



People. Power. Possibilities.

Central Hudson
A FORTIS COMPANY



Utility of the Future

Heather Adams, Director, Electric Distribution & Standards

2016 Solar Summit

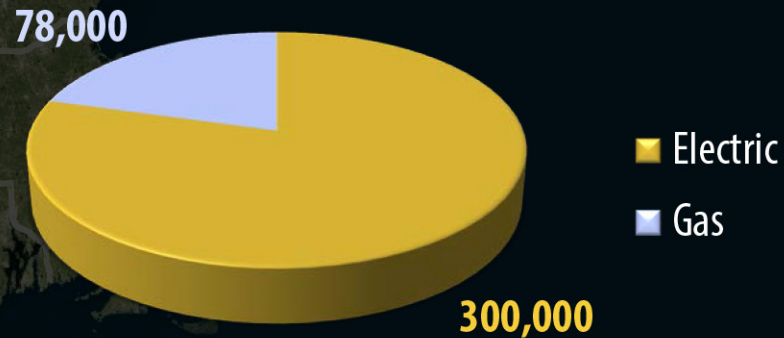
March 2, 2016

Central Hudson Gas & Electric

ABOUT US



Customer breakdown



Service territory statistics

- 2,600 square miles
- 680,000 total population (approx.)
- \$66,300 avg. household income (approx.)

Central Hudson Gas & Electric

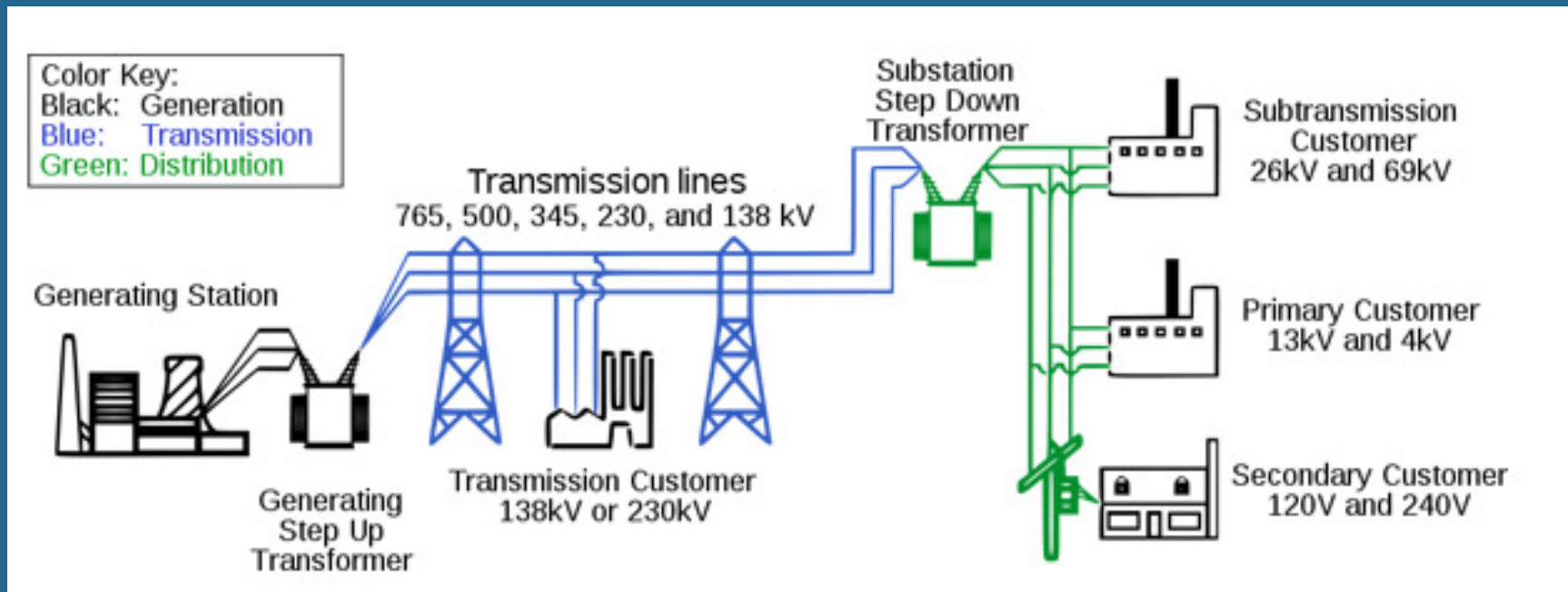
COMPETITIVE OPPORTUNITIES

- ▶ **Fundamental transformation of the utility industry in New York State**
- ▶ **Required divestiture of our large generating facilities in 2001**
- ▶ **Customers have option to purchase electricity and natural gas from third-party suppliers**



Traditional Electric Grid

ONE WAY POWER FLOW



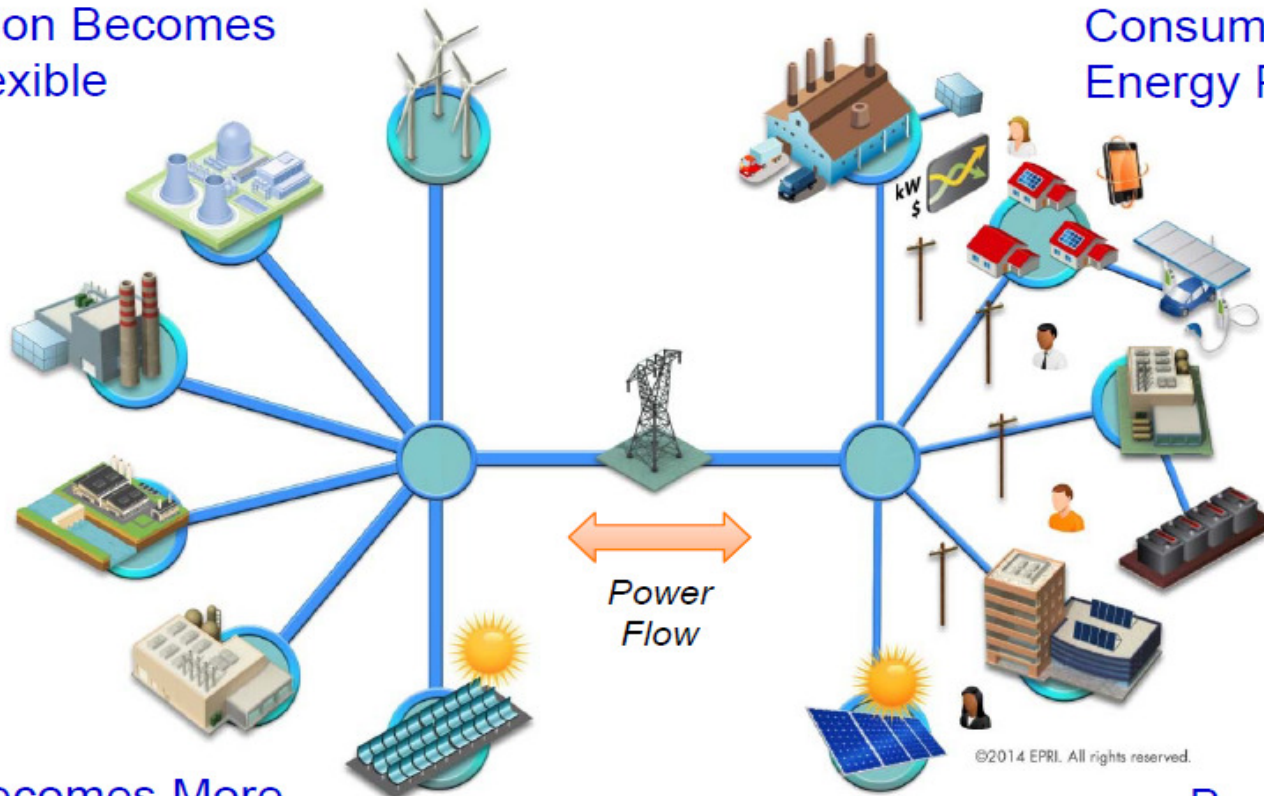
Source: <http://www.ei.lehigh.edu/learners/energy/electricity/electricity6.html>

Transformed Electric Grid

TWO WAY POWER FLOW

Generation Becomes
More Flexible

Consumers Become
Energy Producers



T & D Becomes More
Controllable and Resilient

Loads
Become More
Interactive and Dynamic

What is REV?

REFORMING THE ENERGY VISION

- ▶ **Strategy developed by New York State to reform the electric distribution industry**
- ▶ **Essential purpose is to:**
 1. Improve system efficiency
 2. Empower customer choice
 3. Encourage greater penetration of distributed energy resources (energy efficiency, demand response, distributed generation)
- ▶ **Initiated in 2014**

Policy goals

REFORMING THE ENERGY VISION

- ▶ Enhance customer knowledge and tools that will support effective management of their total energy bill
- ▶ Market animation and leverage of ratepayer contributions
- ▶ System-wide efficiency
- ▶ Fuel and resource diversity
- ▶ System reliability and resiliency
- ▶ Reduction of carbon emissions
- ▶ *Affordability*

What is driving REV?

THE PREMISE

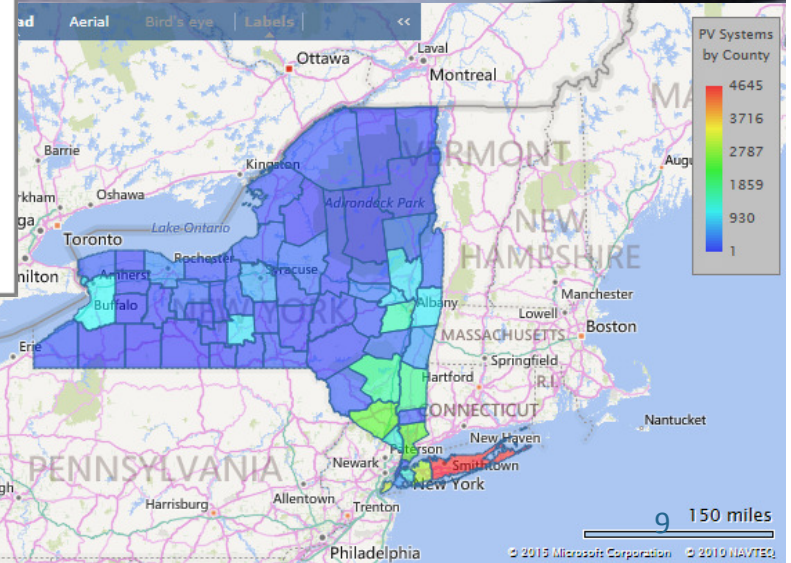
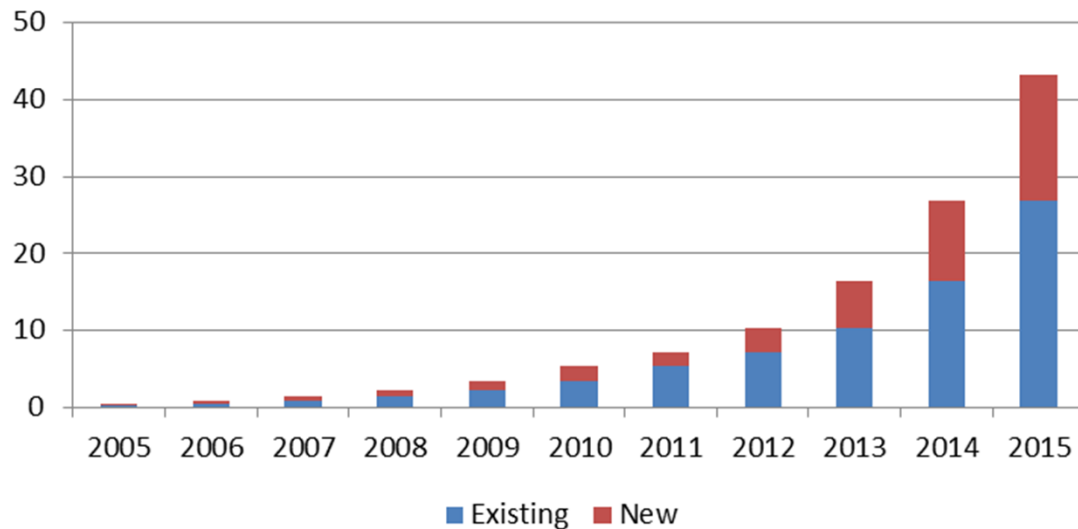
- ▶ **Aging infrastructure**
\$30 billion in the next 10 years
- ▶ **Inefficient grid**
60% utilization; design for peak
- ▶ **Rising energy costs**
Delivery rates/surcharges
- ▶ **Increased demand for uninterrupted service**
- ▶ **Increased adoption of Distributed Energy Resources**

What is driving REV?

HUDSON VALLEY A SOLAR HUB

Central Hudson Solar Photovoltaic (PV) Megawatts (MW) Installed

Cumulative PV MW's Installed by Year



What is driving REV?

THE GAPS

- ▶ **95% of capital investment is condition driven, not load-growth driven**
- ▶ **Aging infrastructure must still be replaced**
84% of bulk transmission is more than 40 years old
- ▶ **Distribution system is not equipped for proliferation of distributed energy resources (DER)**

What challenges does REV present?

FOR CENTRAL HUDSON

- ▶ **Customer education**
- ▶ **Customer engagement**
How do we get them excited?
- ▶ **Technology integration**
It's complex
- ▶ **Utility adoption**
New tools, new skill sets
- ▶ **Supportive regulatory framework**
Must support innovation

Central Hudson's strategy

FOUNDATIONAL TECHNOLOGY

- ▶ Foundational to our core strategy / pre-date REV (2011)
- ▶ Foundational for REV

Distributed System
Automation (DA)



*NETWORK
STRATEGY (NS)
(Real-Time)*

*ESRI GIS
(Asset Model)*

System Operations
Center (DMS)



Central Hudson's strategy

FOUNDATIONAL TECHNOLOGY

1. Distribution Management System (DMS)

- Real time system model
- Integrated Distributed Energy Resources

2. System infrastructure upgrades

- Reduce Losses
- Improve Operational Flexibility

3. Intelligent devices/sensors

- Conservation Voltage Reduction (CVR)
- Fault Location, Isolation, and Service Restoration (FLISR)

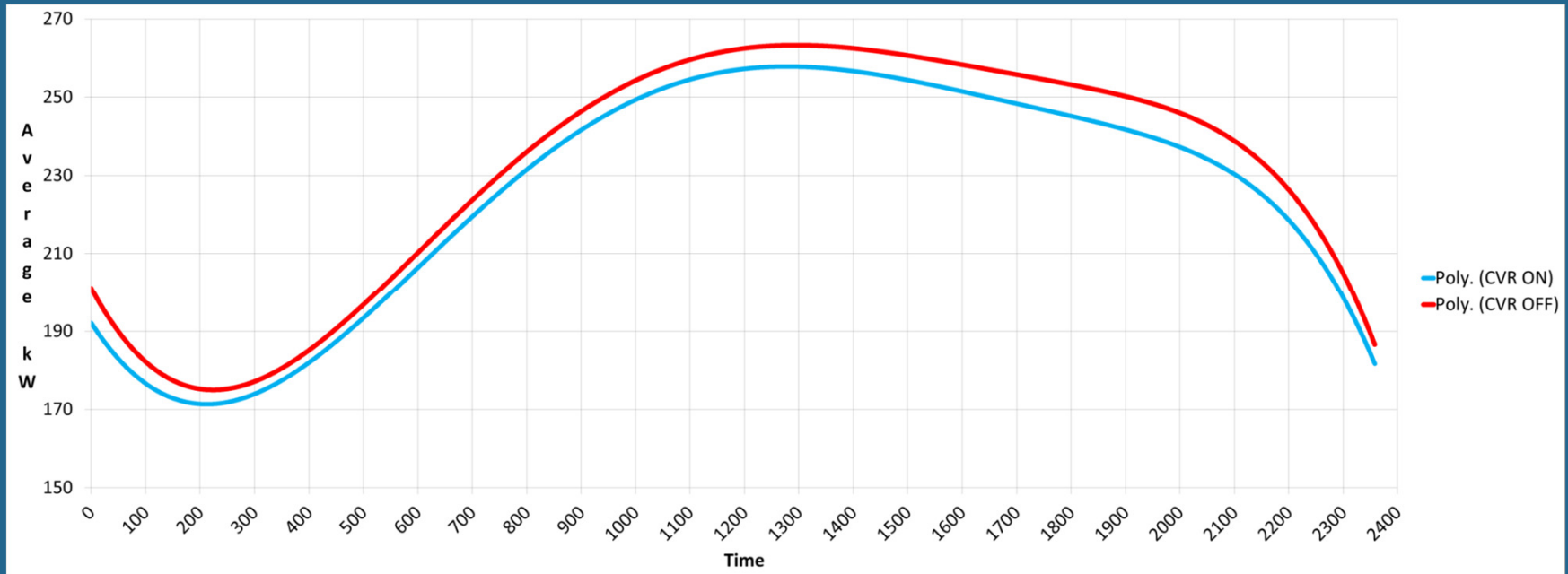
4. Network Strategy



Central Hudson's strategy

FOUNDATIONAL TECHNOLOGY

► Conservation Voltage Reduction reduces energy usage



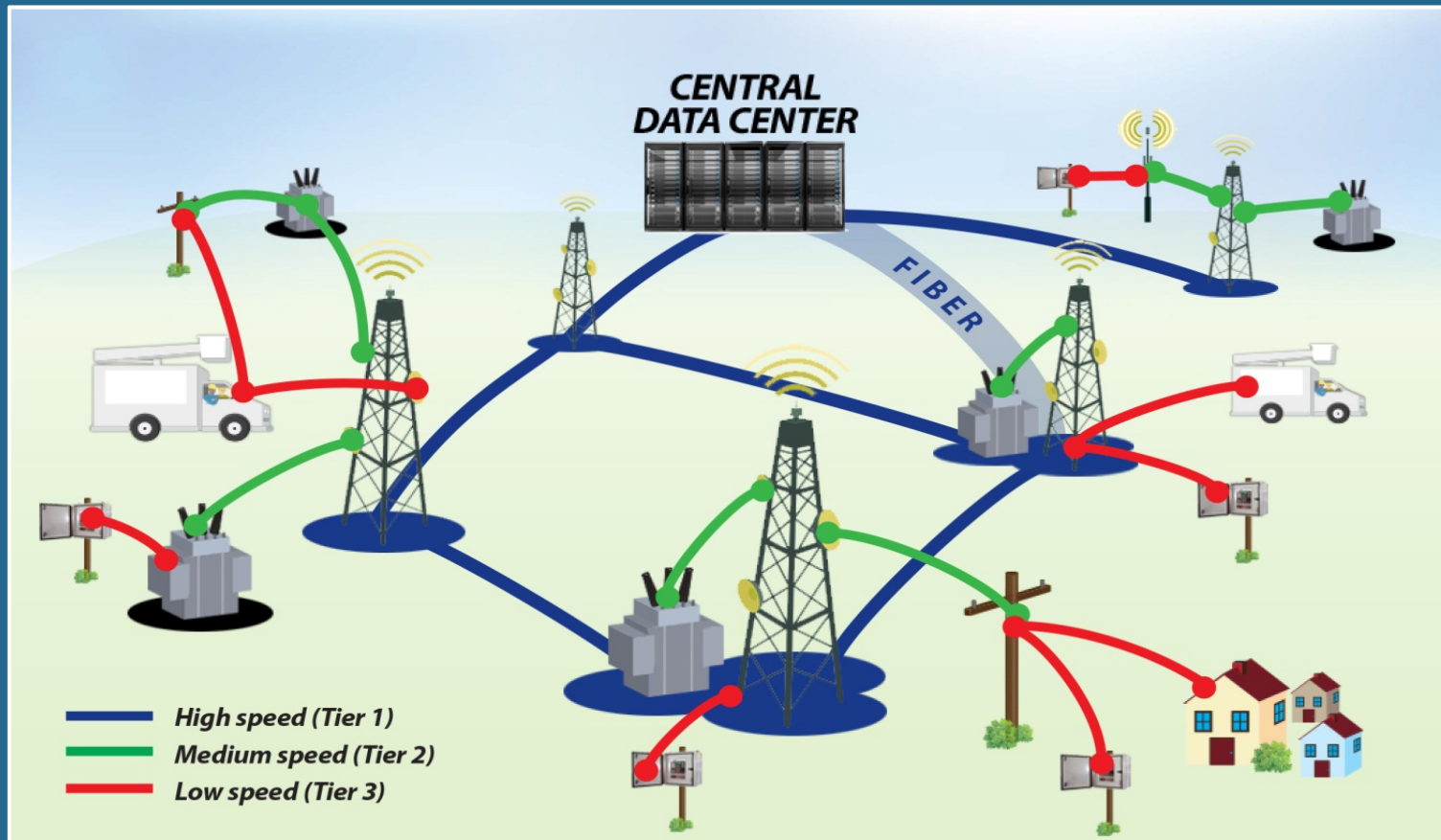
Blue = kW with CVR

Red = kW without CVR

Central Hudson's strategy

FOUNDATIONAL TECHNOLOGY

► Network Strategy – Integrated Communications Network



Central Hudson's strategy

REV DEMONSTRATION INITIATIVES

Targeted Demand Response



Microgrids



Energy Exchange



Targeted Area Requirements



■ Northwest Corridor

- Original T&D Need 2019
- Deferred 10 years
- 10 MW demand response

■ Fishkill Plains

- Original T&D Need 2020
- Deferred 5 years
- 5 MW demand response

■ Merrit Park

- Original T&D Need 2020
- Deferred 7 years
- 1 MW demand response

Conclusion

UTILITY OF THE FUTURE

- ▶ **Rate of change is rapidly increasing**
- ▶ **Collaborative approach is necessary for innovation**
- ▶ **The story is ... to be continued**

- ▶ **Resources**

NY REV: www.dps.ny.gov/REV

Electric Power Research Institute: integratedgrid.EPRI.com, smartgrid.EPRI.com

NY Sun: ny-sun.ny.gov

Central Hudson: www.centralhudson.com