

A SHOCKING TRANSFORMATION

DOES ELECTRIC GRID 2.0 MEAN ENERGY DEMOCRACY?

John Farrell
March 9, 2016

Presentation at NESEA 2016

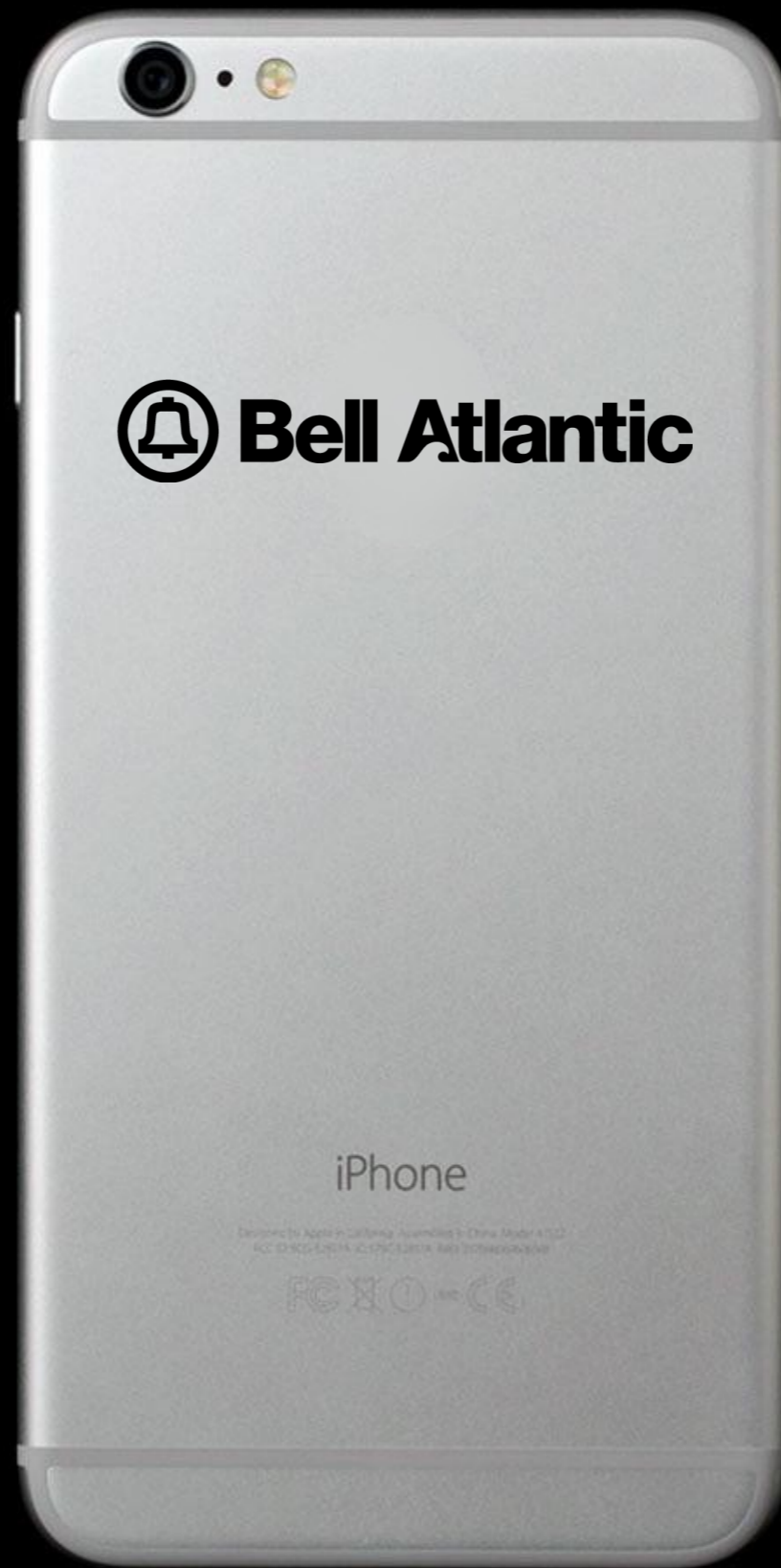


IISR's
**ENERGY
DEMOCRACY
INITIATIVE**

A QUESTION



Did you get one
of these...



From a landline
company like
that?



A SIMILAR
MONOPOLY
PROBLEM

STEADY FOR DECADES

"GOLDEN AGE"

c1900

1970

- Regulated monopolies
- Profits from sales
- Profits from new power plants
- "bigger is better"



IISRs

ENERGY DEMOCRACY
INITIATIVE

SHOCK #1

"GOLDEN AGE"

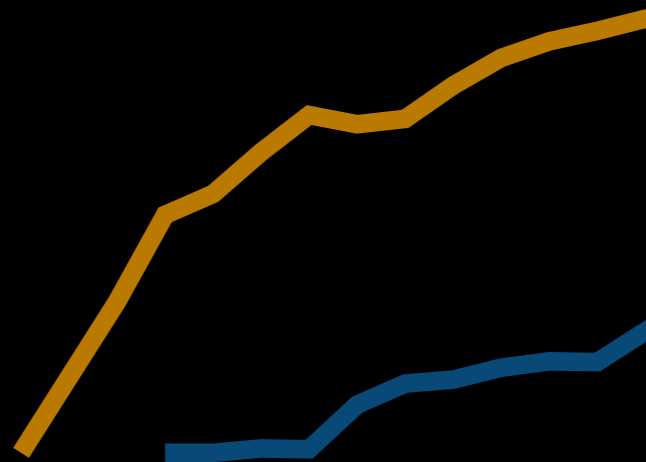
COST & COMPETITION

- Prices rise
- Sales slow
- Competition starts

c1900

1970

1980



- Per capita electricity use
- Average annual retail electricity prices

SHOCK #2

"GOLDEN AGE"

COST &
COMPETITION

STABILITY

DEREGULATION &
RENEWABLES

- Independent producers rise, as do interstate transactions

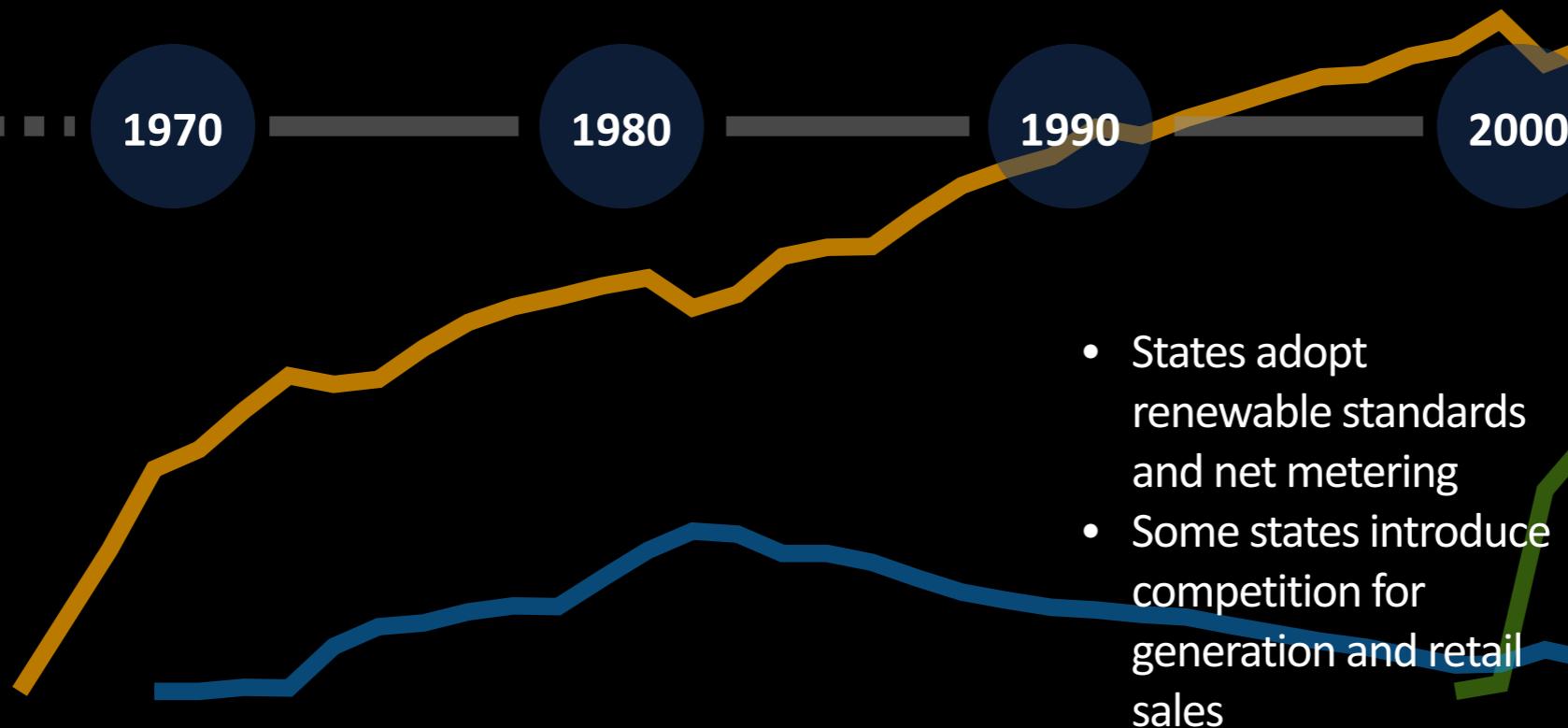
c1900

1970

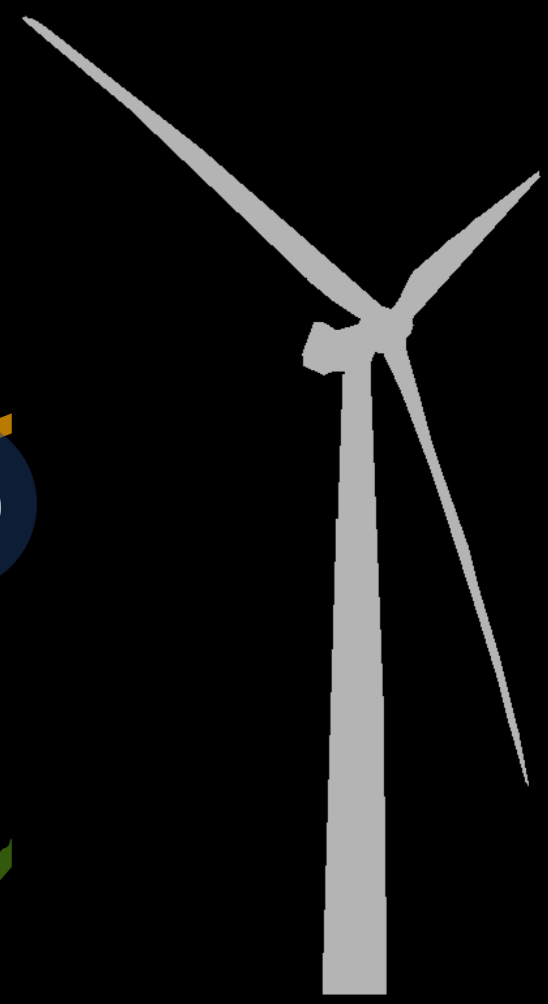
1980

1990

2000



- States adopt renewable standards and net metering
- Some states introduce competition for generation and retail sales



- *Per capita electricity use*
- *Average annual retail electricity prices*
- *Wind and solar power capacity*



Sources: World Bank, EIA, US Census, SEIA, LBNL

A TRANSFORMATIVE TIME

"GOLDEN AGE"

COST &
COMPETITION

STABILITY

DEREGULATION &
RENEWABLES

TRANSFORMATION

- Wind+Solar go exponential
- Demand flattens

c1900

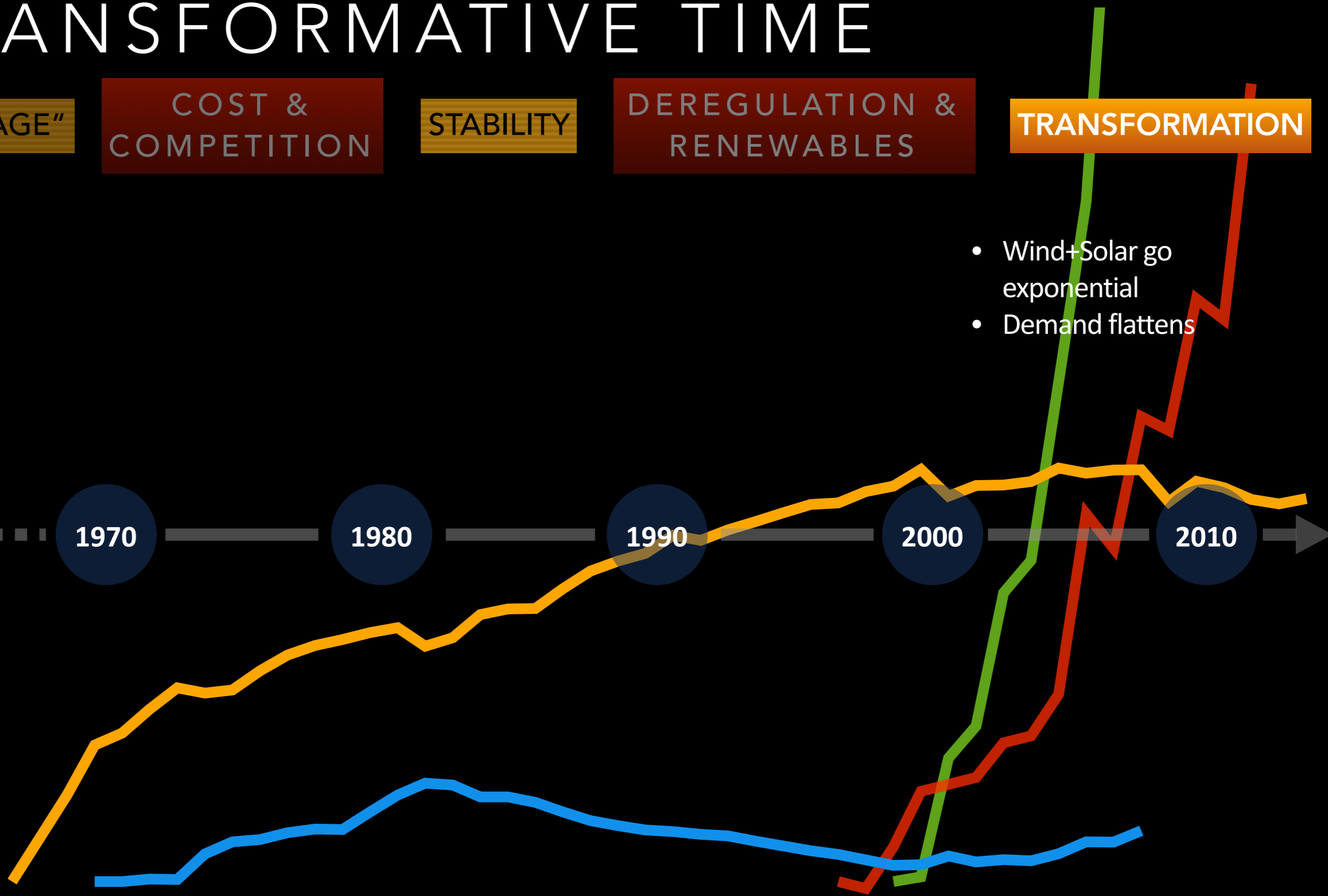
1970

1980

1990

2000

2010



Sources: World Bank, EIA, US Census, SEIA, LBNL

- Per capita electricity use
- Average annual retail electricity prices
- Interstate transmission spending
- Wind and solar power capacity

*Utilities are like bakers that
only try a recipe once a
decade. No iteration
means no innovation.*

NO PIECE
OF CAKE

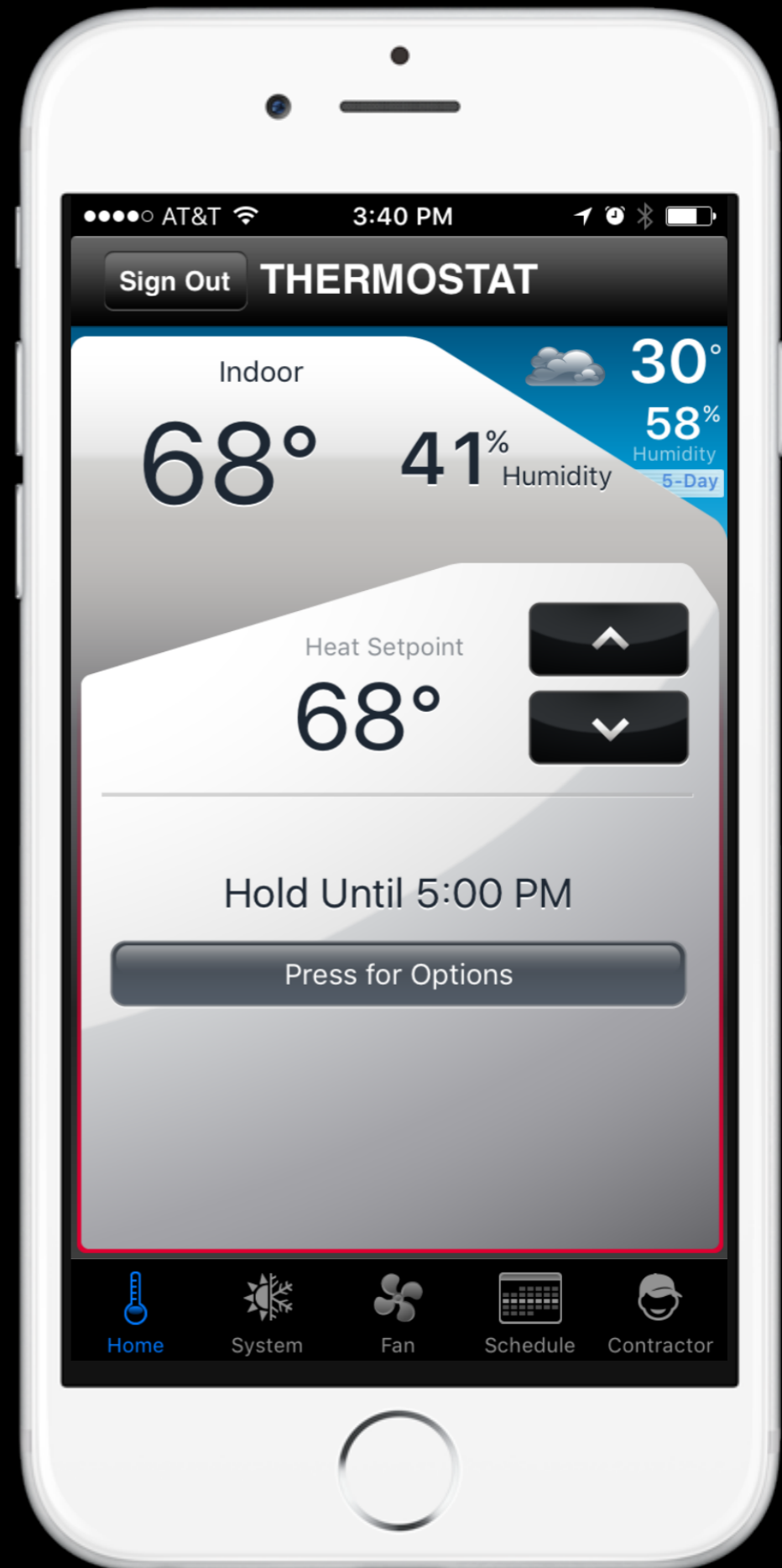


IN CONTRAST



1 INSTALL EVERY
60 SECONDS

UNPRECEDENTED POWER

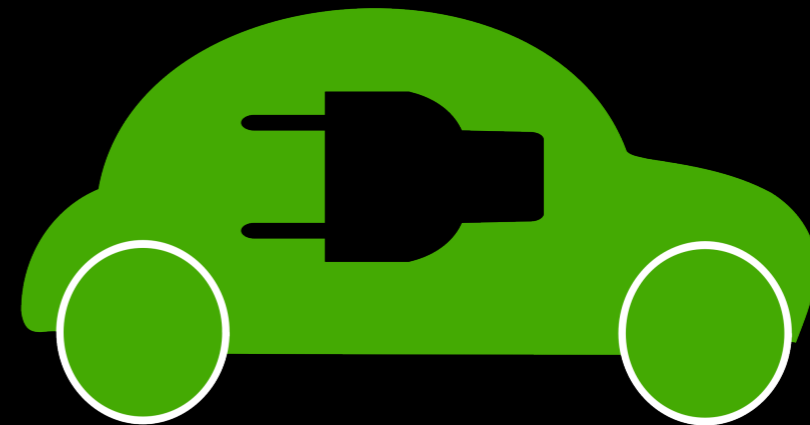
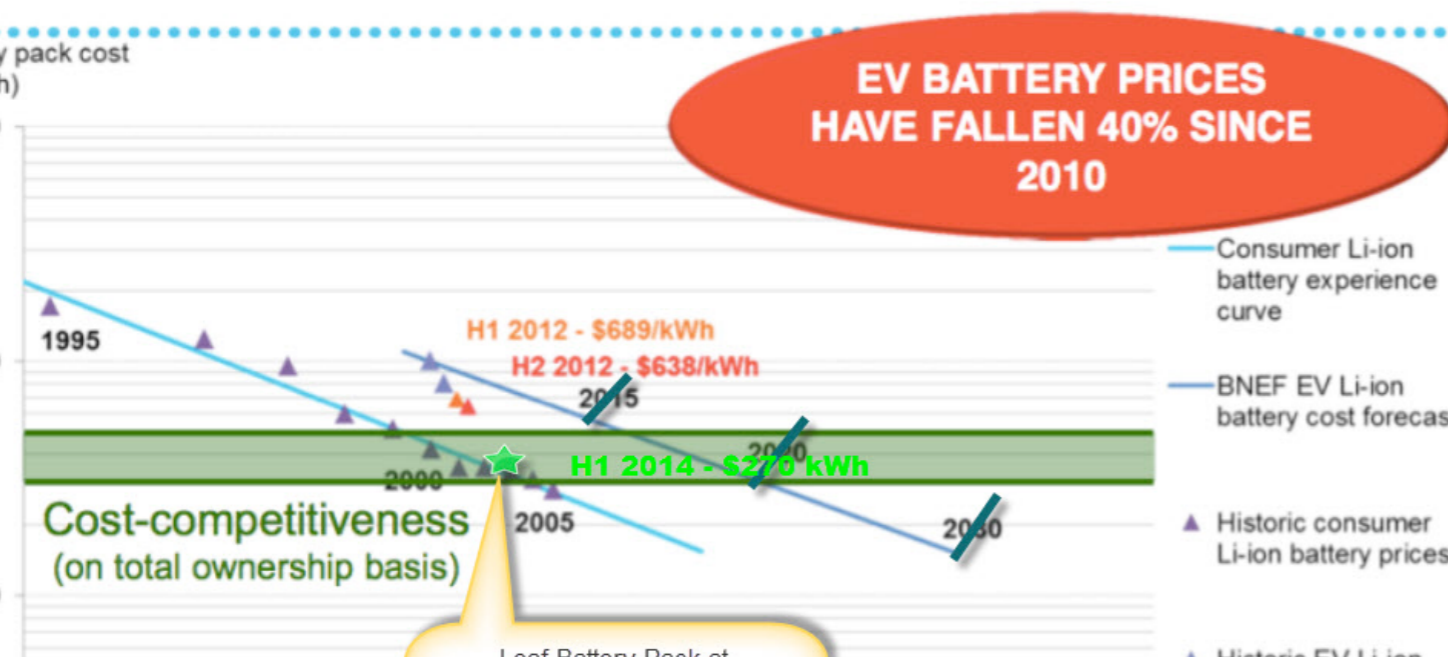


Software allows
many iterations



BATTERIES
EVERYWHERE

LI-IUM-ION BATTERY EXPERIENCE CURVE



DISTRIBUTION GRID INVESTMENT LAGGING

*“America will see an **investment gap** in distribution infrastructure **of \$57 billion** by 2020”*

American Society of Civil Engineers



MIND THE GAP



IT'S A WHOLE
NEW WORLD

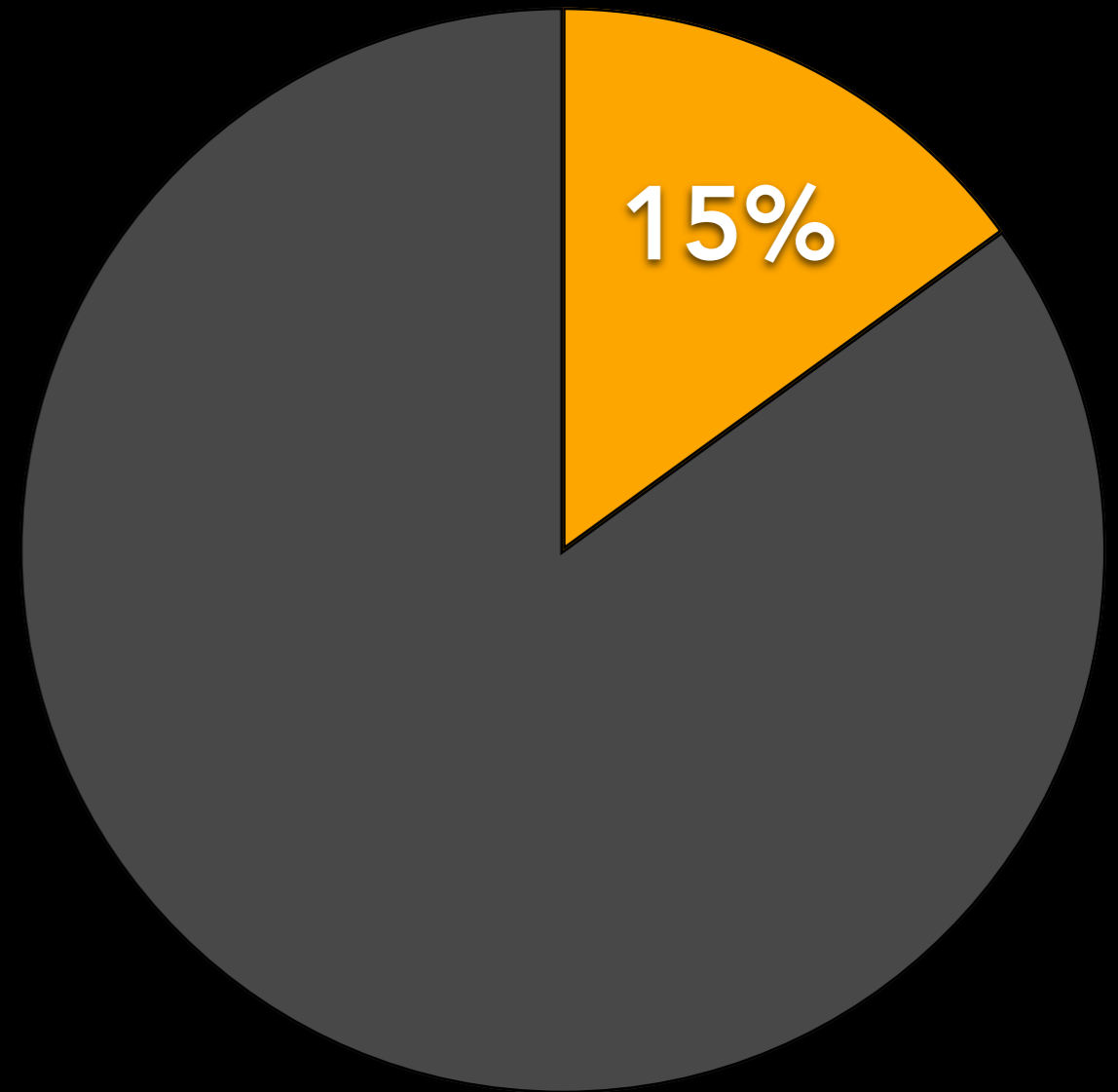
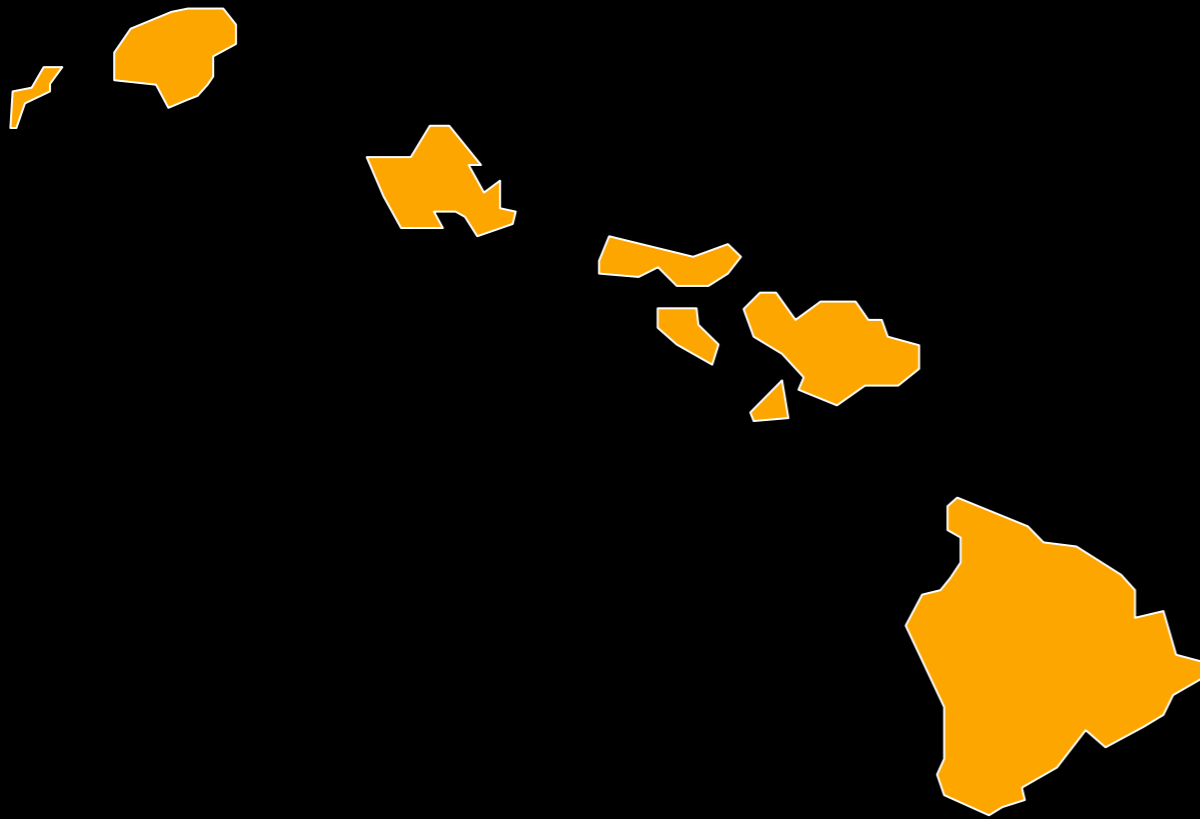


Small town
adds storage
to solar

Minster

POPULATION 2,806

PERCENT OF
HOUSEHOLDS WITH
SOLAR



SOLAR ALONE

Inexpensive solar+storage will be cheaper than grid electricity in most places within 20 years, half the life of new power plants

SOLAR+EV+BATTERY +SMART CONTROLS



53% used on-site

89% used on-site

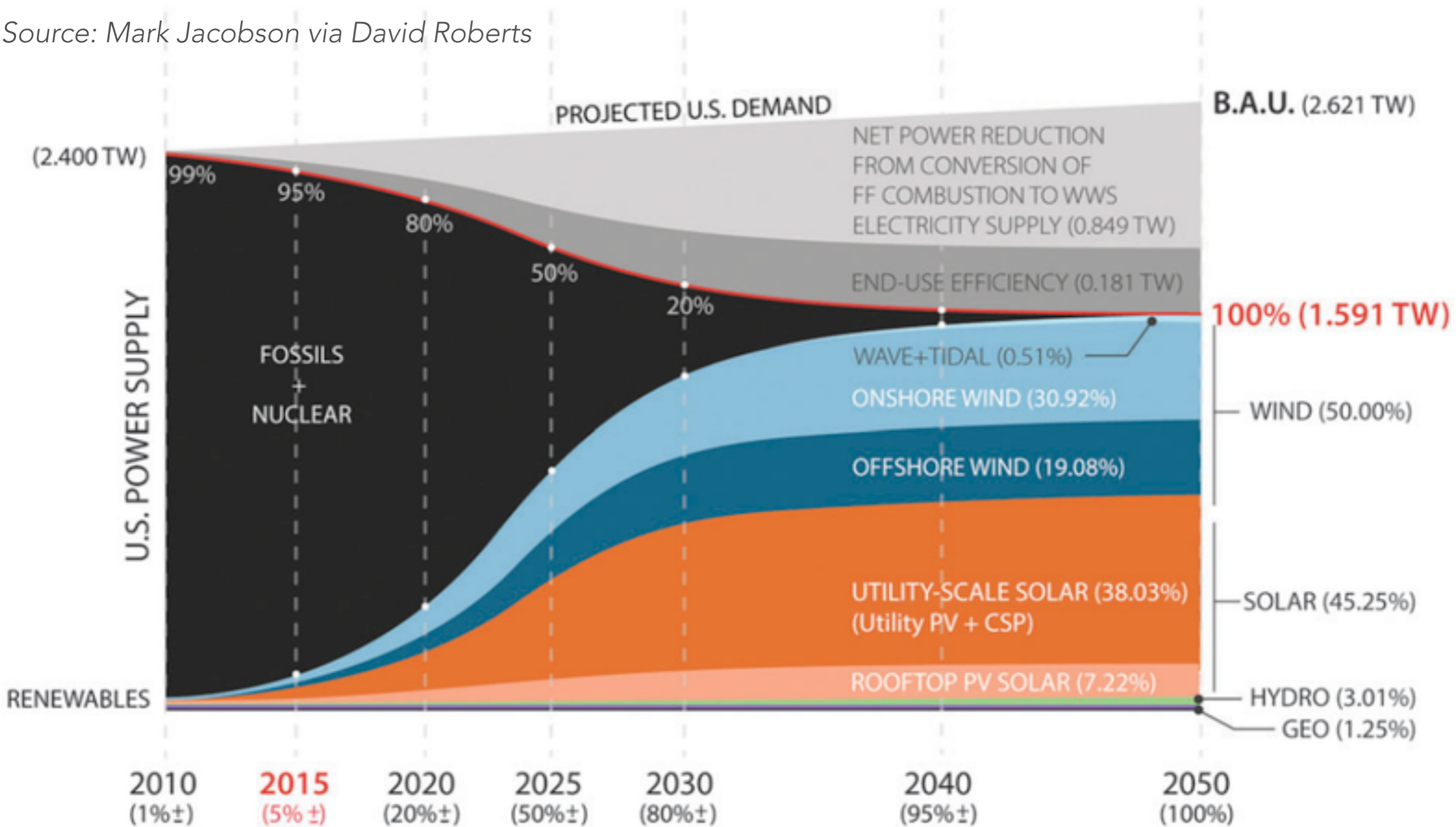
UNEXPECTED



HOW DIFFERENT
WILL IT BE?

100% RENEWABLE ENERGY*

Source: Mark Jacobson via David Roberts





Credit: mark notari via Flickr

*WITH A FEW CHANGES IN DIRECTION

1. ELECTRIFY EVERYTHING



Credit: Ken Bosma via Flickr

2. REDUCE USE

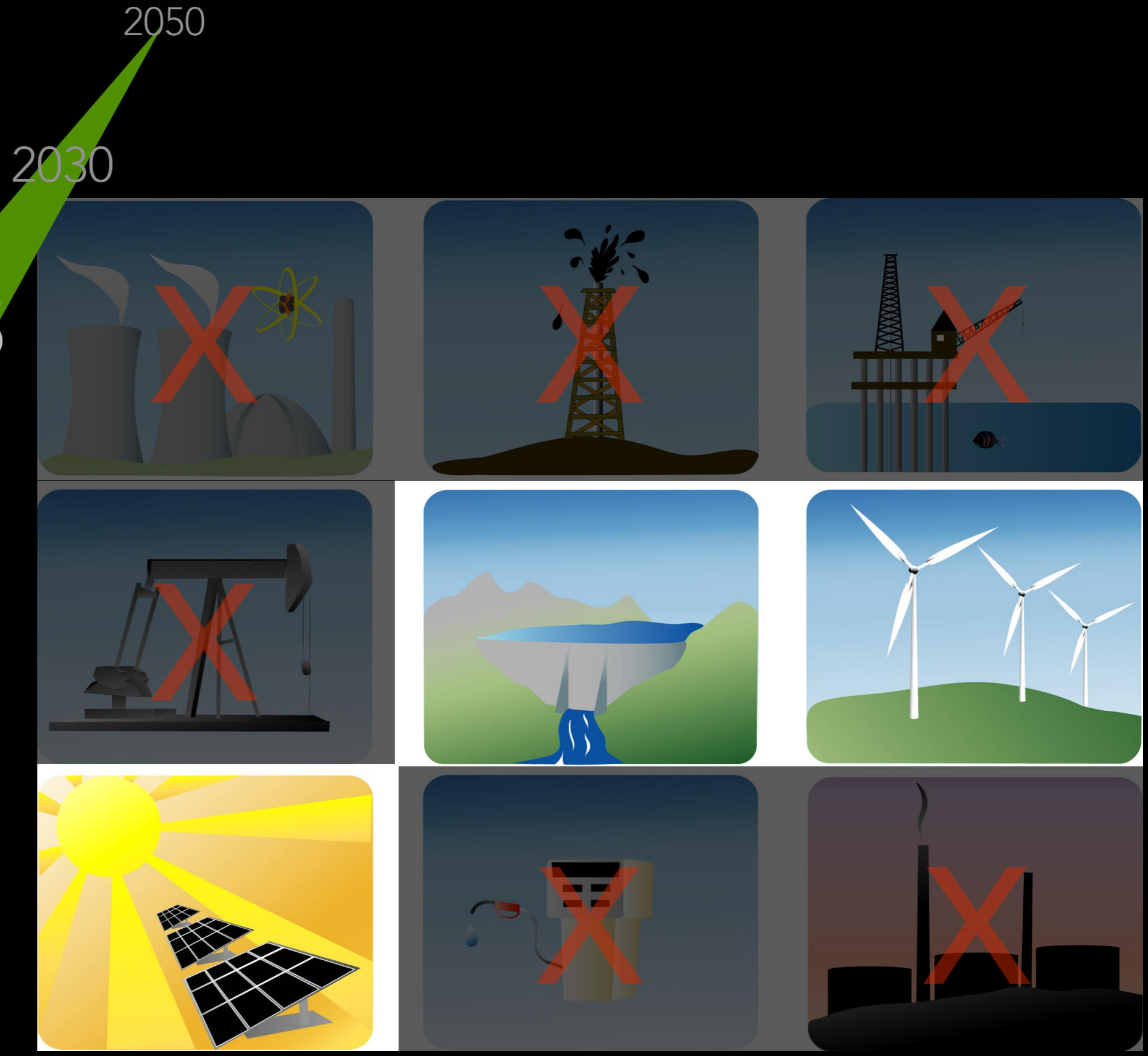
39.3%

Compared to business-as-usual

3. WIND-WATER-SOLAR ONLY

for new
power
plants
after 2020

016



ELECTRIFICATION TIMELINE TO REACH 100% RENEWABLE BY 2050

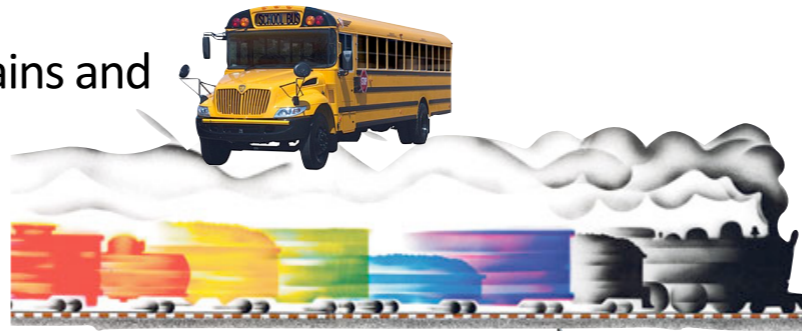
Heating, drying, and cooking in the residential and commercial sectors



2015

2020

All new trains and buses



2025

All new heavy duty trucks



2030

All new long-haul aircraft

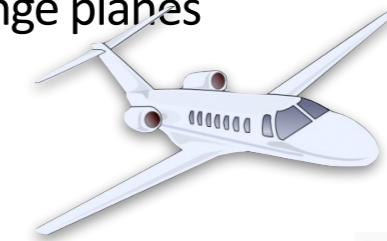


2035

All new light-duty vehicles



All new small, short-range planes



2040

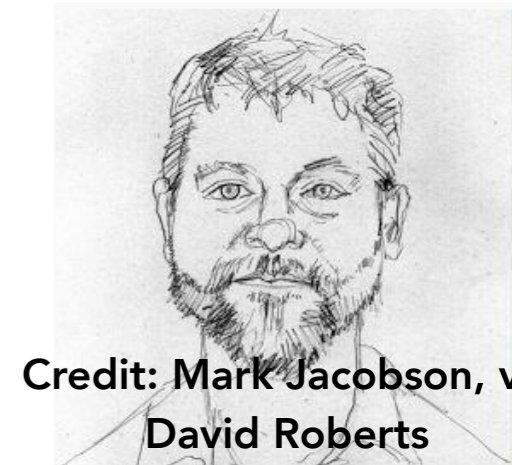
All new ships and ports



All new small marine vessels



IN JUST 25 YEARS...



Credit: Mark Jacobson, via David Roberts

A hand is shown holding a hammer, poised to strike a large, dark, spherical metal weight. The weight is suspended from a chain and sits on a scale. The background is a blurred industrial setting with various mechanical parts and a sign that partially reads "ELECTRIC COMPANY". The scene is overlaid with a dark, semi-transparent layer featuring white geometric shapes and lines, creating a stylized, abstract effect.

ADAPT OR DIE?



It seems an equal choice between energy democracy and utility monopoly...

But one is a dead end



NEW RULES

1. Enable alternatives

5 Reasons Why Microgrids Face Macro-Problems

1. A microgrid is undefined in most state laws



2. Questions as to who legally sells/distributes energy

3. Utilities denying interconnection requests



4. Lack of a plug-and-play control solution

5. Who pays for it?
Who benefits?



NEW RULES

2. Set up market



NEW RULES

3. Allow power sharing





John Farrell | 0 Comments | Dec 15, 2014

A \$48 Billion Opportunity for U.S. Electric Customers

Electricity customers in the U.S. got good news last week. A new report from Accenture highlighted a potential revenue loss for U.S. utilities of \$48 billion per year by 2025 due to distributed solar and energy efficiency. But where does that money go? If we pursue a democratic energy system as outlined in ILSR's new...

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REPORT



Beyond Utility 2.0 to Energy Democracy

Why a technological transformation in the electricity business should unlock an economic transformation that grants power to the people.

John Farrell
December 2014



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