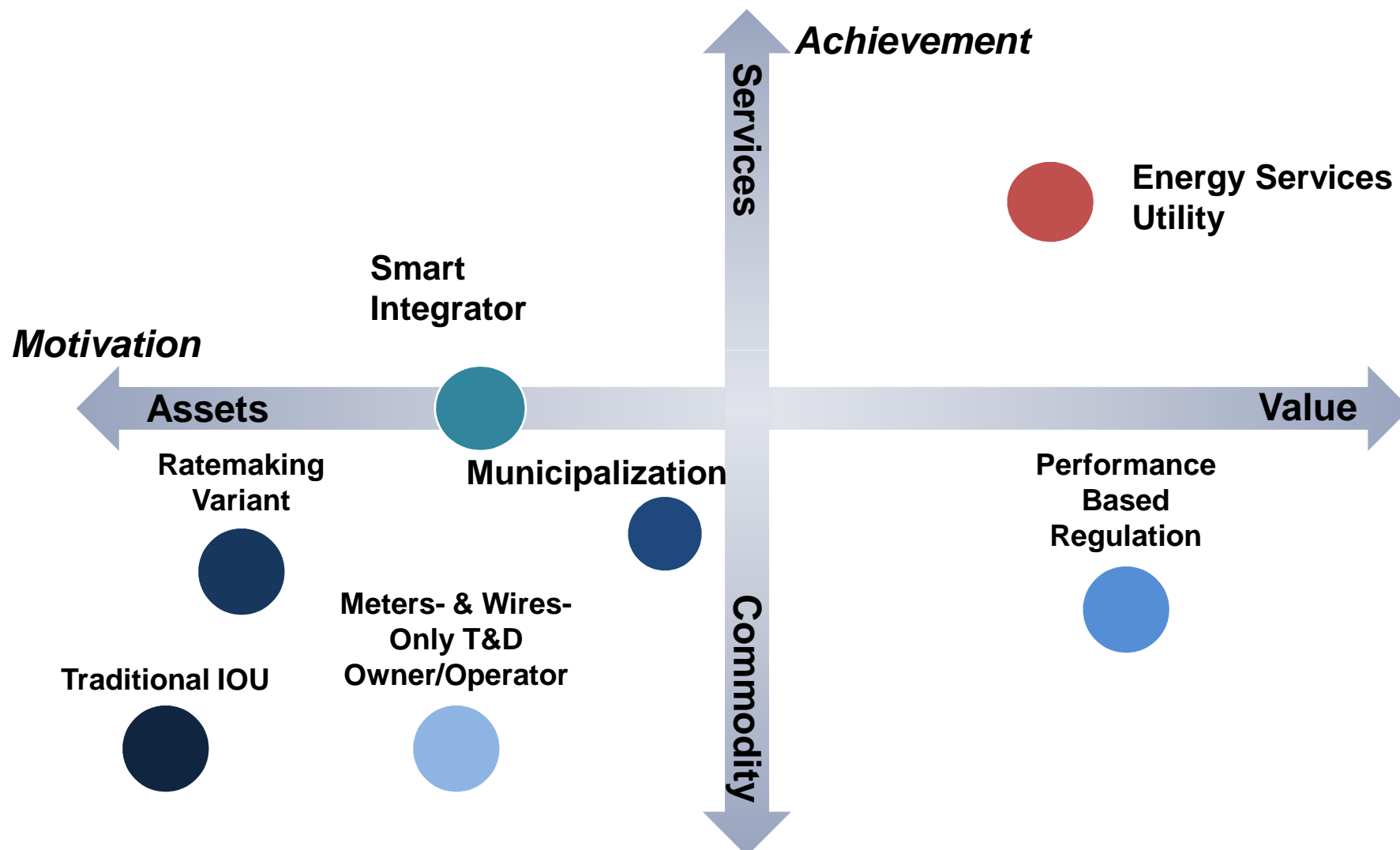
Many Initiatives Exploring New Utility Business Models

- Massachusetts Grid Modernization Working Group
- Hoover Institution Task Force On Energy Policy
- California Public Utility Commission
- Energy Foundation Utilities 2020
- RMI E-Lab Initiative
- EEI Distribution 2020
- Minnesota Working Group
- New York & Maryland
- Cal Tech Resnick Institute & Other University Efforts
- State of Hawaii Reliability Standards Working Group
- Western Governor's Association
- NARUC & RAP
- DOE & National Laboratories

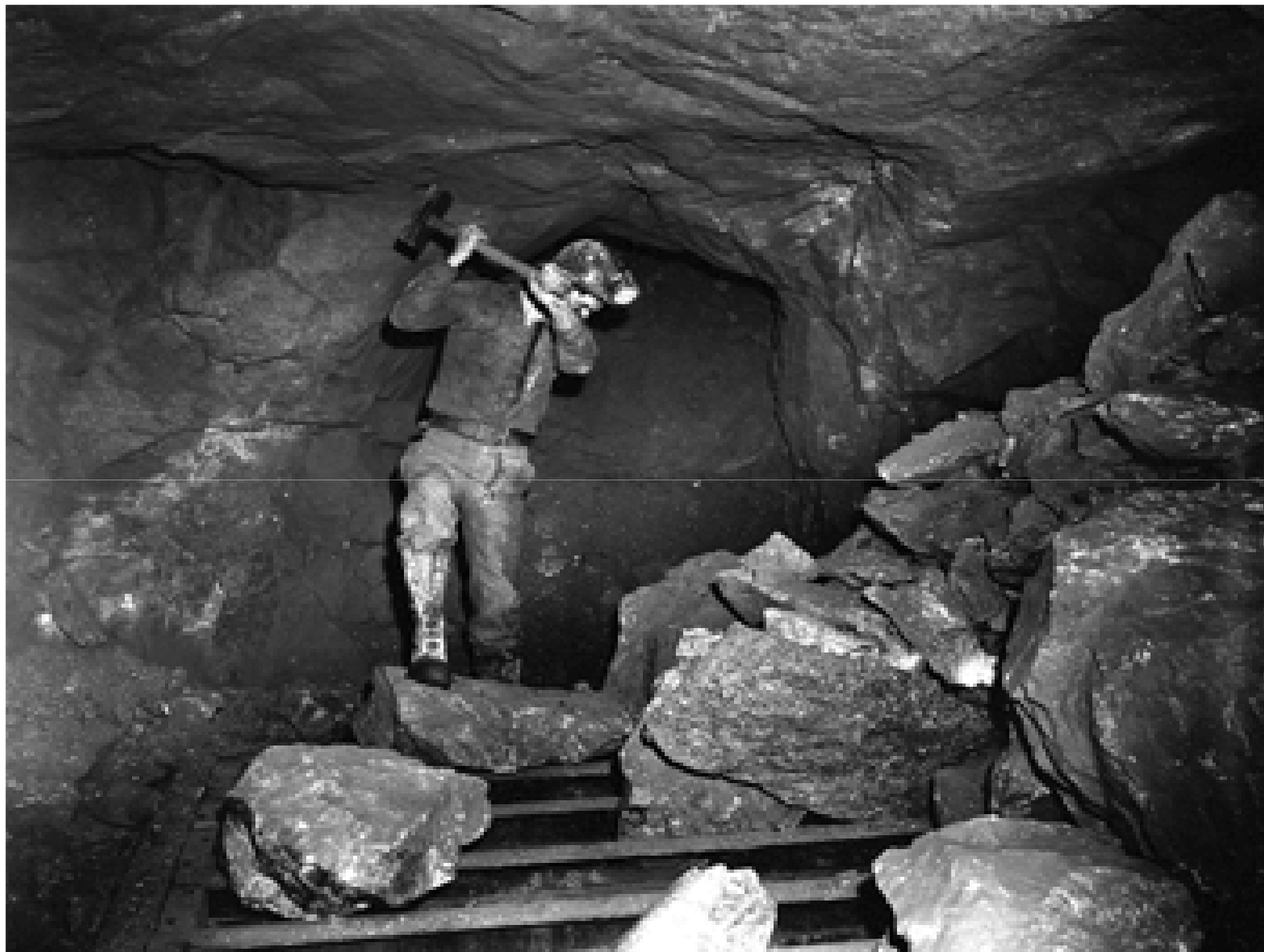


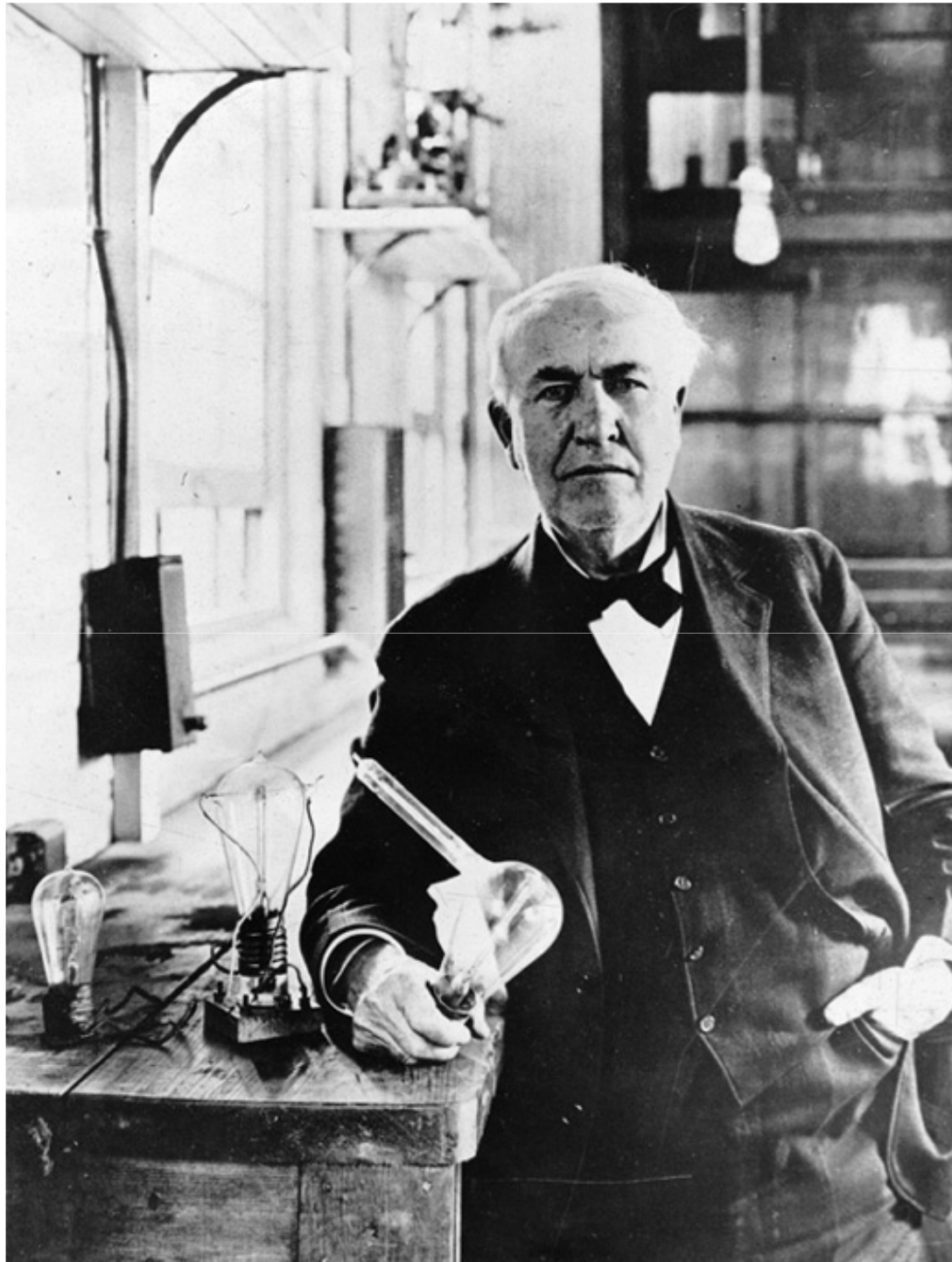


Continuum of Utility Business Models: Profit Motivation vs. Profit Achievement



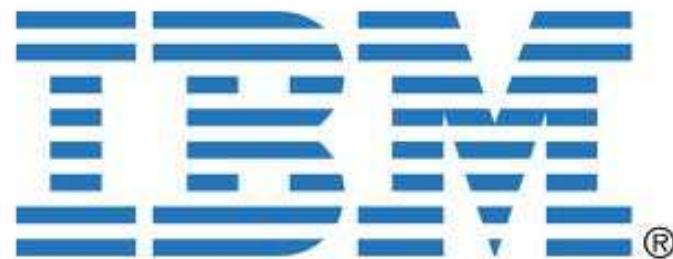
The industry will divide into camps that pursue different business models







imagination at work



Service and Value Oriented Utility Mission Statement for the Next Century

To improve our customers' lives, strengthen the communities we serve, and protect the environment through high-value, integrated energy services delivered on both sides of the meter



“Somehow, in the past 100 years, it was decided that utility property ended at the meter. It doesn’t have to be that way.

We are slowly redefining what has historically been called the rate base.

This produces not only a customer benefit, but an overall societal benefit and, quite candidly, a shareholder benefit.

Ralph Izzo
Chairman and CEO
PSE&G

We're Talking Real Money: \$1.5 Billion in Rate-Based Renewables and Efficiency at PSE&G

- Solar: \$600 million in rate base today, additional \$580 million approved
- Energy efficiency: \$160 million in rate base today, additional \$100 million approved, and they'll file for more later



“Our business in the 21st century is as an energy optimizer, not just of the grid, but an optimizer of every home, every business. Optimizing all the way from the device back to the generating plant.”

“If I can make as much money investing beyond the meter as I can in building and running power plants, I’d rather invest beyond the meter. We want to be the solutions provider, the Amazon.com of energy.”

Jim Rogers, Chairman and CEO
Duke Energy

Questions

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