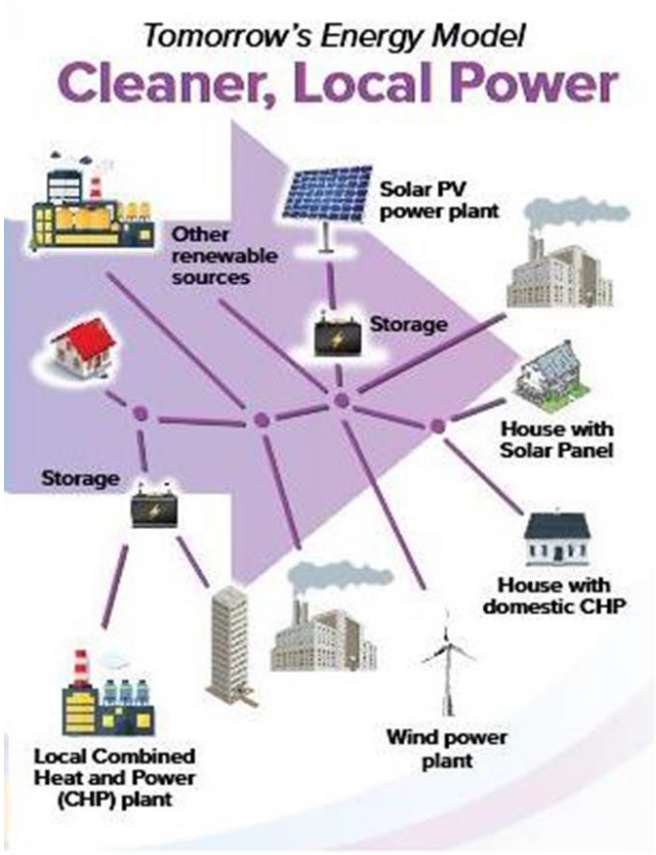
Integrating Intelligent City Systems with Climate Strategy



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Intelligent Efficiency:

So Let's *Solve the Problem**

*** - achieve *all of the efficiency we need* to preserve our climate.**

Energy Efficiency *is a Real* Solution for Climate Change

- **CO2 emissions need to drop 7% per year to sustain a livable Earth (GDP adj.)**
- **Efficiency addresses over half of what we need to do by 2050,**
- **It is impossible to accomplish needed carbon reduction *without energy efficiency.***
- **Efficiency opportunities pay for themselves with energy savings**

BUT we need ALL of it:

Achieving deep efficiency gains across all homes, buildings, and communities *has proven to be a challenging objective.*

Building Energy, Soft Energy, Smart Energy

At Scale, All Together =

Energy Management for a Sustainable Future

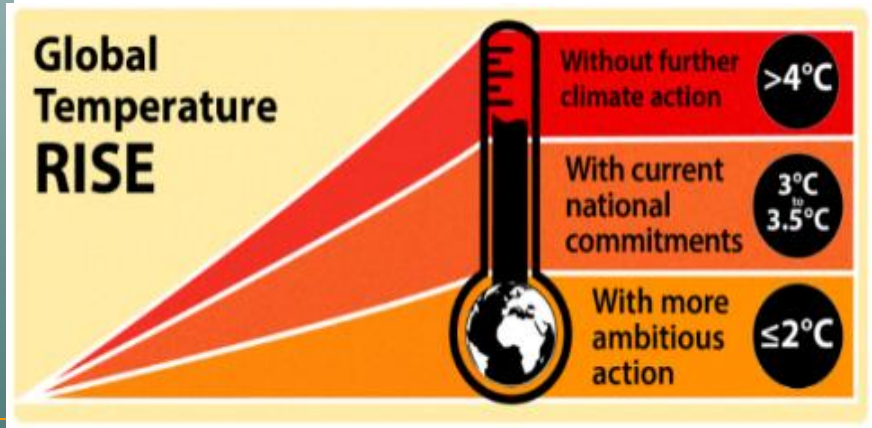
What is it? ***Science, business, urban planning innovations to optimize building energy use.***

= Building Energy Efficiency

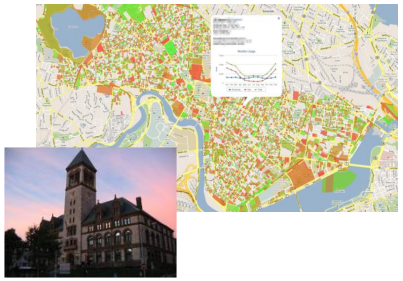
+ Building-to-Grid Systems

+ Carbon-free Site Energy

+ Smart Cities, People



Emerging City/Community Green Leadership Strategies:



CAMBRIDGE ENERGY ALLIANCE

City-scale energy planning

addresses efficiency barriers with :

- New community-based models:
  - Incentives, creative financing, marketing
- Smart city/transparency:
  - Energy disclosure, GIS mapping, microgrids

Democratization:

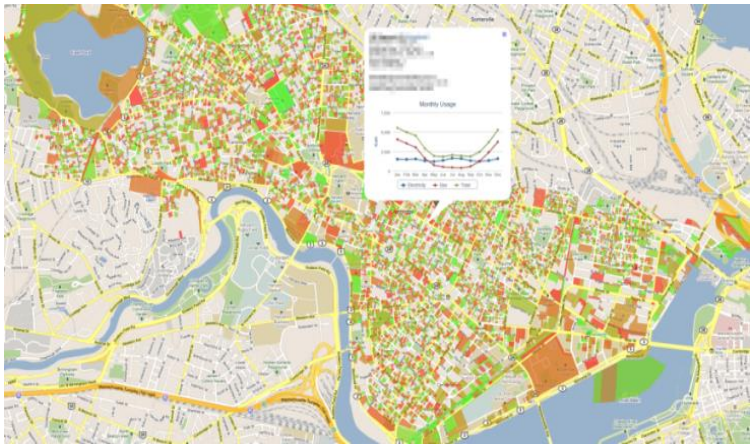
Policy-driven, long-term open access to savings benefits for consumers, businesses and communities.

- Efficiency, DR, carbon mitigation open to new market innovators.
- Effective framework by which innovations are measured, and then rewarded based on results.

Connecting EM with People in Groups:

Community scale energy analytics - big-data driven tools to help accomplish objectives such as:

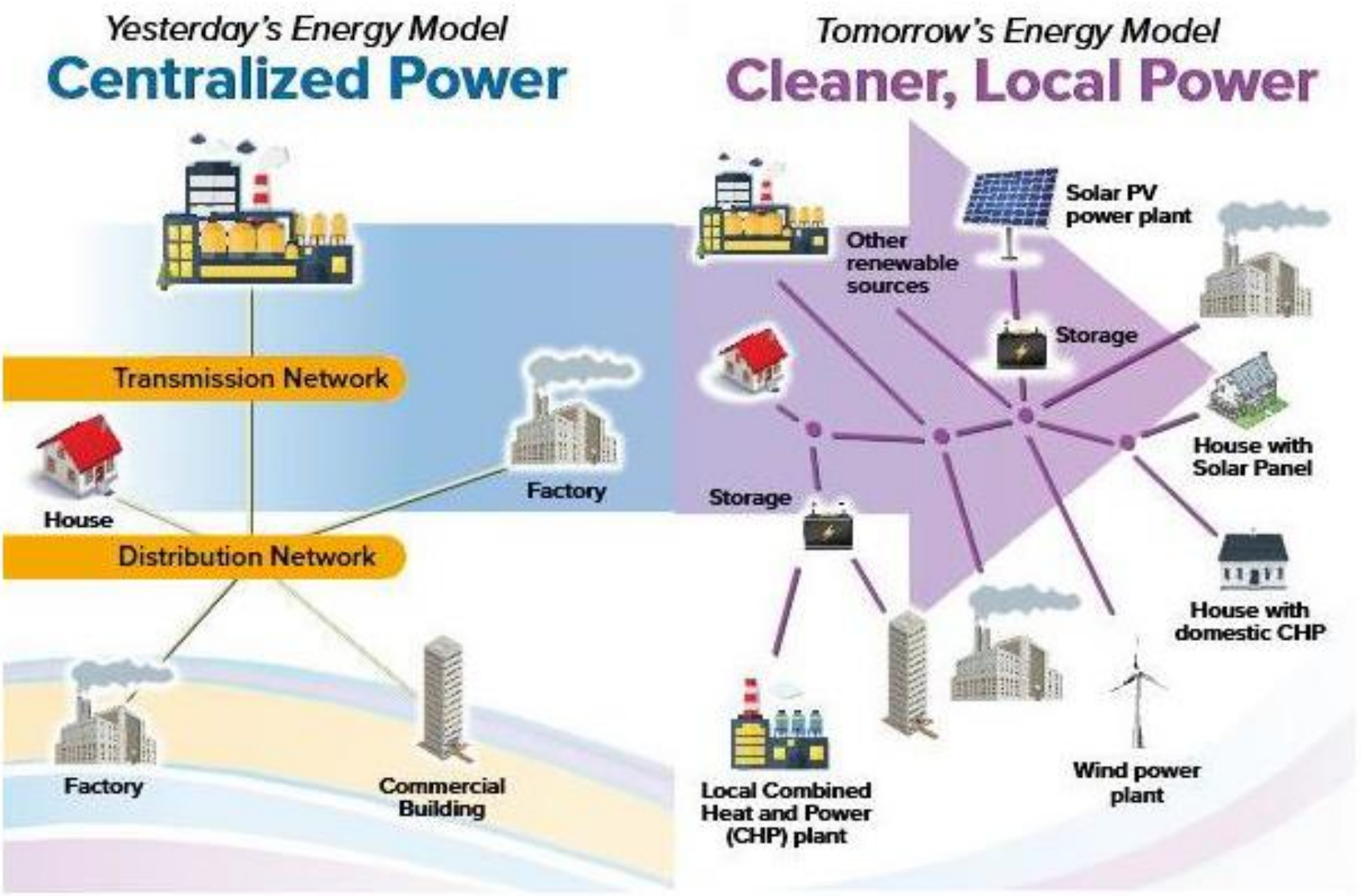
- Community-sponsored diagnostics, feedback, control
- Energy/carbon disclosure and transparency
- City-scale measurement of efficiency potential and achieved
- Neighborhood performance comparisons



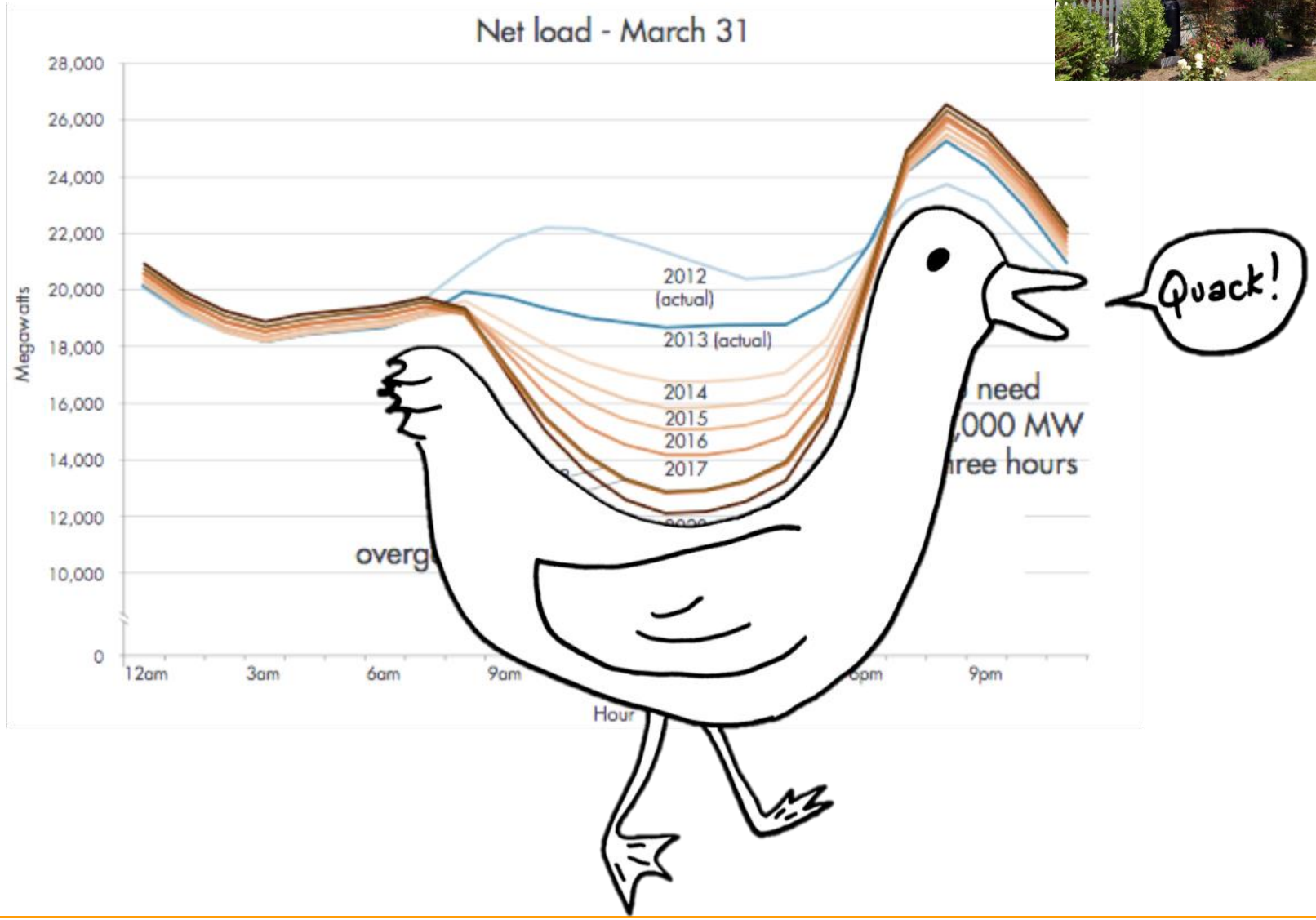
- Similarity:
- Architecture
- Age
- Proximity
- Materials
- Size

CAMBRIDGE ENERGY ALLIANCE

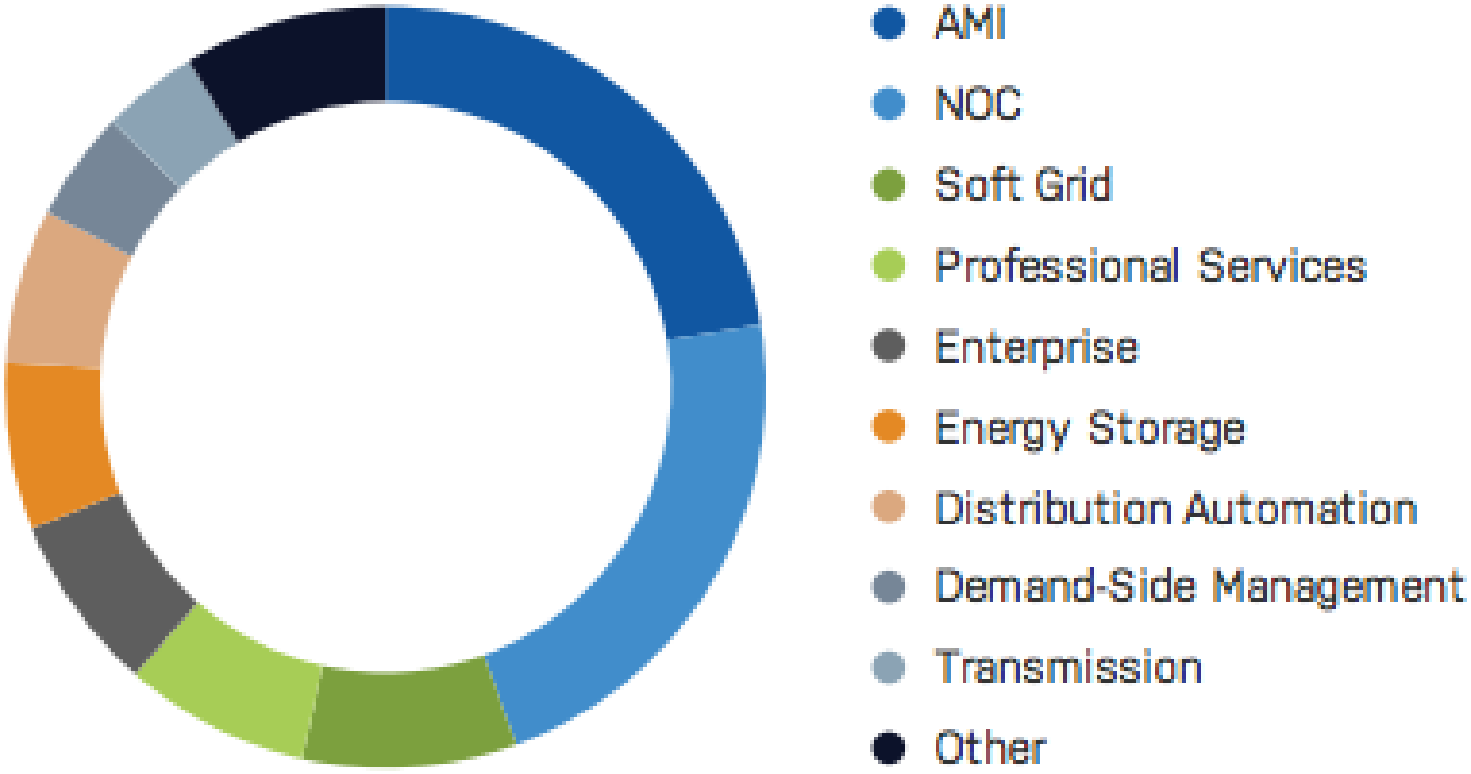
Utility/City Boundary gets fuzzy:



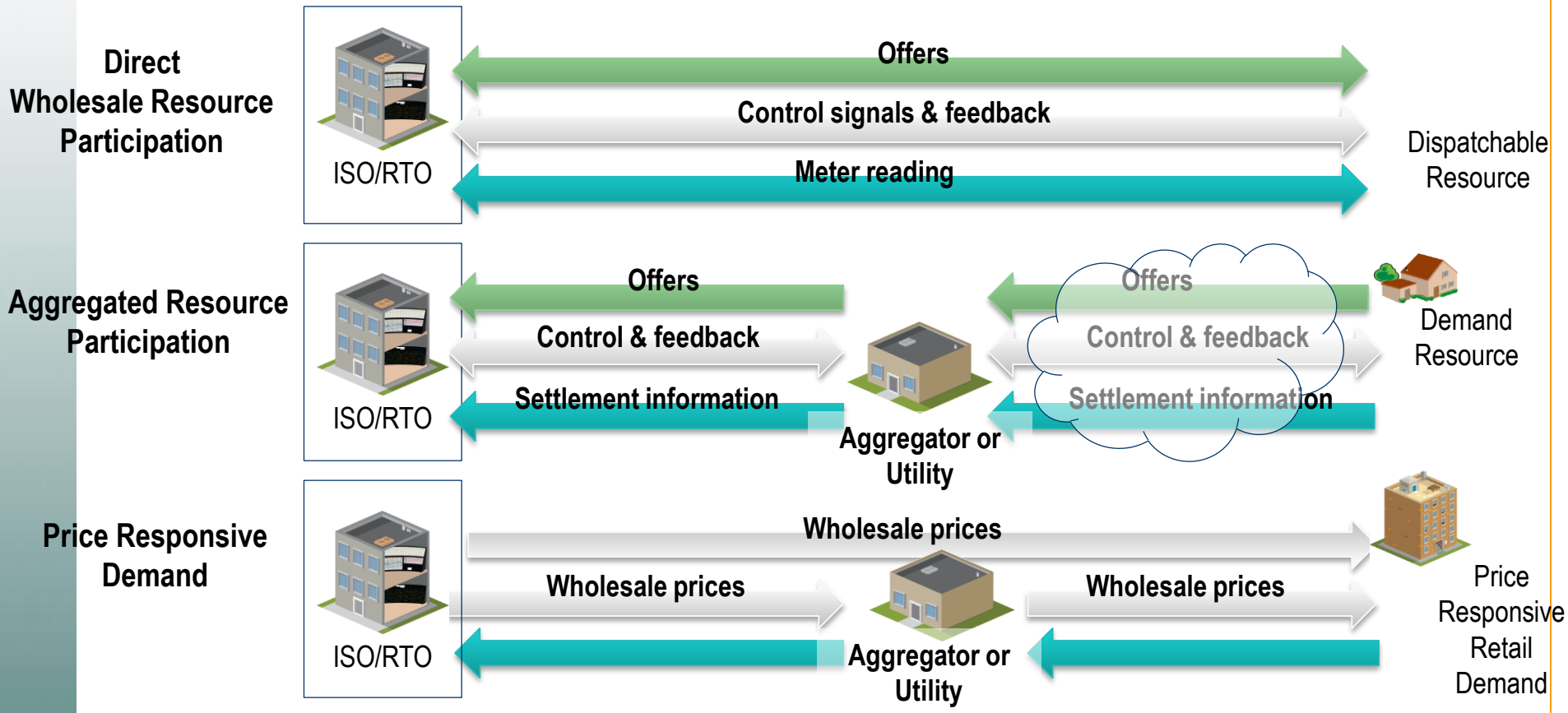
Future of Building-to-Grid:



Smart Cities are applying “Grid Edge” Technologies:



Market-based ISO Demand Response – Democratization model for cities, carbon, efficiency?



MassCEC/DOER

Town and Installer RFPs

Engage tech. consultants

Marketing/Education

System Rebates/SRECs

Installer

Free Site Assessments

Tiered Pricing and Ownership Options

Contracting

Rebate Application

Installation

Homeowner

Sign up for a site assessment

Talk to neighbors!

Community

Installer Selection

Solar Coach

Volunteers

Outreach

MIT Proposed Multifamily Breakthrough Strategy:

Program Design: utility incentives and financing

- **Solarize Model – single vendor, fixed time, simplified**
- **Landlord-tenant expense and financing.**

Recruitment: community-based marketing

- **Community vendor selection**
- **Scoring and relationships**

Treatment: retrofit technology and transparency/disclosure

- **Manageable set – responding to conditions on the ground**
- **Disclosure, benchmarking and GIS mapping**

Make EM Costless, Riskless, Timeless, and Visible to all!