

# *Electricity Planning: of Yesteryear and Tomorrow*

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# Electricity Planning

From 1880's till Recently:

Step 1: Predict needs of consumers.

Step 2: Build infrastructure to meet need plus buffer.

Today and Tomorrow:

Step 1: Predict how much consumption can be reduced or shifted.

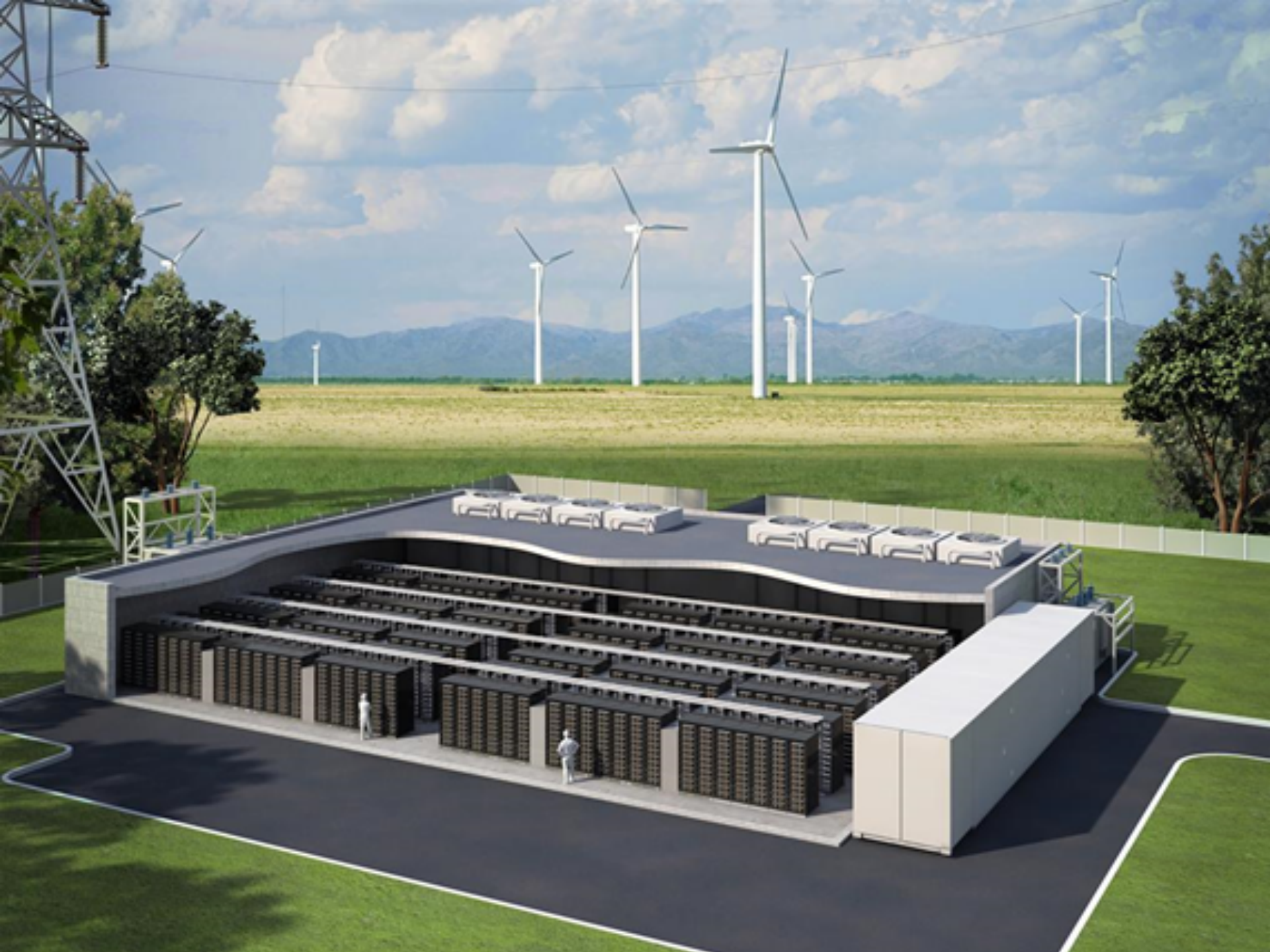
Step 2: If unable to reduce or shift consumption, then return to old model.

# Electricity Infrastructure

## Historic:

- No electricity storage
- Entire infrastructure built to deliver electrons upon immediate demand

## New...



# Tomorrow

1. Demand Response and Energy Efficiency
2. Distributed Generation
3. Microgrids

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TECHNOLOGY

Google to Buy Nest Labs for \$3.2 Billion
Internet Company Extends Reach Into Home with Buy of Thermostat, Smoke Detector Maker

By ROLFE WINKLER and DAISUKE WAKABAYASHI CONNECT
Updated Jan. 13, 2014 6:46 p.m. ET



Nest's thermostat programs itself and can detect when no one is home. Corbis

Google Inc. is on your desktop, in your pocket and now wants to be on your wall.

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The search giant said Monday it is paying \$3.2 billion to buy Nest Labs Inc., a closely held maker of "smart" thermostats and



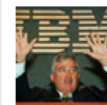
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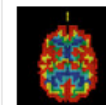
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# Bits



## INTERNET OF THINGS

### Nest Buys Revolv, Maker of Smart Appliance Manager

By CONOR DOUGHERTY OCTOBER 24, 2014 7:52 PM [Comment](#)

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Imagine an unoccupied house with a bunch of machines sitting around talking to one another. Saturday morning cartoons? The opening of a dystopic thriller? No, it's the idea behind a recent acquisition by Nest, the Google-owned maker of Internet-connected appliances like a thermostat and a fire alarm.

Nest announced on Friday that it had acquired [Revolv](#), whose hardware makes it possible for people to control several smart appliances on a single mobile app. Revolv is based in Boulder, Colo., and its small team of engineers will remain there.

Home automation is already here: There are connected washing machines, connected light bulbs and connected locks. But how do you keep track of them all? And, perhaps more important, how can companies get the devices to work together?

That's the idea behind the purchase. Nest began as a thermostat company. It has since added a smoke alarm and [in June, it acquired Dropcam](#), a video monitoring service.

Recently, through its [Works With Nest](#) program, the company has been delving deeper into integrating its products with other smart devices. For instance, the company has a partnership with Jawbone fitness trackers so that when a Jawbone user wakes up, the device can tell a Nest thermostat to start warming the house up.

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WASHINGTON POST | NeedMyTranscript.com facilitates requests from all 50 states and covers more than 18,000 high schools around the country. - *Natasha Singer*

#### Verizon Wireless Injects Identifiers to Link Its Users to Their Web Requests

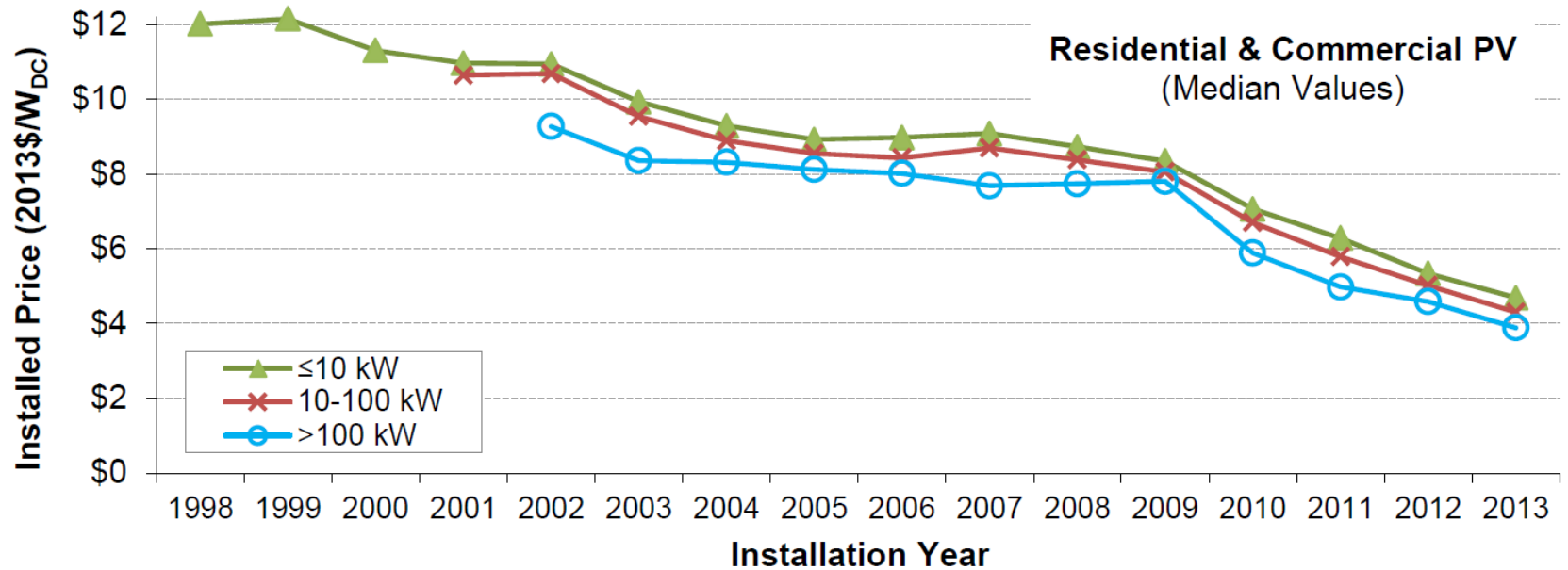
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# Distributed Generation



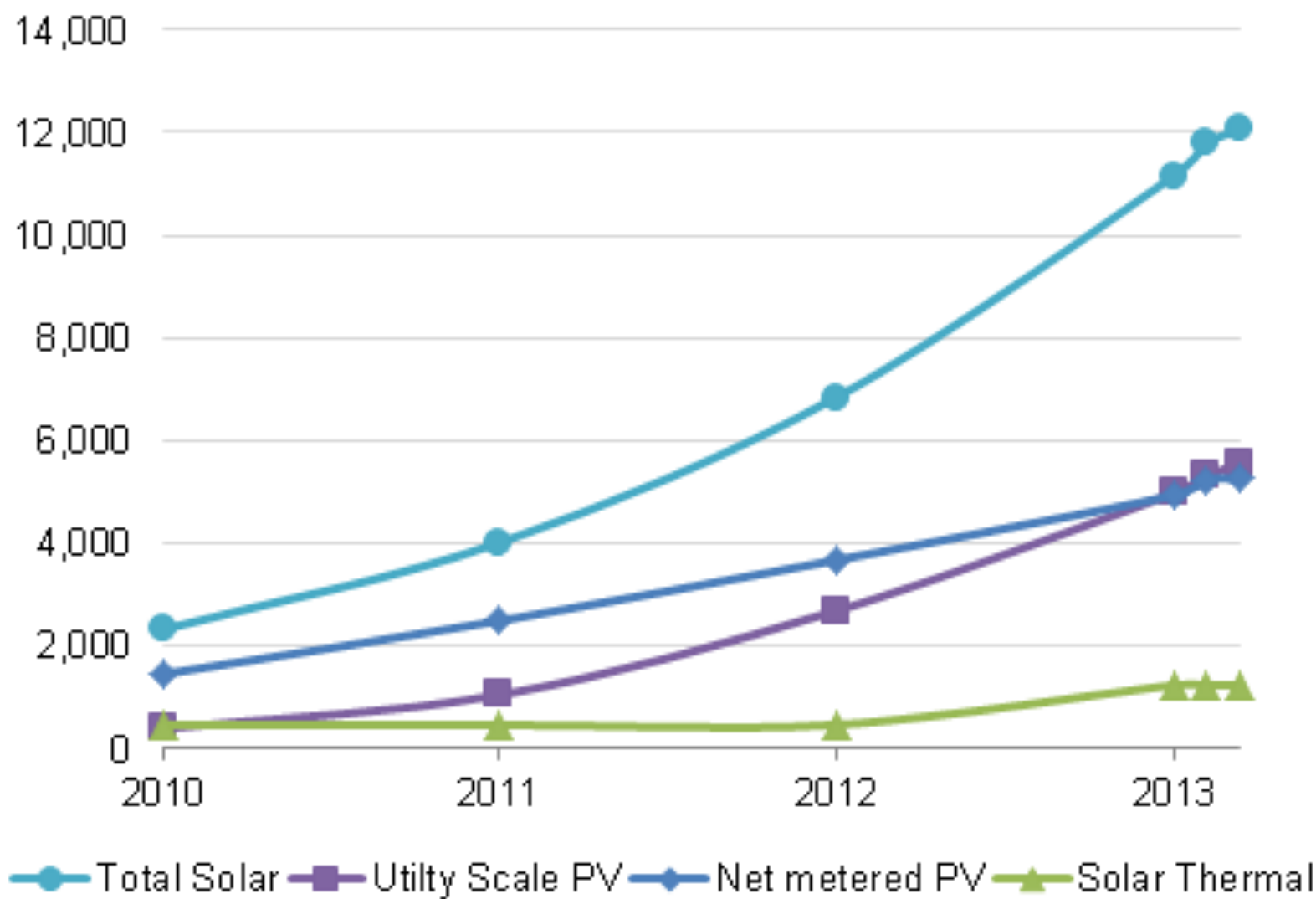
Notes: See Table 1 and Table B-2 for residential and commercial PV sample sizes by installation year. Median installed prices are shown only if 15 or more observations are available for the individual size range.



# U.S. Solar Capacity, 2010-2014



Megawatts



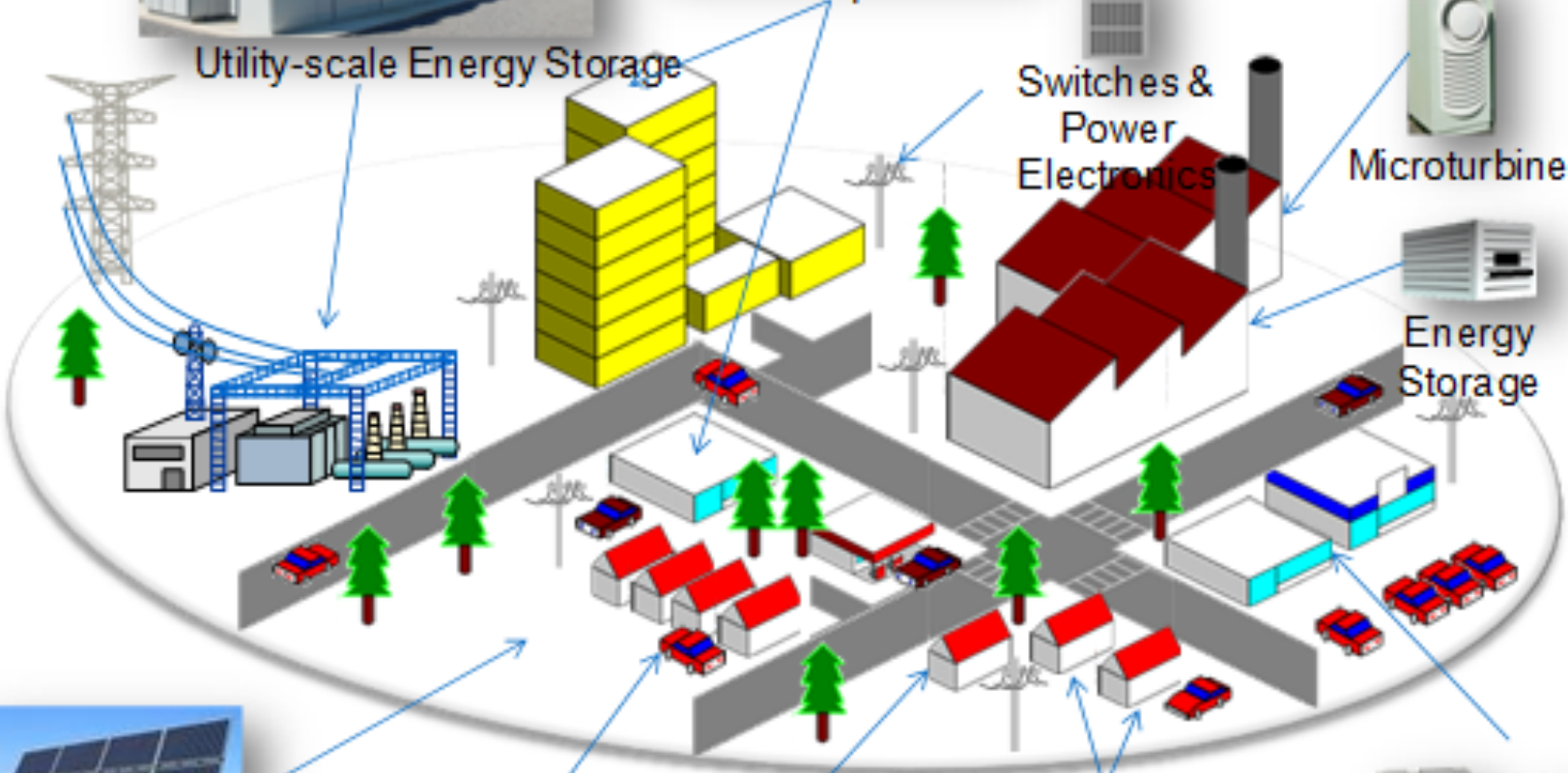
**Many new things to manage!**



Rooftop PV Solar



Utility-scale Energy Storage



Switches & Power Electronics

Microturbine

Energy Storage

PHEVs



Ground PV Solar Array

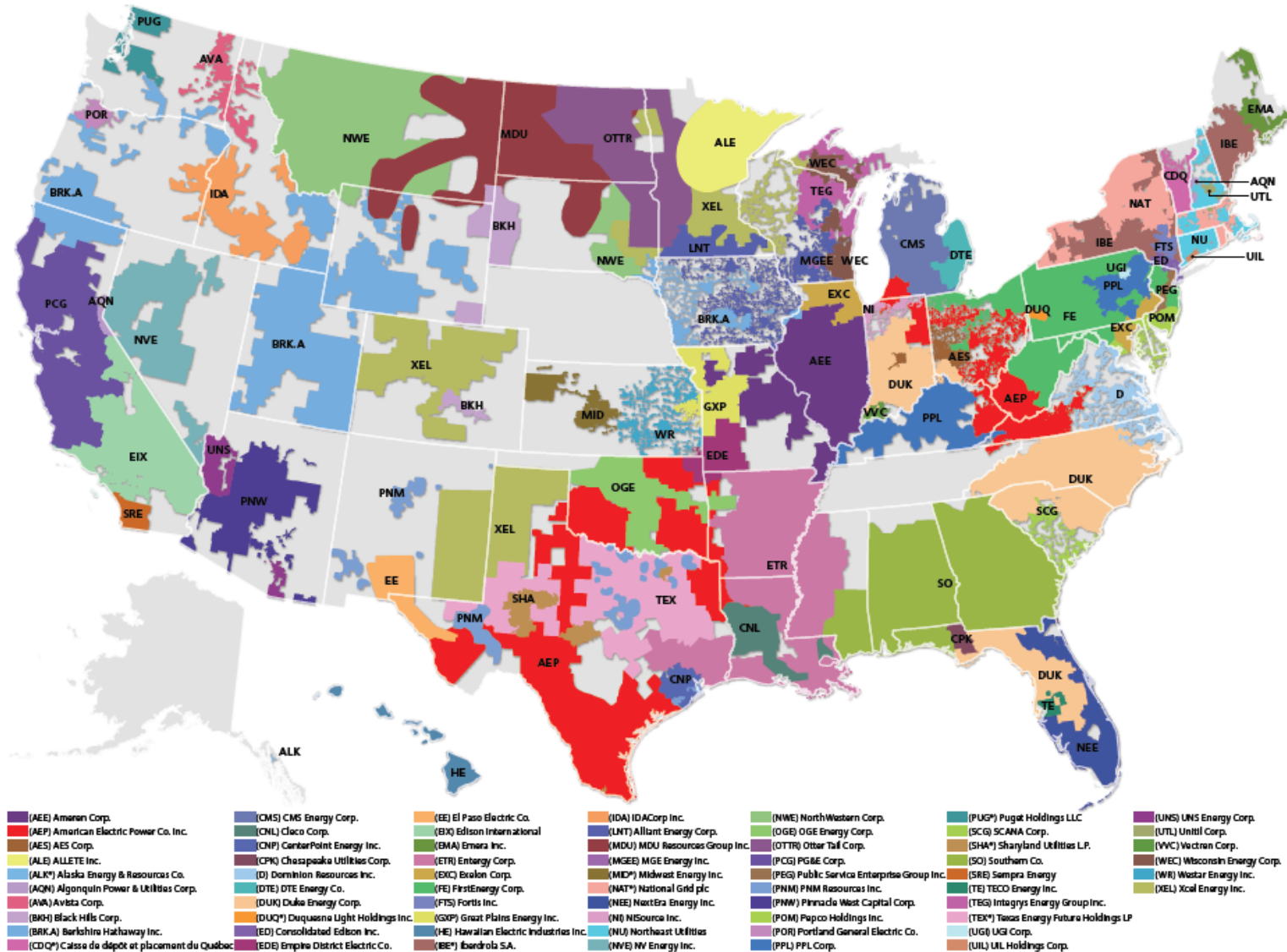


Home Energy System



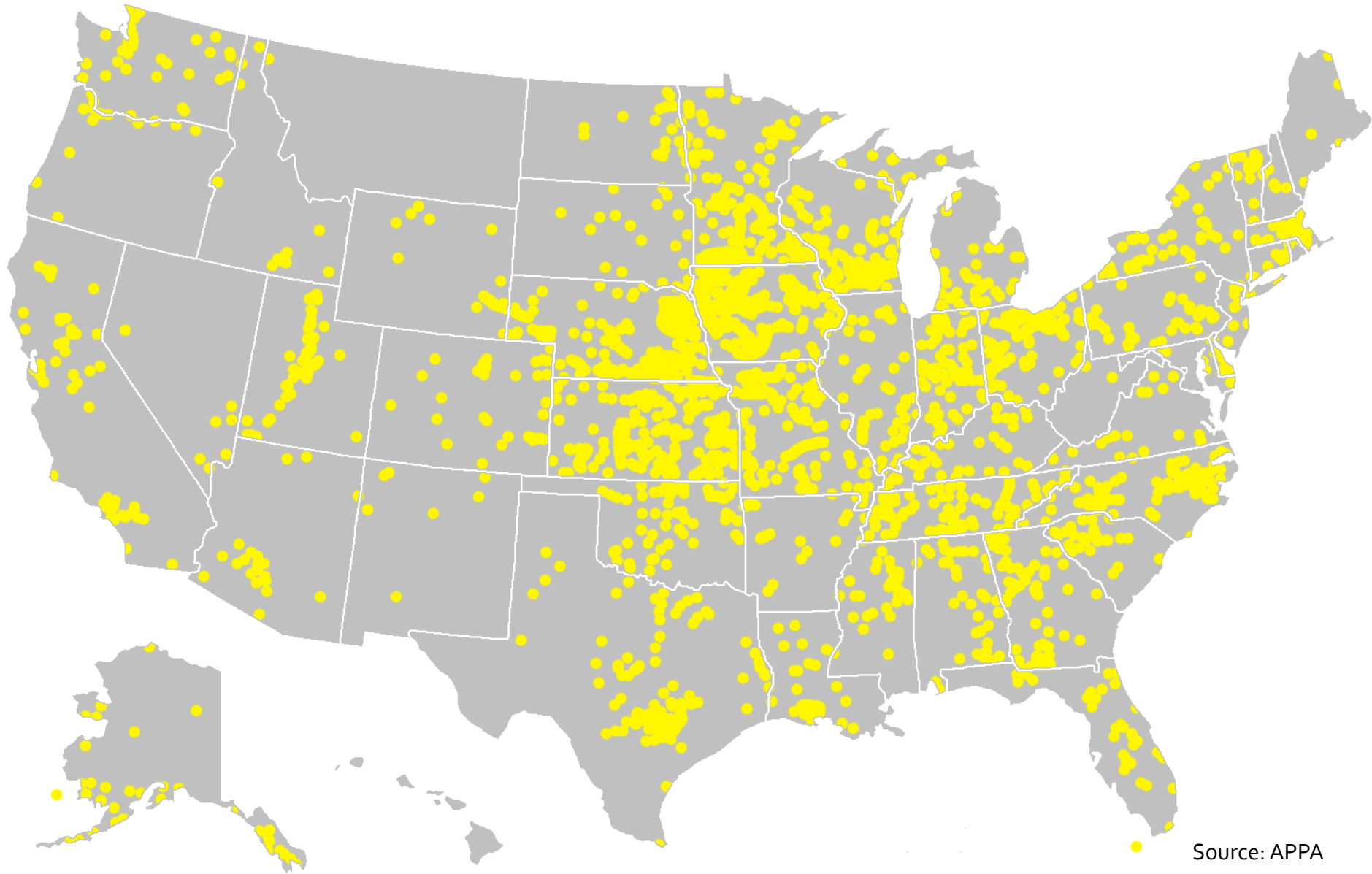
Distributed Generation

# Utility Service Territories – Investor Owned



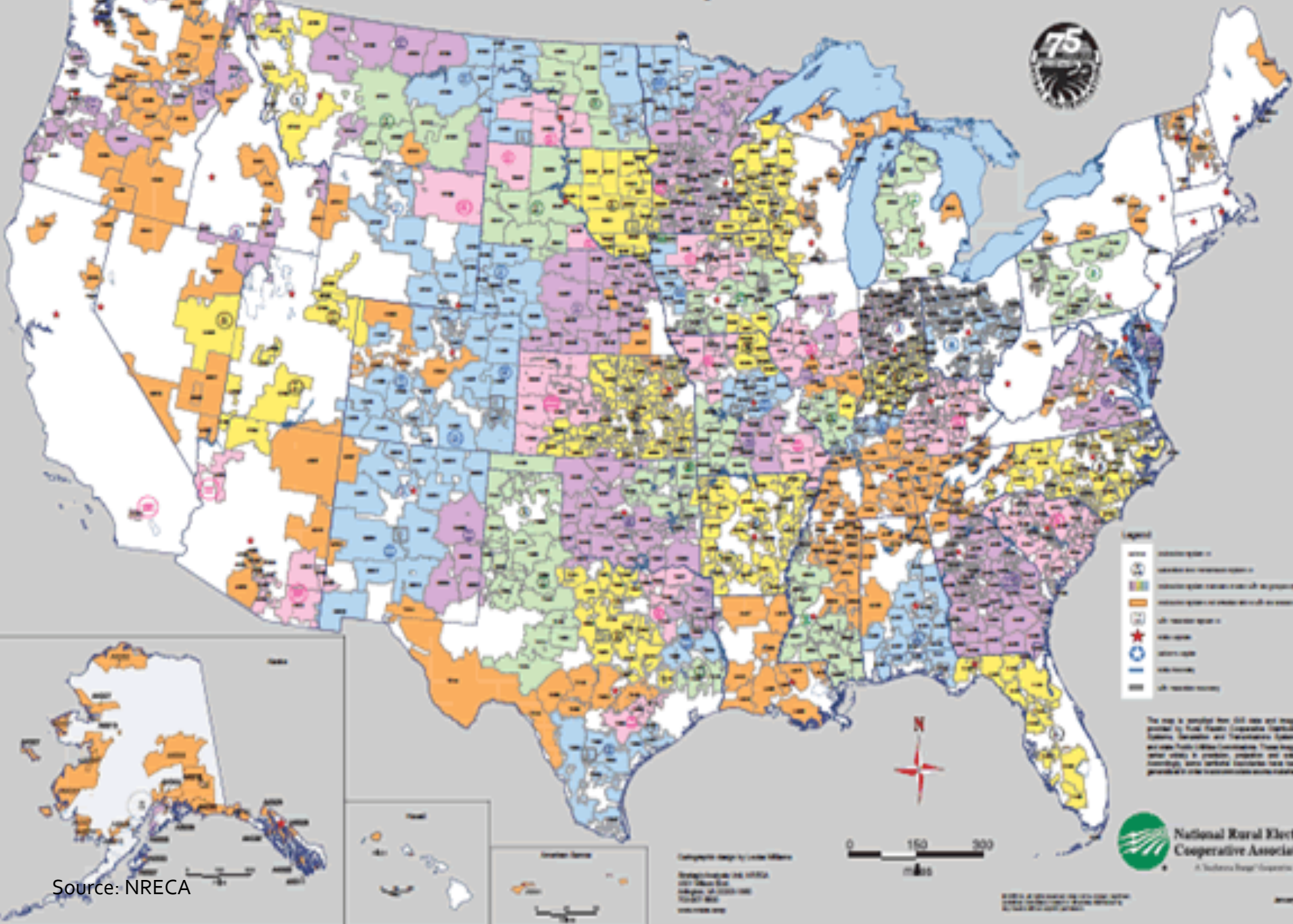
As of Jan. 2, 2014. All companies are represented by trading tickers unless noted by (\*).

# Municipal Utilities



Source: APPA

# America's Electric Cooperative Network



# Tomorrow's Cities & Communities

What Role Will You Play?

*The End  
...& the Beginning*

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