

Climate Smart Communities Webinar

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Climate Smart Communities Webinar

November 13, 2014



Community Energy Options: Micro-Grids, and Community Choice Aggregation

This webinar will begin shortly. Please be considerate of your fellow attendees:

- Please mute your phone to reduce background noise
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- Please do not put your phone on hold at any time.
- To ask a question, please type your question or comment in the chat box feature.

Welcome

Kim Farrow

Environmental Program Specialist

Office of Climate Change

New York State

Department of Environmental Conservation



Climate Smart Communities Webinar

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Climate Smart Communities Webinar

Website Address



<http://www.dec.ny.gov/energy/50845.html>

Climate Smart Community Webinars

Schedule: <http://www.dec.ny.gov/energy/86246.html>

- December 10 (Wednesday), 10:30 a.m. *Best Practices in LED Streetlight Conversions*
- January 8, 10:30 a.m. *Getting to Net-Zero Homes*

***The NYS DEC presents:
CCA and Microgrids: Community
Driven, Private Enterprise Models
for Smart Grid Innovation***

*Presenters: Mike Gordon and Maria
Fields, Joule Assets*

Guests: Climate Smart Communities

November 13th, 2014



Overview

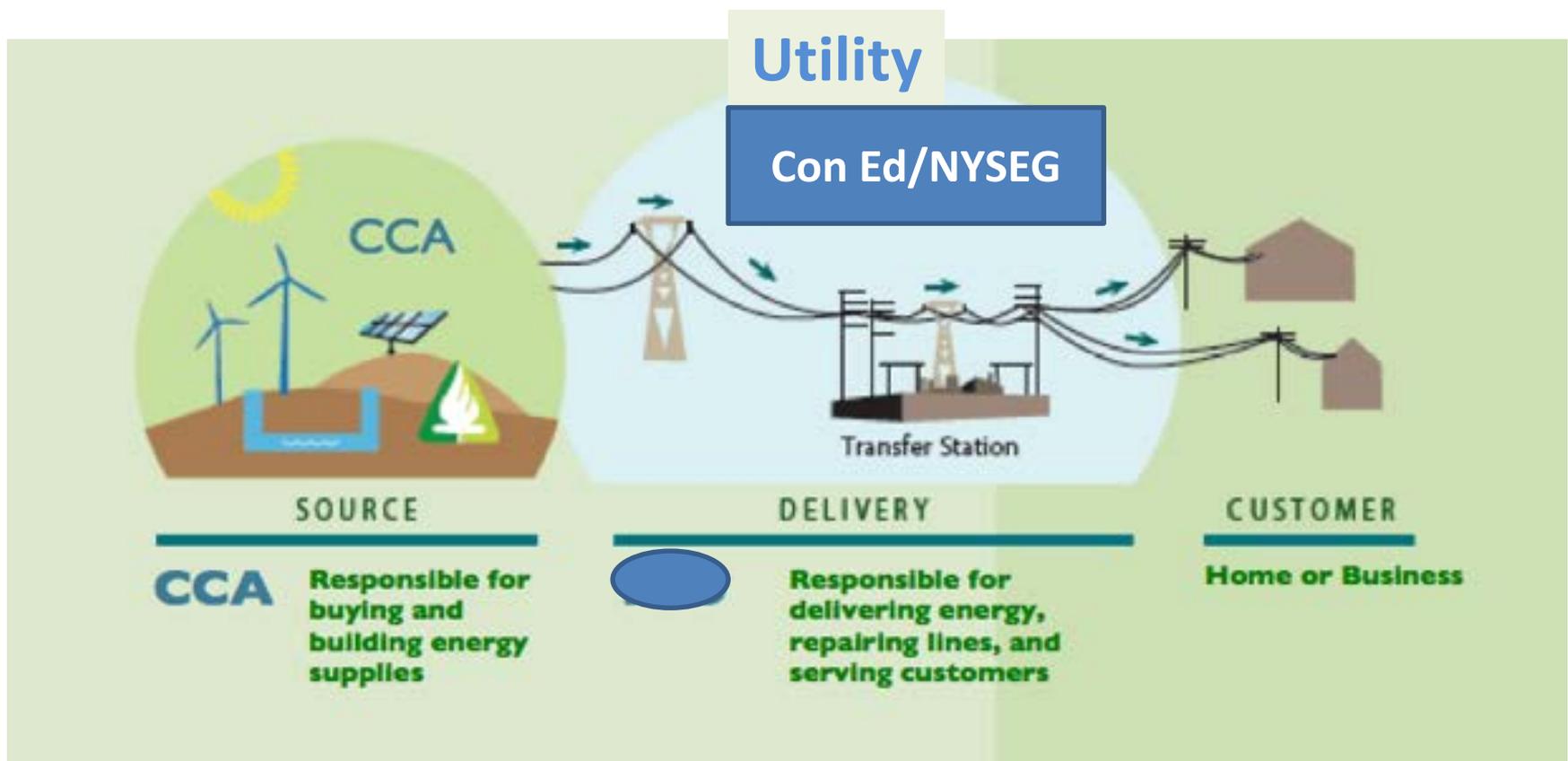
- ✓ **CCA**
 - ✓ **Description of Market Structures & CCAs Potential Role**
 - ✓ **Common Features**
 - ✓ **Potential “Added Value”**
 - ✓ **Renewable Generation**
 - ✓ **Micro-grids**
 - ✓ **Energy Efficiency**
 - ✓ **Stage of NY Legislation**
- ✓ **Micro-grids**
 - ✓ **Driving Value**
 - ✓ **Available Funding**
 - ✓ **Barriers**

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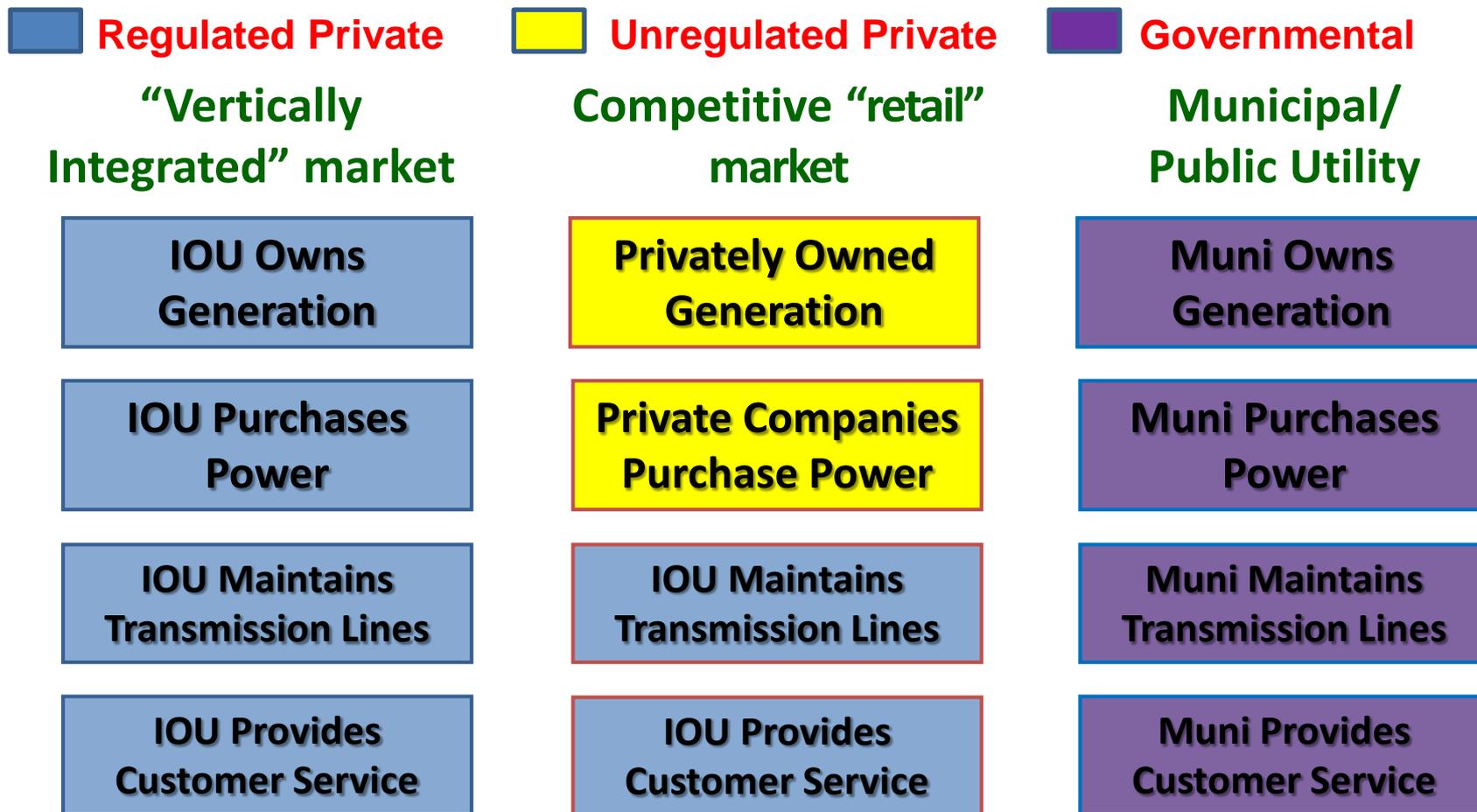
WHAT IS CCA?

CCA (“MEA” in NY) allows cities and municipalities (& in some cases, counties) to pool their residential, business and municipal electricity loads (& gas, in NY) , and to purchase power on their behalf. Energy transmission, distribution, repair and customer service functions remain with the incumbent utility.



NY—A HYBRID APPROACH

- Roughly 70% of U.S. electricity is supplied by vertically integrated investor-owned utilities (IOUs), with much of the balance coming from publicly-owned municipal utilities. **Competitive “retail” markets are a hybrid where key energy functions are split between regulated and unregulated entities.**



CCAs,

- CCA fits into the hybrid market & adds market clout (buying on behalf of all consumers who do not opt out of CCA) and potentially enriched services via a collective governance/customer service entity



CCA contracts with one competitive supplier & can add services

“Vertically Integrated” market

IOU Purchases Power

IOU Maintains Transmission Lines

IOU Provides Customer Service

Competitive “retail” market

CCA Aggregates Power Purchase

IOU Maintains Transmission Lines

IOU Provides Customer Service

Non-Profit/IMA
Adds Features

Municipal/ Public Utility

Muni Purchases Power

Muni Maintains Transmission Lines

Muni Provides Customer Service

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COMMON FEATURES

- ✓ **Enabled by State Legislation (However, NY DPS feels that only rule-making is required)**
- ✓ **Opt-out program (in NY, most proposals/pending initiatives, include electric & gas)**
- ✓ **Local governments as decision-makers (NY 7896? Vote of local governing authority)**
- ✓ **Utilities as delivery and billing partners (No “bill stuffer” ability in NY 7896): “Consolidated billing”**
- ✓ **Existing regulations and environmental mandates apply (e.g. EPS & SPC costs remain, as does eligibility for all NYSERDA incentives)**
- ✓ **No taxpayer funding required (saves residents & small businesses certain NYS taxes)**

Additional Value?

#1: STABLE RATES & COST SAVINGS

NY: Pilot; A7896 requires either:

Floating rates with discount commitments or

Fixed rates that are lower than trailing average

IL: Initial 25% savings off Utility rates (rate gaps narrower, now)

MA: Average 6% lower rates for default supply; small premium for 100% green

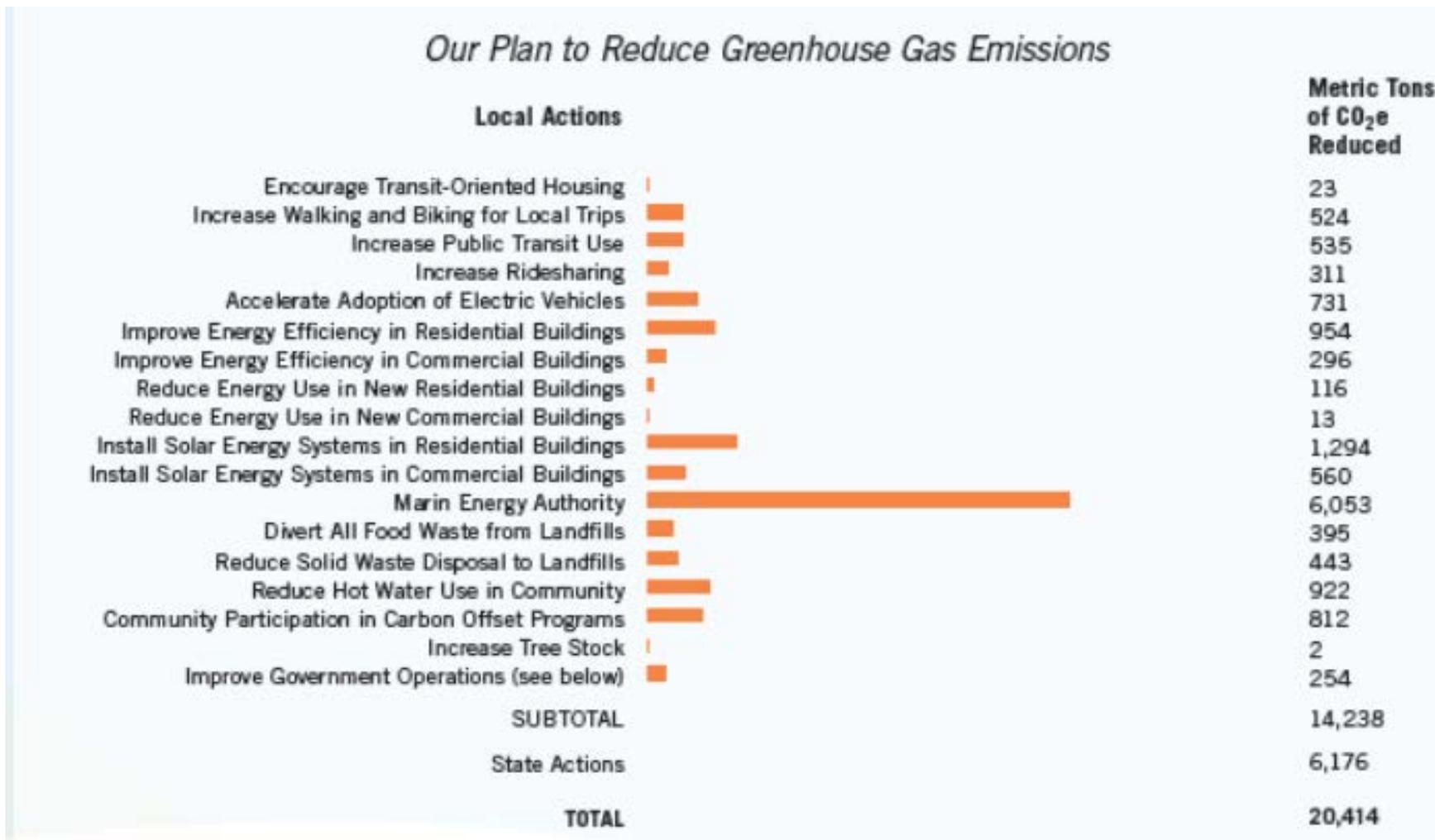
Additional Value?

#3: INJECTION OF DOLLARS, BEYOND SAVINGS, INTO LOCAL ECONOMIES

- Westchester County; 7896, prospectively, offers a risk-free view (pilot) for other municipalities in the state:
 - Opportunity to direct a portion of \$1.5 billion in annual spend, toward local power supply
 - Tax relief
 - Enhanced investment in
 - renewables,
 - micro-grids and in
 - energy efficiency upgrades
- Marin: \$100 million, bought locally
- Illinois; Chicago, and the majority of state residents, buy locally

Investment in Renewables—Example

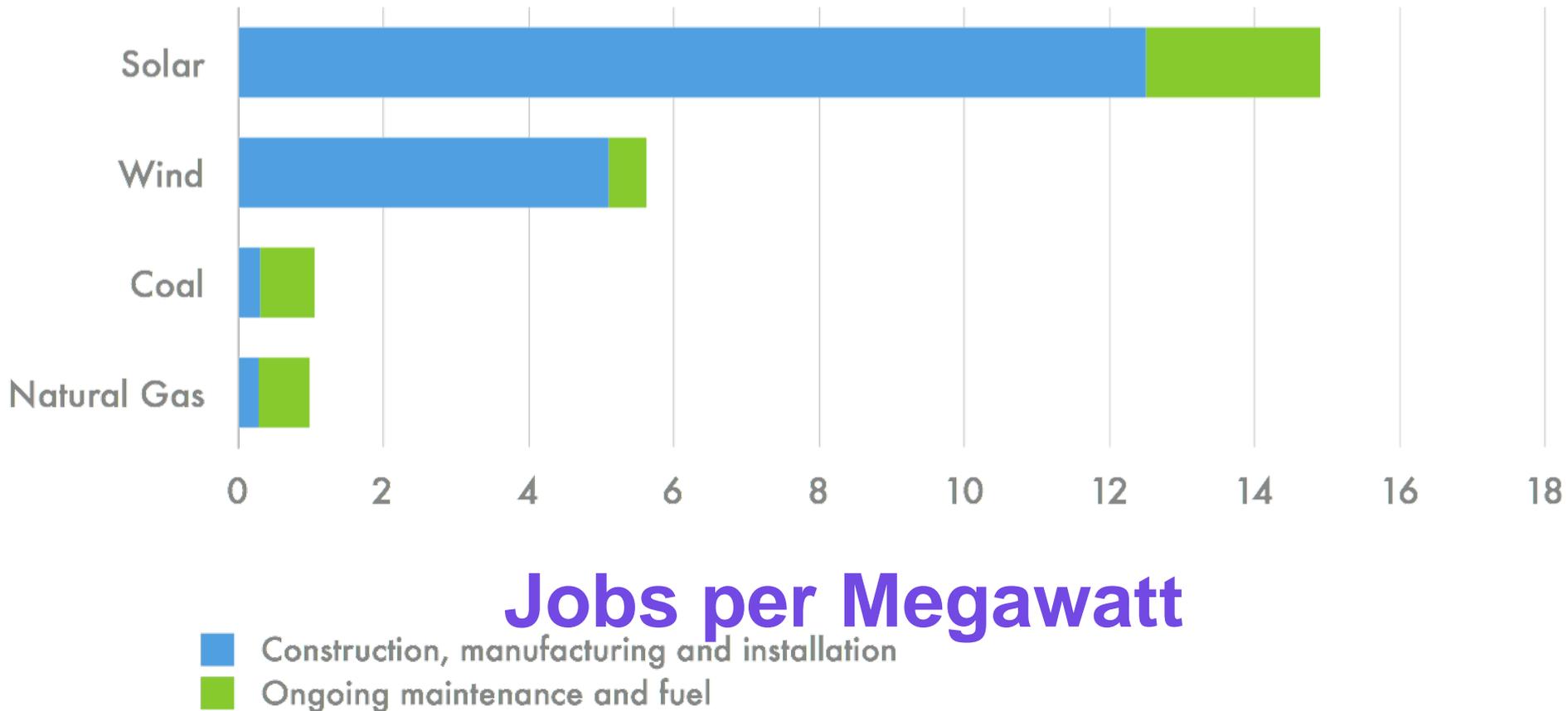
A. DIRECTED PURCHASE OF RENEWABLE SUPPLY REDUCES GHG EMISSIONS



Investment in Renewables—Example

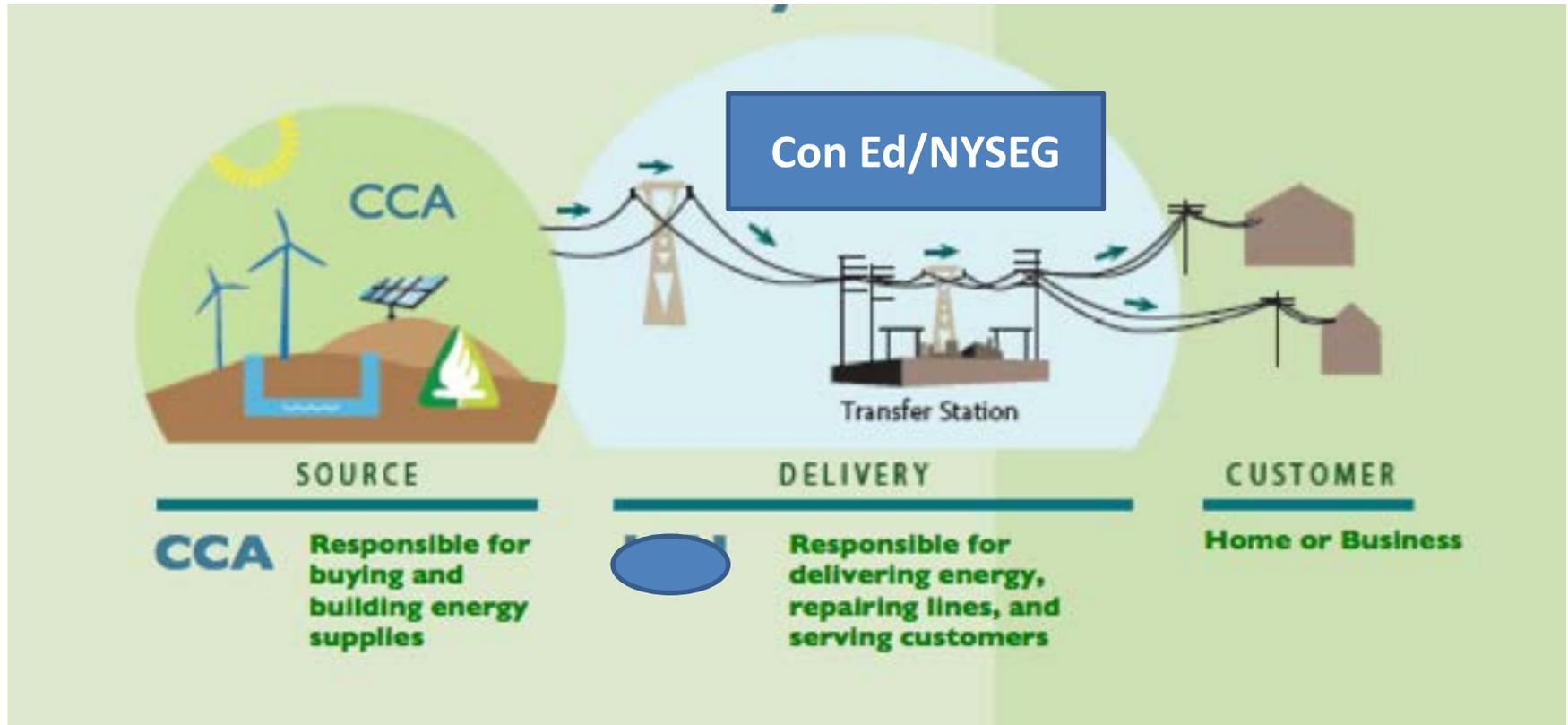
B. PPAS CAN DIRECTLY FINANCE LOCAL RENEWABLE SUPPLY

Local Ownership Boosts Jobs from Renewables



Investment in Microgrids—Example

A. Win-Win for Local Supply & Reliability



- The further a power plant is, from its customer, the greater is its “transmission loss” penalty
- Due to this “win-win” opportunity, CCAs should be uniquely eligible for NYS’ micro-grid support funds (\$40 million)

Investment in Microgrids—Example

B. ABILITY TO EARN REVENUE IN STATE POWER MARKETS

The power grid pays for services These services include:

1. Balancing intermittent renewable generation by adjusting generation or consumption (2 seconds notice)
2. Providing relief when the grid is stressed by over-use by either generating more or reducing consumption (2 hours notice) and
3. Responding to local perturbations by either generating more or reducing consumption (10 minutes notice)



The entire micro-grid can sell these services, together, allowing access to the more lucrative “grid support” programs

Investment in Efficiency—Example

A. CAN CREATE EFFICIENCY INVESTMENT FUND, OVER AND ABOVE NYSERDA

- If total price is still lower than utility's, the CCA can include a bill surcharge that will accumulate dollars for an energy efficiency fund that can distribute incentives for energy efficiency upgrades
- Residents and small businesses will still be eligible for additional NYSERDA incentives for any qualifying efficiency upgrade

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What's Happening in New York?

✓ Legislation

✓ A7896 (Paulin)/S5500 Pilot Legislation Passed in Both Houses; Awaiting Governor's Signature

- ✓ Applies to Westchester County (3 years, only)
- ✓ Gas & Electric
- ✓ Opt out for all NOT buying through competitive suppliers
- ✓ Opt in for those buying through competitive suppliers
- ✓ Must either be
 - ✓ Variable rate that is guaranteed to ALWAYS be less expensive than utility or
 - ✓ Fixed rate that is less than the six previous months' average utility rate

What's Happening in New York (2)?

✓ Legislation

✓ Statewide Legislation

- ✓ Introduced in Assembly by Cahill (unknown prospects)
 - ✓ Open time-line
 - ✓ Requires a lot of data from utility
 - ✓ No price limitations

✓ Regulatory

✓ Department of Public Service

- ✓ Preliminary opinion is that statewide legislation not necessary
- ✓ Regulatory rule-making would focus in two areas
 - ✓ Allowing explicitly for “opt-out” structures and
 - ✓ Setting rules re data transfer

What's Happening in New York (3)?

✓ Regulatory

✓ Process

- ✓ IF the Governor signs the pilot (if not, in our estimation, we all wait at least a year for anything of value to emerge)
- ✓ PSC or DPS establishes “fair cost” for utilities to provide (they may decide that data must be provided for free):
 - ✓ Aggregated consumption data for those not buying competitively (needed for localities to ask suppliers to quote a price to supply for residents and small businesses)
 - ✓ Specific information on customers who do not opt out (e.g. meter #, annual consumption)
- ✓ Regardless of whether the Governor signs the pilot
 - ✓ DPS proposes to PSC that it commence a rule-making process
 - ✓ The PSC does or does not accept such a process and IF it decides to commence such a process
 - ✓ Invites comment and
 - ✓ Establishes rules

CCA—OVERVIEW

CCA offers consumers an energy choice that reflects their goals and values without the tax burden of maintaining an aging delivery system.

CCA allows communities to choose their electricity supply, use/build local generation, and set rates locally.

CCA allows for local program optimization: integration of solar PACE, energy efficiency funding, green business programs, reliable micro-grids, etc.

CCA helps meet State regulations and environmental mandates.

The opportunity could be realized, as soon as three months from now

Thank You. Questions?

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■ Rice husk power plants are lighting up never-seen-electricity homes in Bihar

Micro grids, micro power plants may change state's energy woes

HARINI CALAMUR
MUMBAI, JULY 5

Maharashtra is under power shortage estimated short between 1500 megawatts. For which tops industrial production, of a shortage in blow. Industries businesses and homes are reeling under power cuts. In such as Maharashtra hours of electricity on a daily basis longer the exception the norm.

Maharashtra has big power projects up. There is the largest consolidated energy plant being in Dhule. There thermal plants are up and the on



MICRO GRID

Polytechnic

Sustainability Defined

The Team

Engineering:
Dr. Sant Palkar, Anurag Bhatnagar, Richard Deshpande, David Mendonca
Sant Palkar, Anurag Bhatnagar, Richard Deshpande, David Mendonca

GTI:
Dr. Laura Rabin, Muhammad Khidmaty, Chris Bond, Alice Kaplan

MICROGRID Europe 2013



THE SOFTGRID 2012

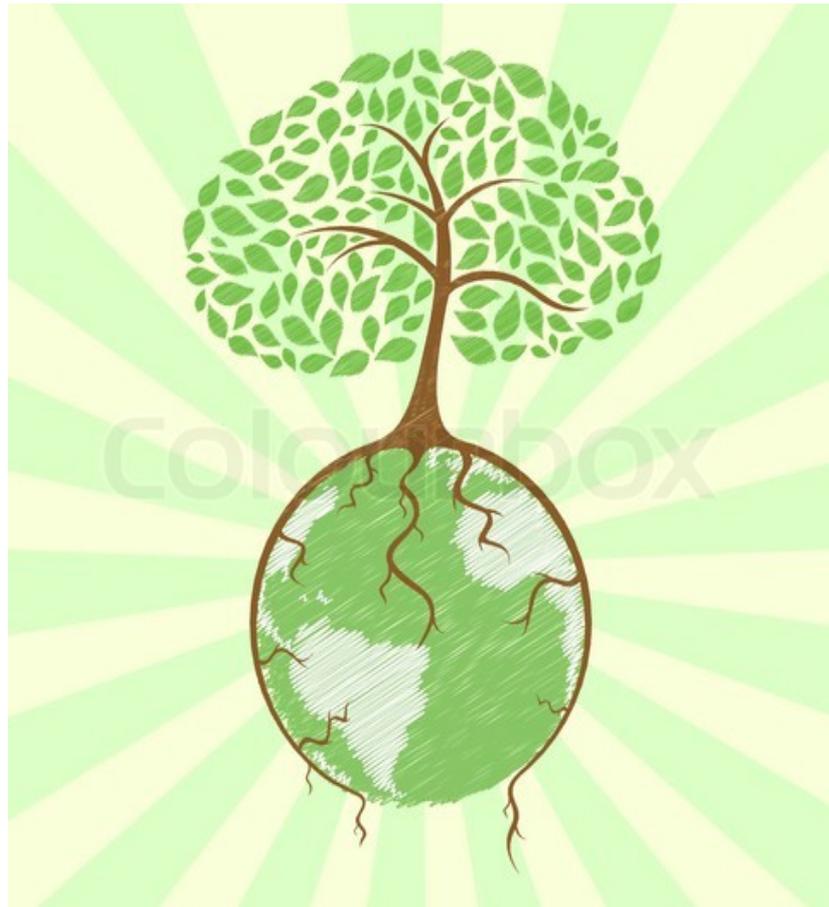
AUG. 14-15
SAN FRANCISCO, CA



ETAP Grid, Smart Grid, Microgrid Solution



The Grid is getting smarter – but has a long way to go



- Demand is in the distribution system
- Fluctuations here require balancing within the system
- Increased demand and complexity put strains on the grid

- Line losses and inefficiencies mean that only 30% of generation ultimately reaches customers

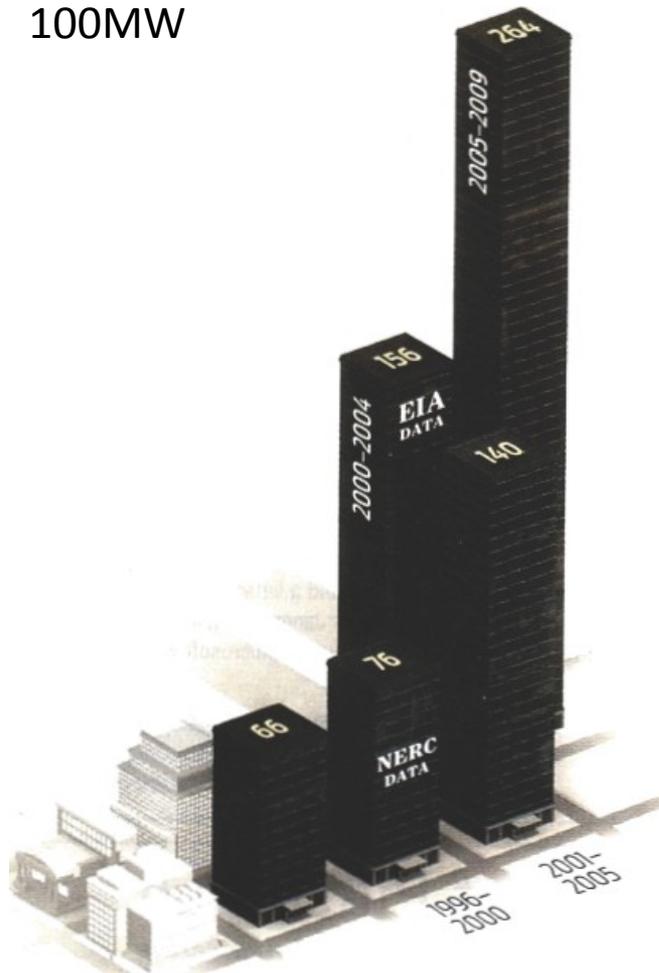
- Generation has historically provided increased capacity/adjustments to balance the grid
- Future growth of this model is limited by constraints and expense

ISO/RTO markets increasingly pay demand response or “negawatts” commensurate with the value they provide to the grid and seek broader and more robust market participation in the future.

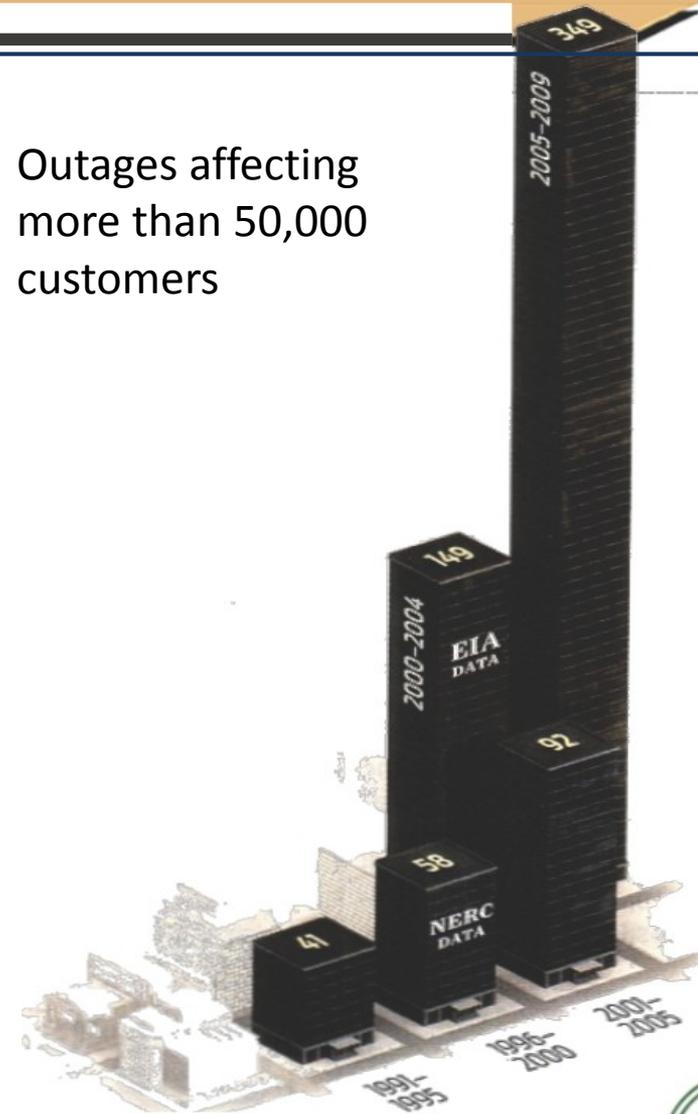
- Critical Infrastructure Resiliency
- Energy Cost Savings
- Greenhouse Gas Reductions
- Economic Development / Business Continuity
- Reducing T&D Capital Costs and grid congestion
- Future Proofing energy infrastructure
- Exploiting local opportunities

Decreasing Grid Reliability

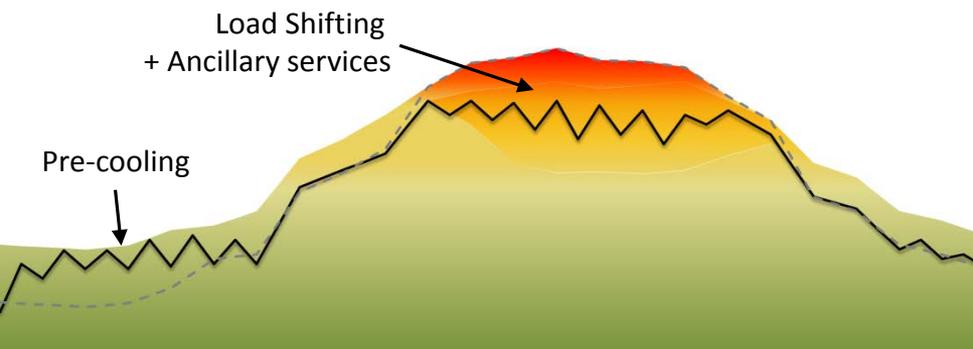
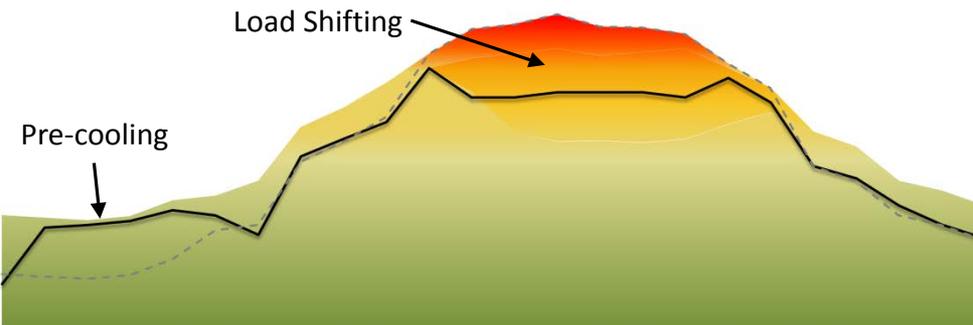
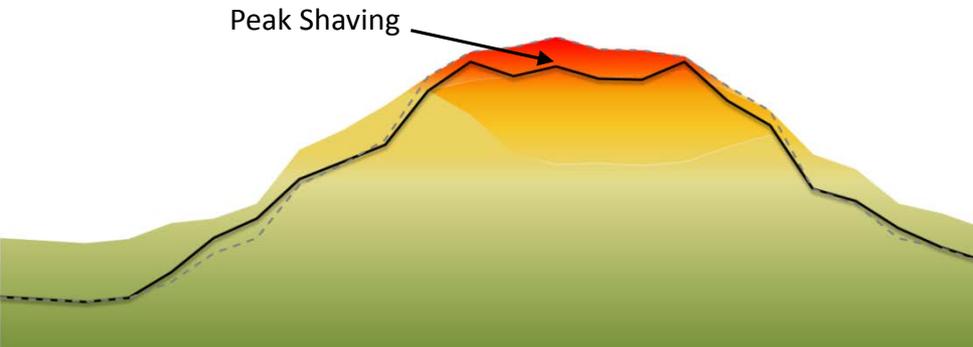
Outages greater than 100MW



Outages affecting more than 50,000 customers



Wholesale Market Opportunities are expanding and becoming more complex



Reliability Programs

- Low frequency , mandatory response
- Easy to Implement
- A reactive way to earn additional revenue stream

Economic Programs

- High frequency, voluntary response program
- Daily Price Settlement
- A proactive way to earn additional revenue

Ancillary Programs

- Self-balancing according to minute by minute grid balancing needs
- Requires sophisticated energy assets such as generators or battery storage
- Automated Demand Response is opening this market

Market opportunity - The Emerging Importance of Demand Side Resources



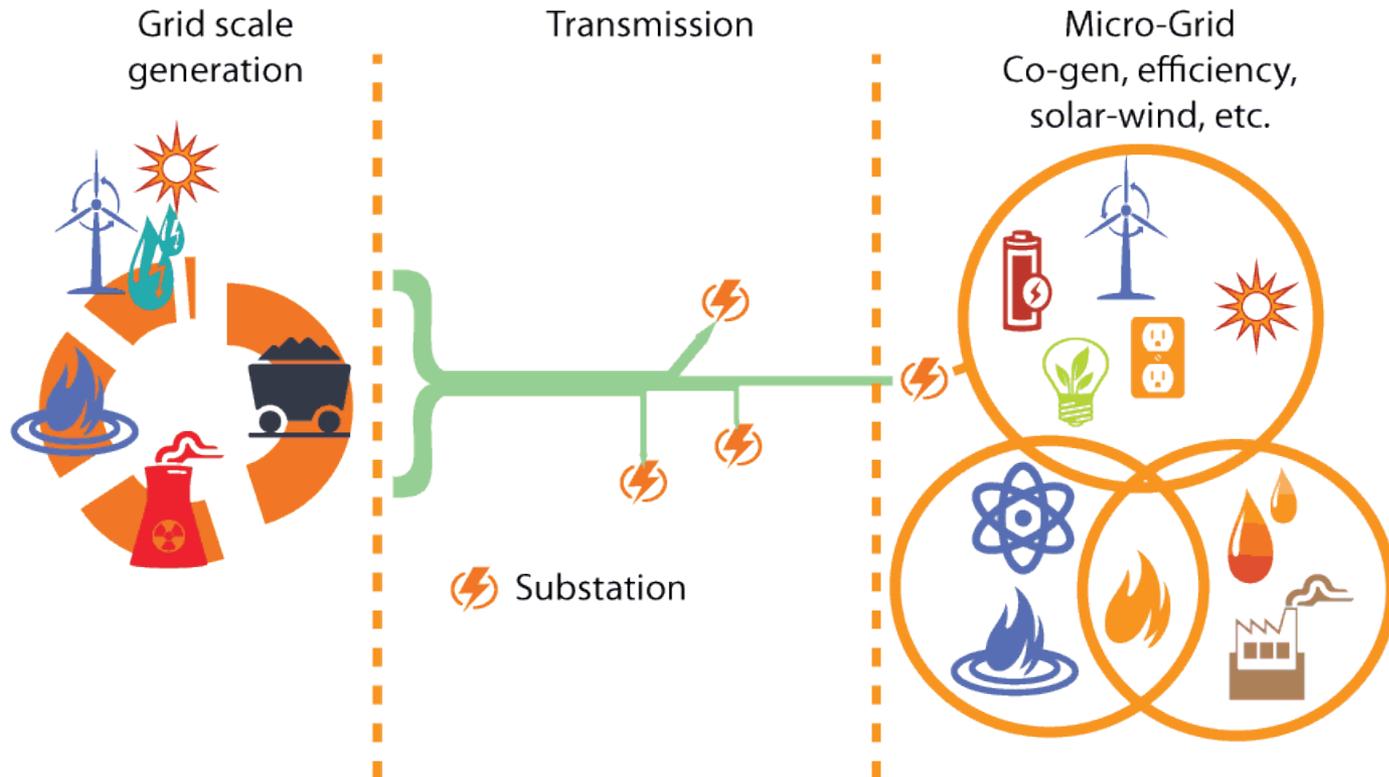
Challenge

1. Increased renewable penetration on the grid increases complexity
2. State efficiency standards drive policy push for EE
3. Customer adoption of green initiatives (100% of new US generation added in March 2013 was solar) is adding uncontrolled generation to the grid
4. Most of this change is occurring in the grid's distribution system with smaller customers. Historically these resources are not "grid aware"

Opportunity

1. Better and cheaper technology for reducing and controlling loads
2. Policy makers are increasingly pricing in the value of avoided cost, power quality, reliability etc. making demand side management more valuable.
3. Microgrids are a model for integrating resources at the "edge of the grid" so they can respond to price signals and provide resources to the grid
4. The opportunity is there, but the path forward is complex

Microgrids are a way of managing this complexity and transforming the business environment for a number of technologies

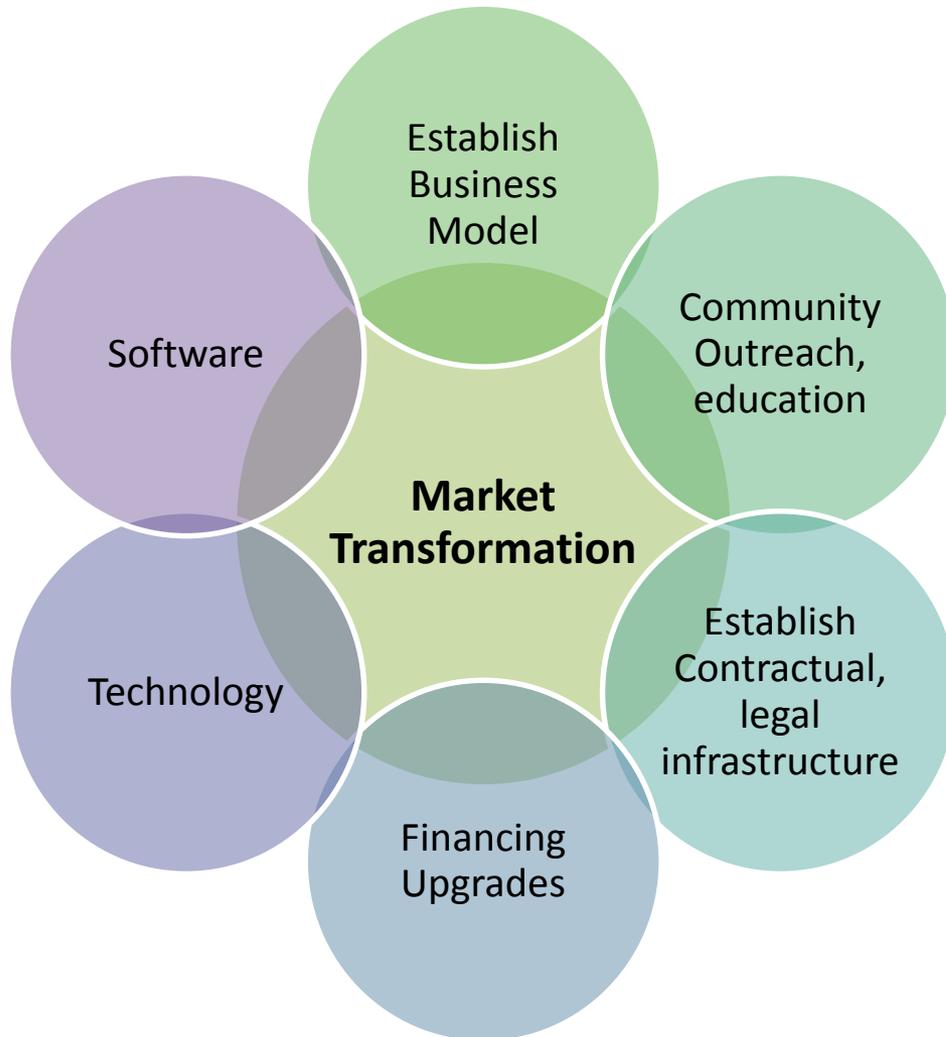


Microgrids integrate diverse distribution resources into a single unit that can provide value to the grid

Microgrids are made up of a number of components

- **Smart Buildings**
 - Grid Aware Buildings, capable of modulating consumption against economic sustainability, and comfort goals
- **Renewable Generation and Storage**
 - On-Site Renewable Generation such as Solar, Geothermal, and Wind
 - Integration of storage to manage renewable and load variability
 - Storage is also a tool to provide support services to the grid
- **Electric Vehicles**
 - Represent mobile storage units, which can augment on site storage capabilities
- **Communications Infrastructure & Information Management**
 - Reliable and Secure Communication Link between Demand Side Resources and Electric Utility enable real time information exchange
 - Real Time Information Exchange & Management is the foundation microgrid operation
- **Command and Control Infrastructure**
 - Provides mechanism for actionable microgrid processes such as resource performance settings and microgrid network configuration
- **Power Flow Management**
 - Ensures stability and reliability of a microgrid network
 - Provides mechanism for operating within acceptable voltage and current limits





Microgrids are complex and disruptive. Numerous barriers will have to be overcome for microgrid benefits to impact the grid/environment/economy on any scale

- *Who owns the assets?*
- *Who benefits?*
- *What are legal/contractual structures necessary for commerce to occur?*
- *Historically, all of these functions was provided by the utility*

Working with PACE University, NY State, technology providers, commercial building owners and community sustainability groups to understand:

- Business Model for multi stakeholder microgrids
 - What are legal and governance structures needed to facilitate commerce?
 - What are sources of value, expected investment returns for EE, DR, EV charging, Solar, Energy Storage projects within the microgrid
- Performance Modeling
 - Assess resources, generation and dynamic load potential
 - Assess available technology options
 - Engineering study to model and size technology installations
 - Economic study to model economic performance of these resources within microgrid setting

New York Prize:

Powering a new Generation of Community Energy

- NY Prize is a first-in-the-nation \$40 million competition to engage communities in advancing plans for local power infrastructure to reduce costs, promote clean energy, reliability and resiliency.
- NY Prize will inspire a new generation of local power by challenging New York communities, businesses, entrepreneurs, and electric utilities to design and implement community-based microgrids, which offer energy independence as well as local power generation and distribution. The competition will spur new business models and community partnerships with the private sector to increase reliability and reduce costs for consumers.



Thank You

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For more information/reading:

smartgridman.com

<http://www1.eere.energy.gov/manufacturing/distributedenergy/ceacs.html>

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