Energy Efficiency Renewable Policy Alignment

Coordinating Policy to Optimize Energy Savings

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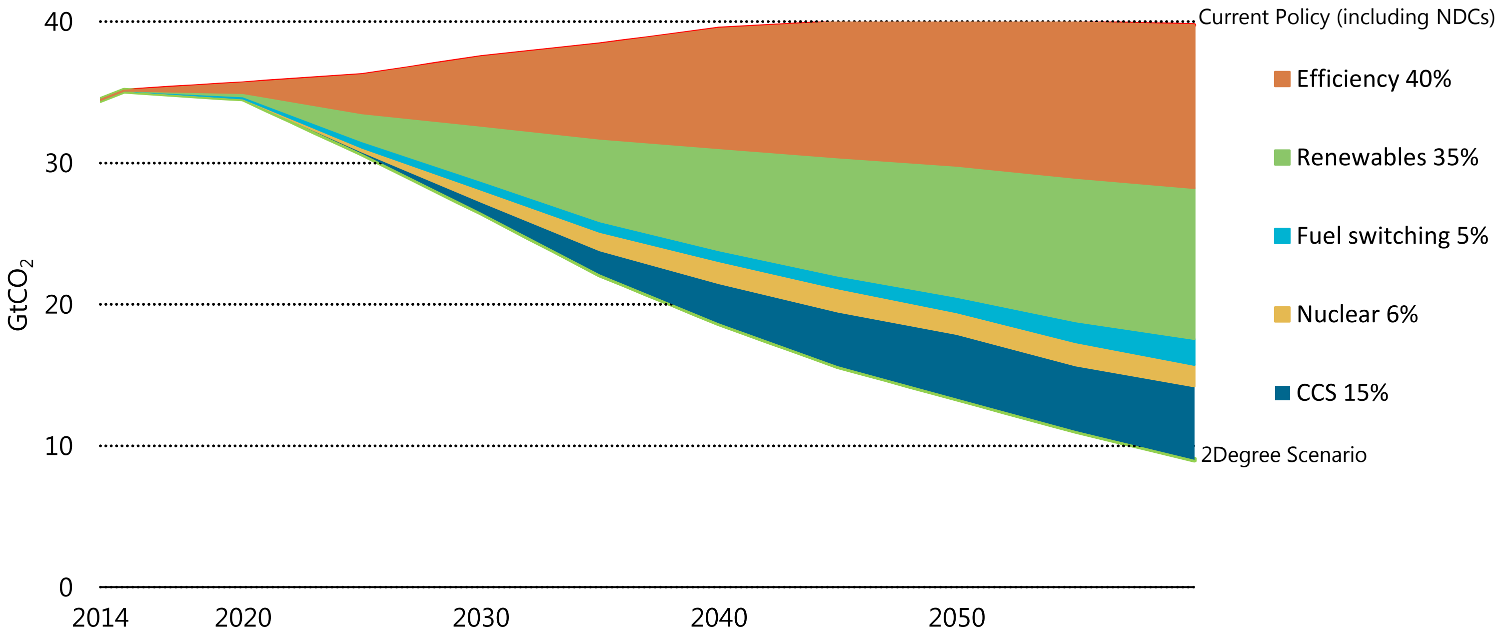
CAA EED Plenary October 20th 2017

IEA

Efficiency and Renewables are key to future energy systems

The IEA projects that energy efficiency and renewables will contribute 75% of the reductions in emissions needed over and above current announced policy to reach 450ppm or 2 degrees scenario



"Reduction efforts are needed on both supply and end use sides; focusing on only one does not deliver 2 degrees" **Energy Technology Perspectives 2017**

Background

- To date, policies for renewable energy and energy efficiency have generally been distinct from each other.
- This approach risks sub-optimal outcomes or contradictory signals. Such risks greatly increase as the scale of deployment of efficiency measures and renewables technologies grow.
- There is an increasing recognition of the need for a more integrated policy approach that looks at demand and supply together, and that is focused on the overarching policy end-goals.
- This will be required to accelerate deployment and increase investment.

We frame this issue in three dimensions

1. Designing policies that deliver the end goals most cost effectively
2. New policy thinking is required as pace and scale of deployment grows
3. Technology innovation, particularly in digitalisation, is opening up new solutions that also demand changes in policy thinking

Dimension 1. Focusing on the end goal

- Policy, design is often compartmentalised, targeting specific technologies or focused exclusively on either efficiency or renewables.
- For example, some policies support renewable heat installations with no reference to building efficiency, leading to waste. Others focus exclusively on efficiency solutions but do not acknowledge clean energy sources.
- Policy processes and institutional arrangements can exacerbate compartmentalisation, risking overinvestment and locking in wrong solutions.
- How do we ensure that the combined effect of all of our policies delivers the whole of energy system outcomes we want, without unnecessary cost or unintended consequences?
- Example: PG&E in California wishes to fill the capacity gap from the planned closure of a nuclear power plant through procurement of capacity which is open to energy efficiency, flexible generation and storage.

Dimension 2: New policies for a new era

- Risks of misalignment are smaller when levels of deployment are small, but the current, and future scale of deployment means we are entering a new phase where risks are much greater.
- Success in efficiency can undermine certain types of renewable energy business model, and policy instruments, that presume demand growth.
- Surplus cheap clean power available at certain times, may also affect the case for efficiency action.
- Policy will need to facilitate more complex, mixed solutions involving efficiency, renewables (centralised and distributed), storage and management.
- This will need to be done in the context of existing infrastructure, accommodating current technologies and avoiding stranding assets.

Dimension 3 Emerging Technology Opportunities : Thinking about energy as a service

London-based BBOXX delivers energy systems to remote off-grid African locations.

- The system is designed not to provide a certain quantity of energy, but to deliver the required services.
- The package includes super-efficient lights, TV, radio and phone chargers supplied by a solar panel with battery storage.
- The system is charged on a monthly service fee basis through mobile phone.

Similar service models are also emerging in established energy markets.

- Start-ups in North America, Australia and Europe are selling households and businesses, a greater sense of control over their energy costs and carbon, through solar, storage and smart energy management systems.

Other technology companies are piloting the delivery of smart, clean, reliable, energy services for urban developments in places like Lyon in France, Japan and Korea.

Key issues for policy makers

- Emerging issue – more urgent for early movers and those with strong targets

- Shaped by prior investment in infrastructure, resources, politics and future opportunities for jobs and growth.

- All recognise :
  - more dynamic and complex interaction between supply and demand side
  - the challenges and opportunities offered by technology and digitisation
  - not well equipped to analyse this issue. For example hard to predict future supply-demand trends and impact of policy and technology on those trends.

- Countries are seeking information on emerging innovative policy approaches and tools by which to analyse the issue. They would welcome IEA support on this.

Proposed next steps

Background analysis

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Policy Deep Dive Workshop with policy makers & industry

- Case Examples of emerging approaches
- Discussion with policy makers on how current policy and tools might be adapted

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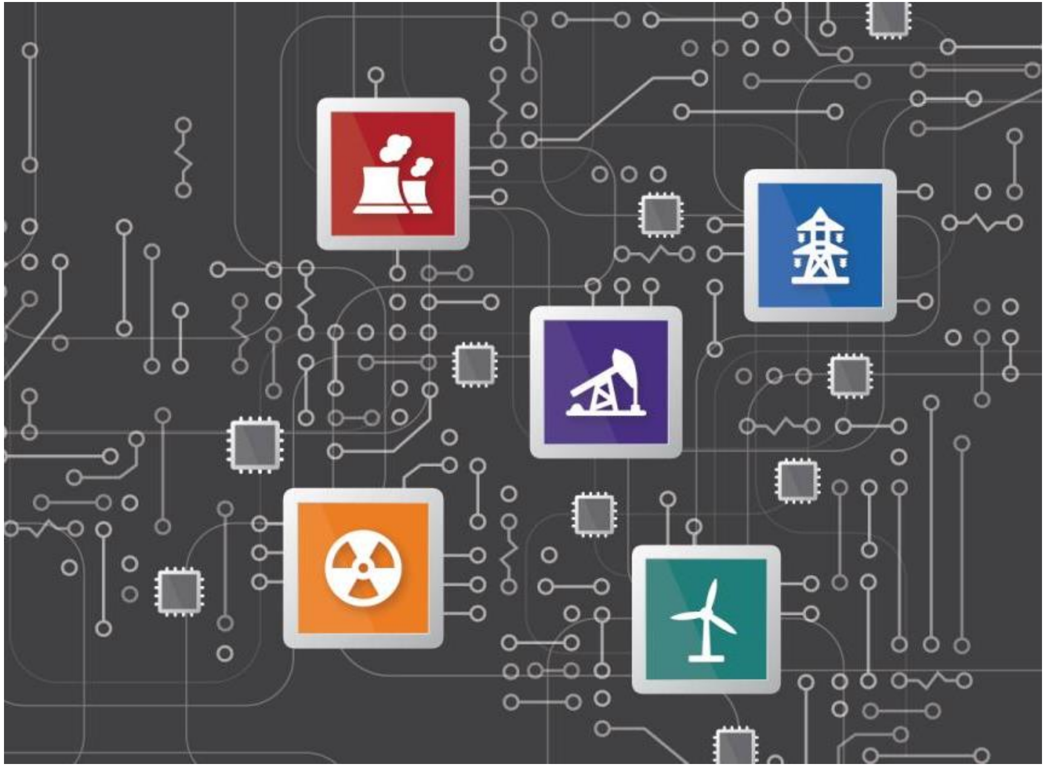
Publication of analysis and case studies

- Global Platform
- Countries, Regional, National Platforms

Proposed Focus on EERE Policy work

- Focus where technology's are enabling:
  - Energy service models
  - New ways of integrating renewables and energy efficiency
  - Policies that discourage incentives for oversized systems
  - Tools that are scalable, replicable, and visual



Proposed Workshop – Joint REWP and EEWP Workshop Proposal April 2018

Buildings

- India's Energy Conservation Building Code
- NYC's initiative for efficient buildings
- DOE Zero Energy & Energy Star Homes initiatives

Appliances

- Efficient appliances with AC and DC power converter
- DC to DC storage permits more efficient recapture
- LA AFB electrical vehicle, integrated battery & DR

Market Design & Incentives

- New York Reforming Energy Vision
- California capacity markets, time-of-use
- Data platforms efficiency, time and location

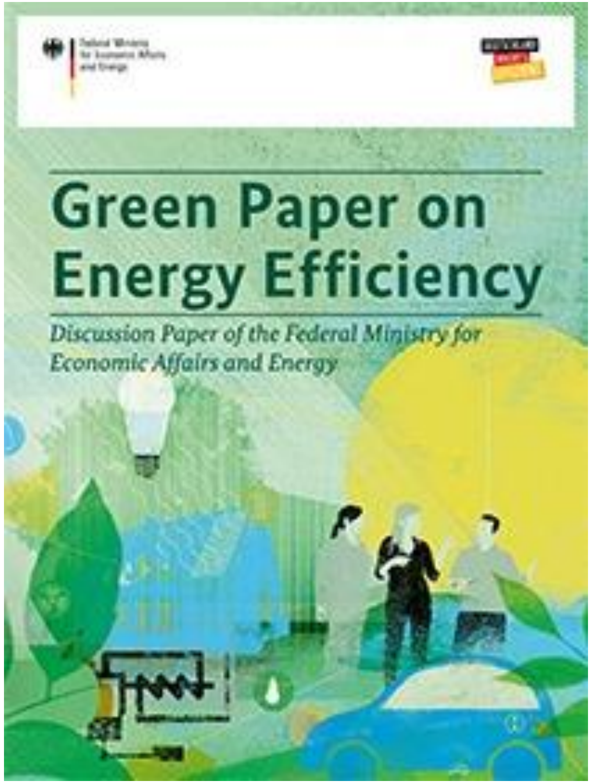
Examples of Policy

Successful alignment of energy efficiency and renewable energy

Policy Design Approach

Germany's Green Paper on Energy Efficiency & Power Markets include 3 pillars

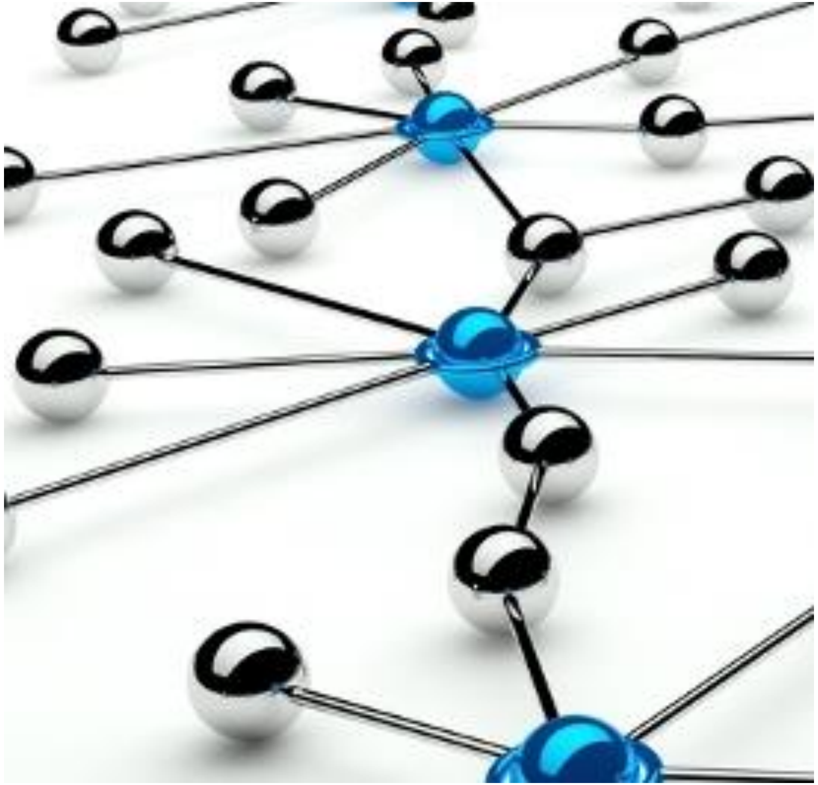
- Reducing demand in all sectors "Energy Efficiency First"
  - Better understanding and reducing demand to reduce the overall cost of supplying clean energy.
- Increasing the direct use of renewable energy,
  - Such as solar thermal, geothermal, waste heat and bioenergy for heating, building air-conditioning and hot water
- Then optimal use of renewables in electricity, heat and transport, through electrification and sector coupling
  - Electrification of the whole energy system will ensure excess power generation is captured through sector coupling



Policy Design Approach & Tools

Some countries are beginning to align policy design and governance.

- The EU's *Clean Energy for all Europeans* package (2017) for the first time covers energy market, renewable energy and efficiency policies & will use a common reporting framework. EU has developed models which measures the impact of policies on the power system (balance) as well as emission goals.
- The Australian Department of Environment and Energy is now responsible for carbon, energy market, energy efficiency and renewable energy policy. The Finkel review recommends energy market reforms & clean energy target, which doesn't pick technology.



And to trial new ways of thinking and tools when it comes to policy design and planning.

- Sweden explored four potential energy futures linked to broader economic and societal trends to identify recommendations for its future energy policy
- Visual optimisation tools that map demand, energy efficiency and renewable supply to find least cost mix.

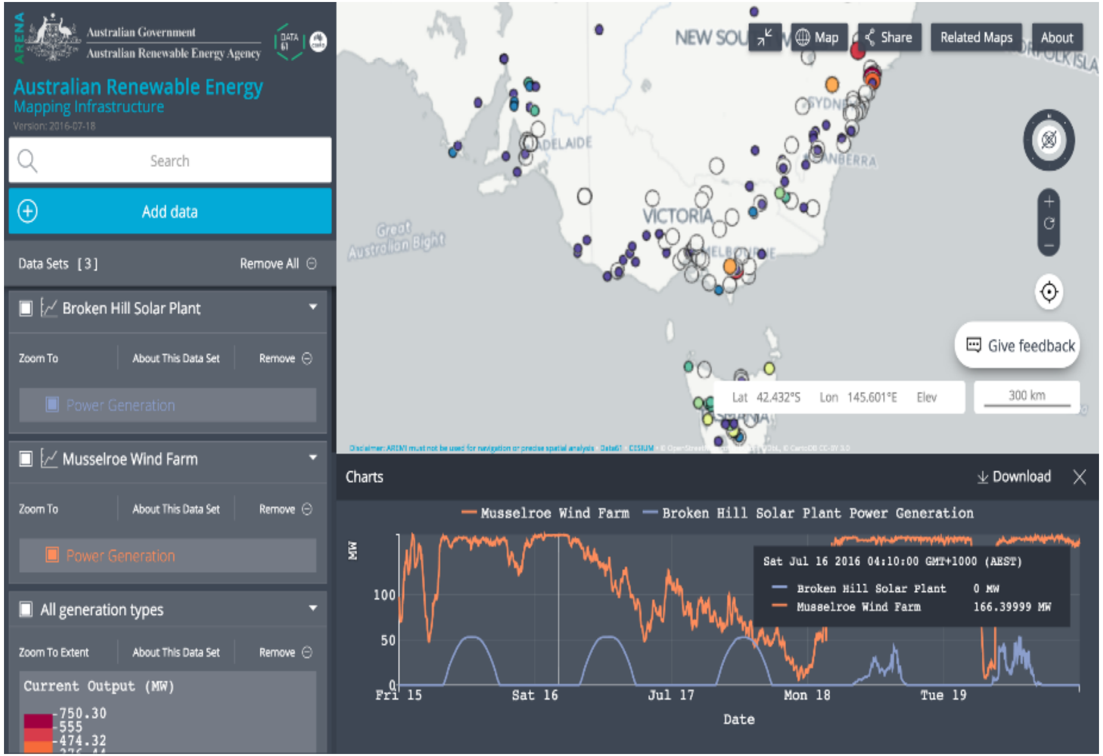
Open source geospatial tools that enable more optimal decisions

Tools to help understand interaction between demand and supply and least cost mix.

Increasingly energy efficiency and distributed energy resources and technology will need to take on time and location value.

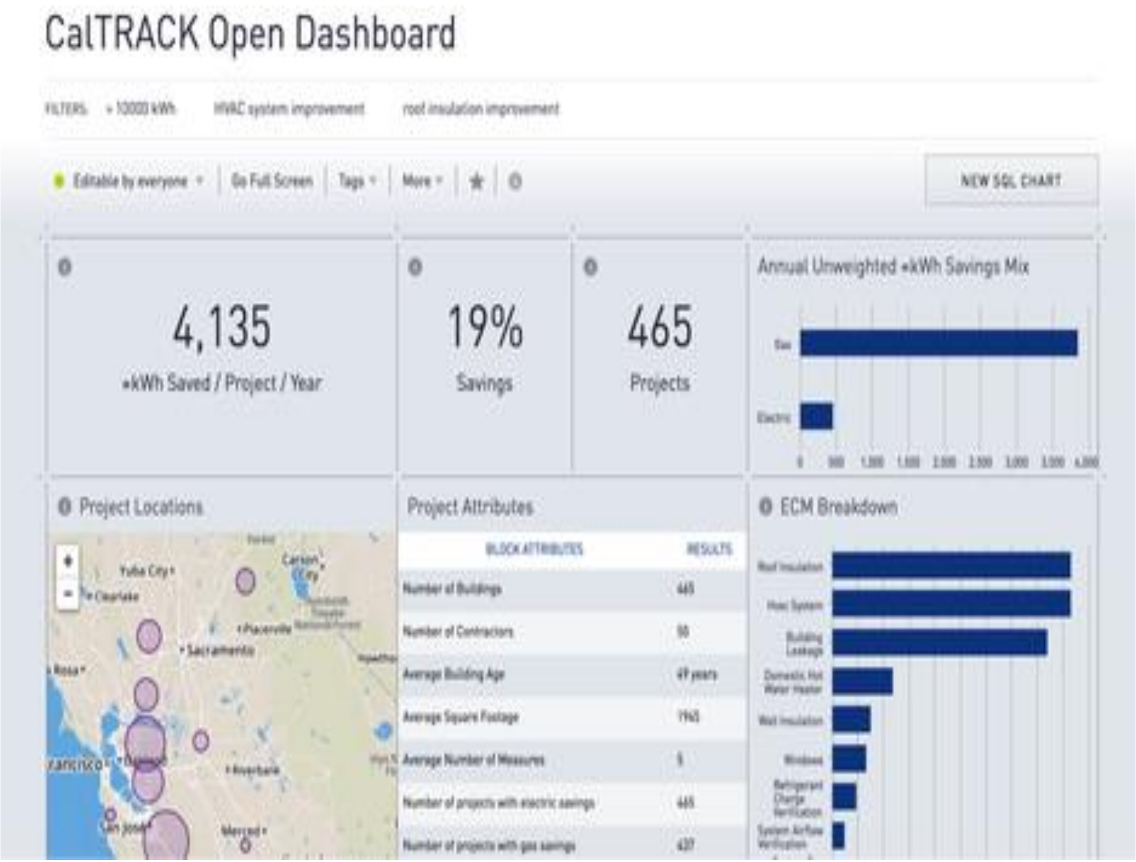
Where is it more economic to place solar battery diesel than grid upgrade?

Where and when would reducing energy demand be most cost effective?



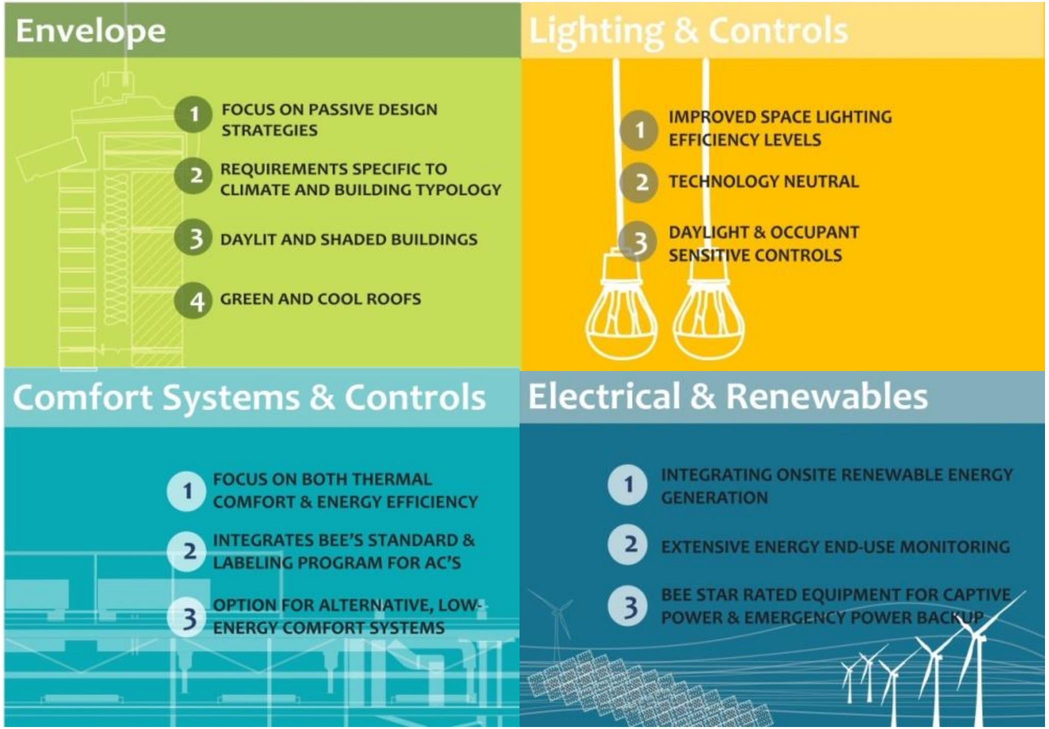
Tools - energy efficiency into a time and location based resource

- Data platforms that map metered energy (savings) enables energy efficiency to become a time and location based resource that is reliable for markets and grid operators
- Creates a value to energy suppliers as well as consumers
- Tracks service and equipment performance



India's Energy Conservation Building Code

- Unprecedented construction boom
- Demand to increase 8% annually
- Passive design, lighting, renewables
- Applies to buildings using +100kW
- Adoption integral for utilization
- 3 performance levels



Brooklyn-Queens Demand Management

- NY REV prompted BQDM program in order to defer a $1.2 billion substation upgrade.
- Instead ConEdison is investing $200 million in non-wire alternatives to meet the addition 69 MW of demand in 2018
- Policy takes into consideration both EE & RE
  - 52 MW of demand reductions, 17 MW of DER investments
  - Free LED lights in lower income neighborhoods
  - Rebates for residential smart-metering
  - Incentives for thermal energy storage & CHP systems
  - Demand response auction to provide compensation

Qualifying Neighborhoods in Brooklyn & Queens Program