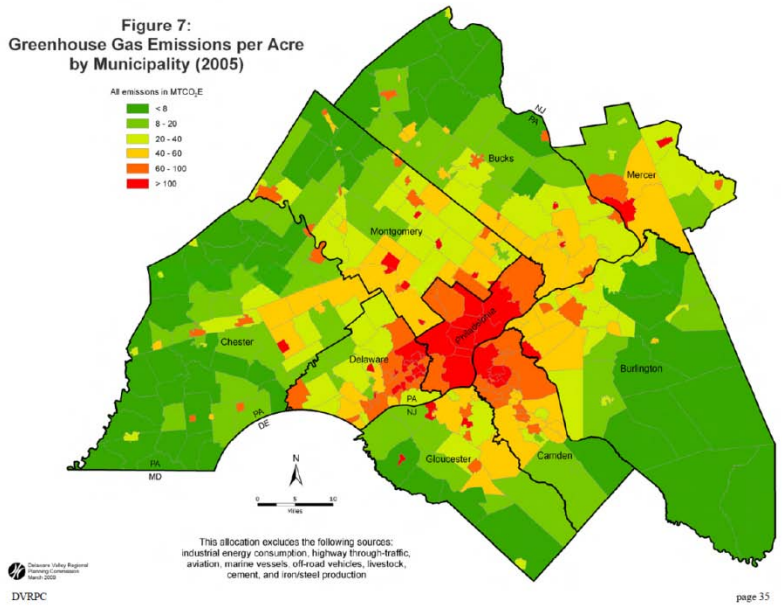
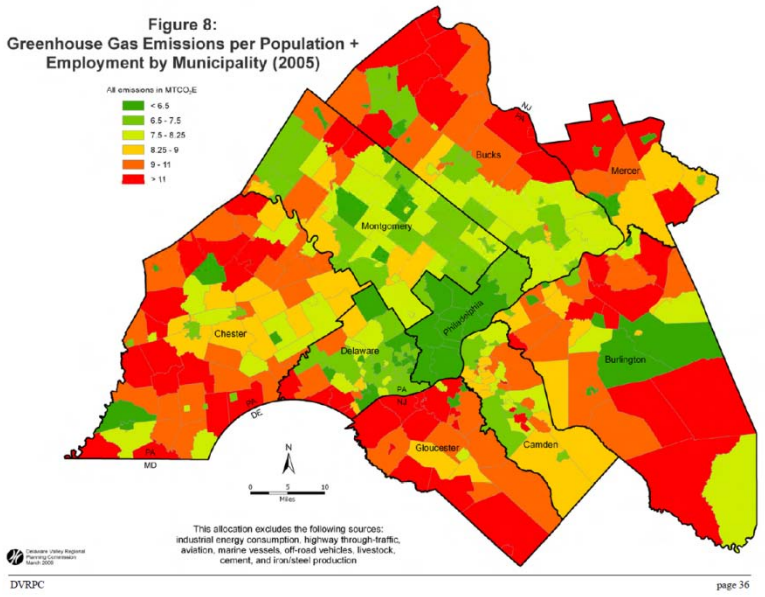
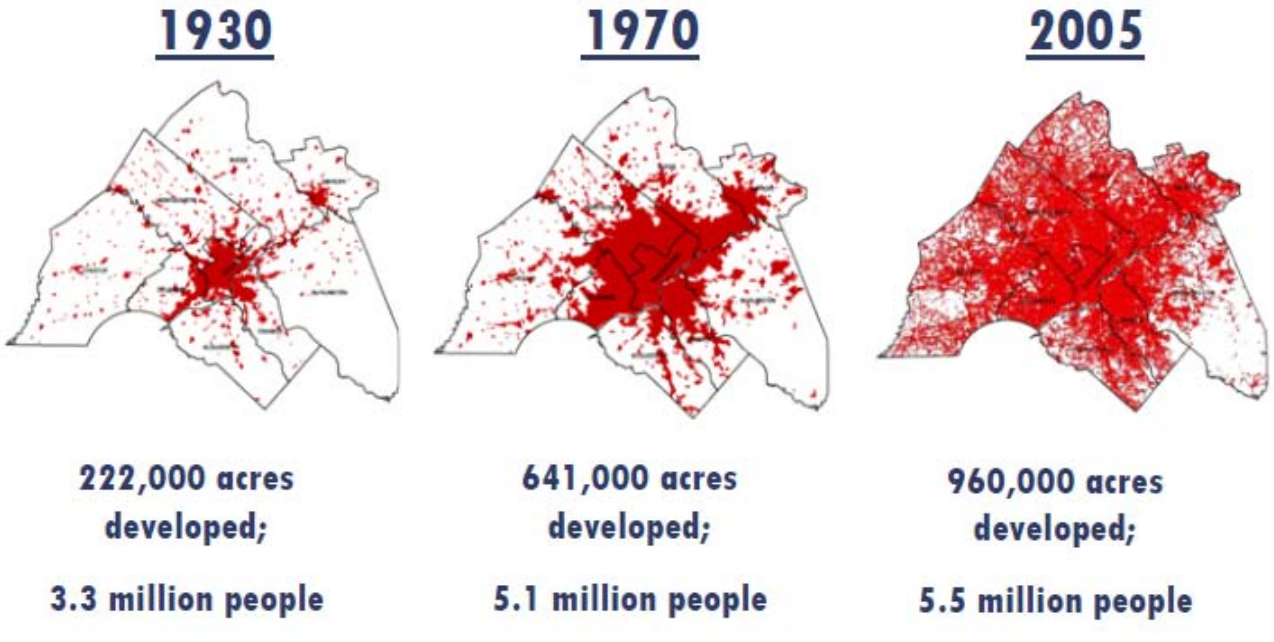
WHY DO CITIES MATTER TO CLIMATE MITIGATION?





1. CENTRALITY—DENSITY—INFRASTRUCTURE CREATE LOW-CARBON PROFILE
2. HIGHEST ROI FOR BOTH OLD (RETROFIT) AND NEW (TOD) INVESTMENT

WHY DOES CLIMATE MITIGATION MATTER TO CITIES?



DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

1. POSTWAR DEVELOPMENT PATTERNS DEPRECIATED THE VALUE OF CITY ASSETS
2. CARBON PRICING APPRECIATES THOSE ASSETS AND CITY COMPETITIVENESS

BUT CITIES MUST DEVELOP NEW CAPACITIES FOR EXPLOITING THEIR ASSETS

GREENWORKS PHILADELPHIA
FIFTEEN BY 2015

GOALS : ASPIRATIONAL
(5) DIMENSIONAL

TARGETS: MEASURABLE
(15) MEASURED

INITIATIVES: ASSIGNED
(169) RATED

GOALS TARGETS INITIATIVES

1. **ENERGY**: REDUCE VULNERABILITY TO RISING ENERGY PRICES

1. **LOWER CITY GOVERNMENT ENERGY CONSUMPTION BY 30%**
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* Create Target Energy Budgets for Operating Departments
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FIFTEEN BY 2015

FIVE GOALS:

ENERGY
REDUCE VULNERABILITY TO RISING ENERGY PRICES

ENVIRONMENT
REDUCE ENVIRONMENTAL FOOTPRINT

EQUITY
INCREASE ACCESS TO HEALTHY NEIGHBORHOODS

ECONOMY
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ENGAGEMENT
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WHAT IS THE URBAN AGENDA FOR CLIMATE POLICY?

1. CITIES AND THEIR METRO REGIONS FORM "ENERGYSHEDS" WITH DYNAMICS SIMILAR TO WATERSHEDS, COMMUTERSHEDS, FOODSHEDS: THEY INTERNALIZE COSTS AND BENEFITS IN WAYS THAT CAN OPTIMIZE OUTCOMES IN TERMS OF BOTH EFFICIENCY AND EQUITY

2. THESE ENERGYSHEDS DISPLAY OPERATIONAL AND TECHNICAL LIMITS THAT CAN BE EXPLOITED TO (A) BUNDLE THE PURCHASE OF ENERGY AND THE TRADING OF ENVIRONMENTAL ATTRIBUTES, (B) MANAGE AND DISPATCH LOAD TO REDUCE DEMAND, ESPECIALLY PEAK DEMAND, AND (C) ACCELERATE THE RETURN ON ENERGY EFFICIENCY INVESTMENTS.

3. TO HARNESS THESE HUGE POTENTIAL BENEFITS IN CARBON REDUCTION, NEW ORGANIZATIONAL CAPACITY MUST BE ALIGNED WITH THE GEOGRAPHY OF REGIONAL ENERGYSHEDS TO SUPPORT MISSION-DRIVEN DECISION MAKING OVER THE LONG RUN.

ENERGYSHED

MANAGING CLIMATE CHANGE AT THE REGIONAL SCALE

OBSERVATION Significant aspects of energy generation, distribution, and consumption operate at a regional scale. Emerging energy policies formed by local, state, and federal governments also impact at a regional scale.

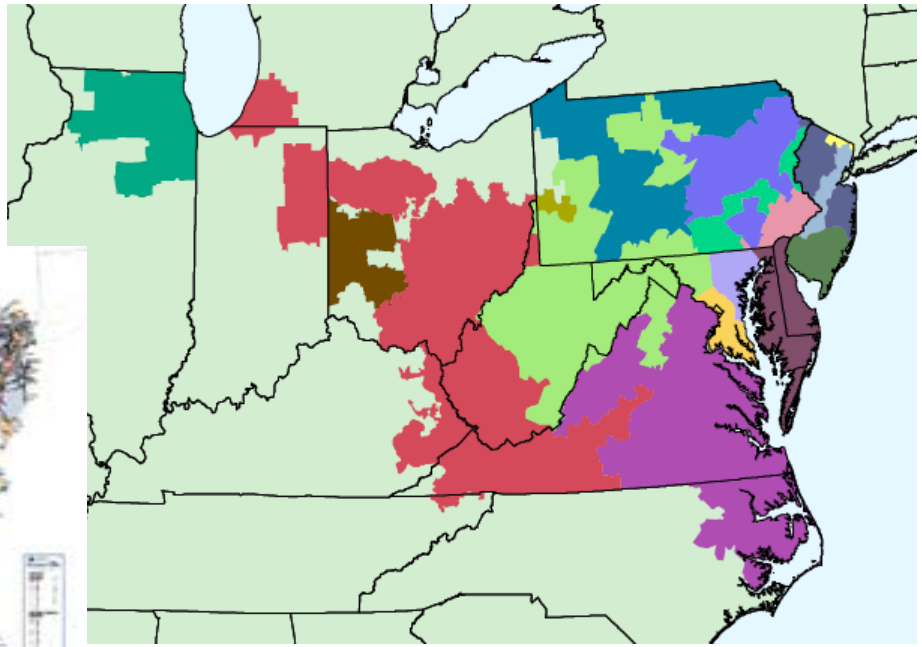
DEFINITION These operations, which are a function of both technical and organizational realities, interact to form an "energyshed." An energyshed is a place internalizing shared impacts from energy management, much as a watershed is a place internalizing shared impacts from water drainage.

HYPOTHESIS The energyshed is an organizing idea that helps both to understand the connections between urban form and energy use and to engage regional stakeholders in optimizing energy. There is a need to build new organizational and technical capacity to manage energysheds.

ENERGYSHED

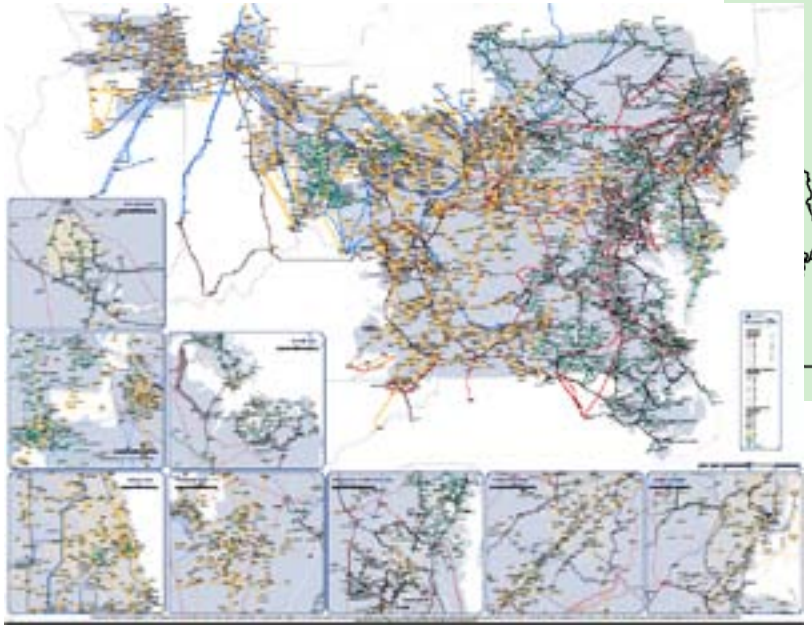
The metaphor is instructive: a hierarchy of sheds and sub-sheds in which impacts are realized at different scales via different mechanisms

PJM Transmission Organization



Pricing Zones

Engineered Grid



ENERGYSHED

OBSERVATION: THREE INTER-LOCKING CHANGES IN ENERGY POLICY

LOCAL Greenworks Philadelphia, 15 Targets by 2015 including:
* Reduce govt total energy consumption by 30% from 2008
* Reduce citywide bldg energy consumption by 10% from 2006
* Acquire from renewables at least 20% of citywide electricity
* Reduce citywide GHG by 20% from 1990

STATE	Delaware	Sustainable Energy Utility
	New Jersey	SRECs make NJ second to CA in installed solar
	Pennsylvania	AEPS requires 18.5% by 2021
		Act 129 require 1% 2011, 3%/4.5% 2013

FED'L Climate legislation: cap-and-trade and/or national RPS
Recovery spending: >$30B on energy, BGs capacity building
Interagency cooperation: Guidance directing metropolitan coord

LOCAL INNOVATION----STATE LEGISLATION----FEDERAL FUNDING

ENERGYSHED

OBSERVATION: REGIONAL SCALE ENERGY OPERATIONS

1. Administrative Geographies (defined by rule)
2. Technical Geographies (defined by expertise/technology)
3. Market Geographies (defined by exchange and interaction with above)
4. Interaction with other “Sheds”

ENERGYSHED CREATES REGIONAL INCENTIVES AND MECHANISMS

ENERGYSHED

DEFINITION: ENERGYSHEDS INTERNALIZE IMPACTS FROM ENERGY MGMT

Three Examples:

1. Administrative Geography of the Energyshed:
   Portfolio of Energy Efficiency Investments defined by ROI

2. Technical Geography of the Energyshed:
   Load Management Dispatched to Load Serving Entities

3. Market Geography of the Energyshed:
   External Benefits of Energy Efficiency Result in Free Riders, Underinvestment

ENERGYSHED

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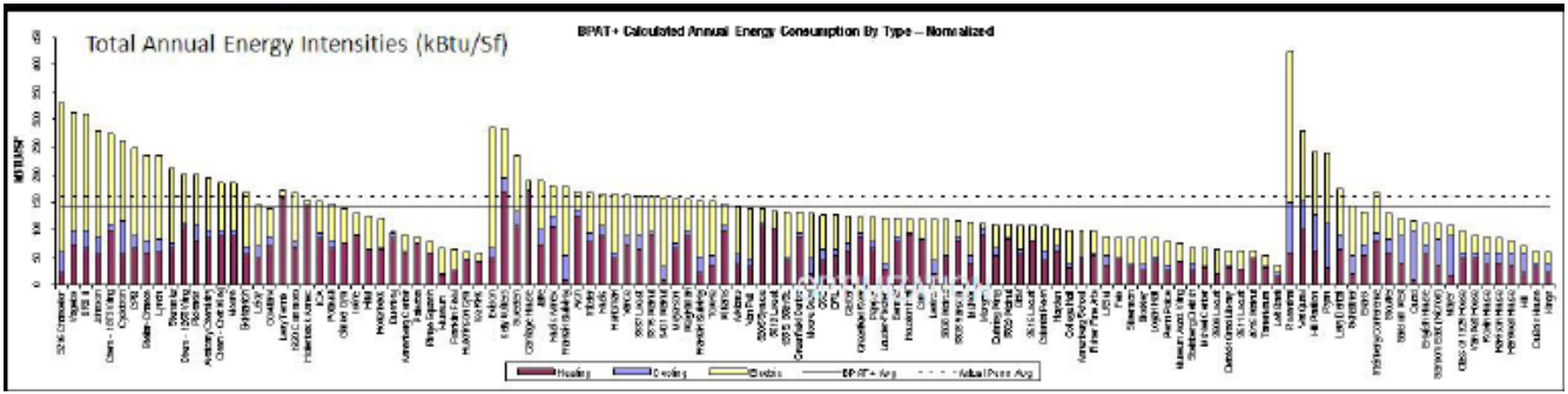


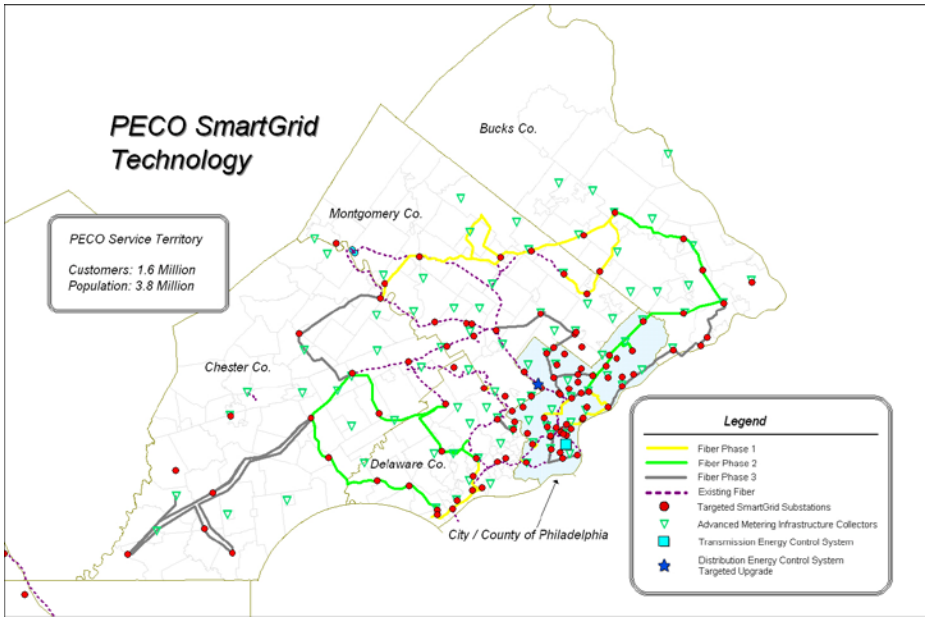
INCENTIVE: Diverse and Efficient Portfolio of Buildings for Energy Efficiency Investments

MECHANISM: Ownership or Decision Making Structure that Increases Portfolio Efficiency

ENERGYSHED

MANAGING CLIMATE CHANGE AT THE REGIONAL SCALE

2. Technical Geography of the Energyshed:
   Load Management Dispatched to Load Serving Entities



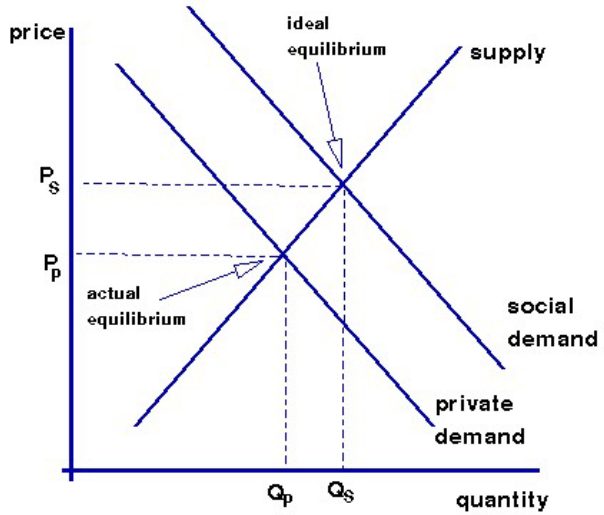
INCENTIVE: Reduce Peak Load Demand from EDC to RTO and Meet 129 Reqs

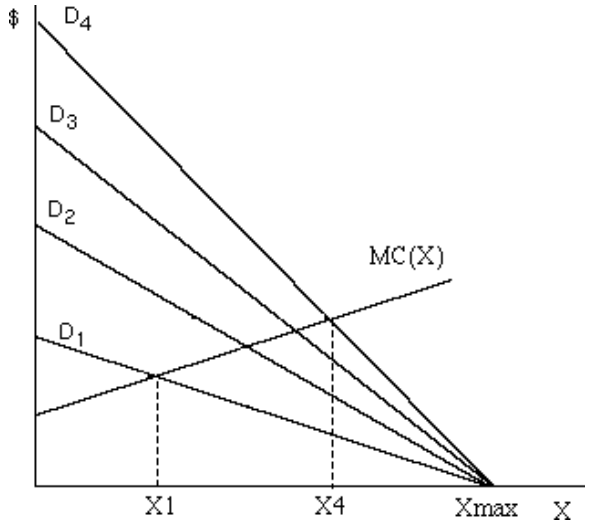
MECHANISM: Coordinated Dispatchable Load Among Distributed Users

ENERGYSHED

MANAGING CLIMATE CHANGE AT THE REGIONAL SCALE

3. Market Geography of the Energyshed:
   External Benefits of Energy Efficiency Result in Free Riders, Underinvestment



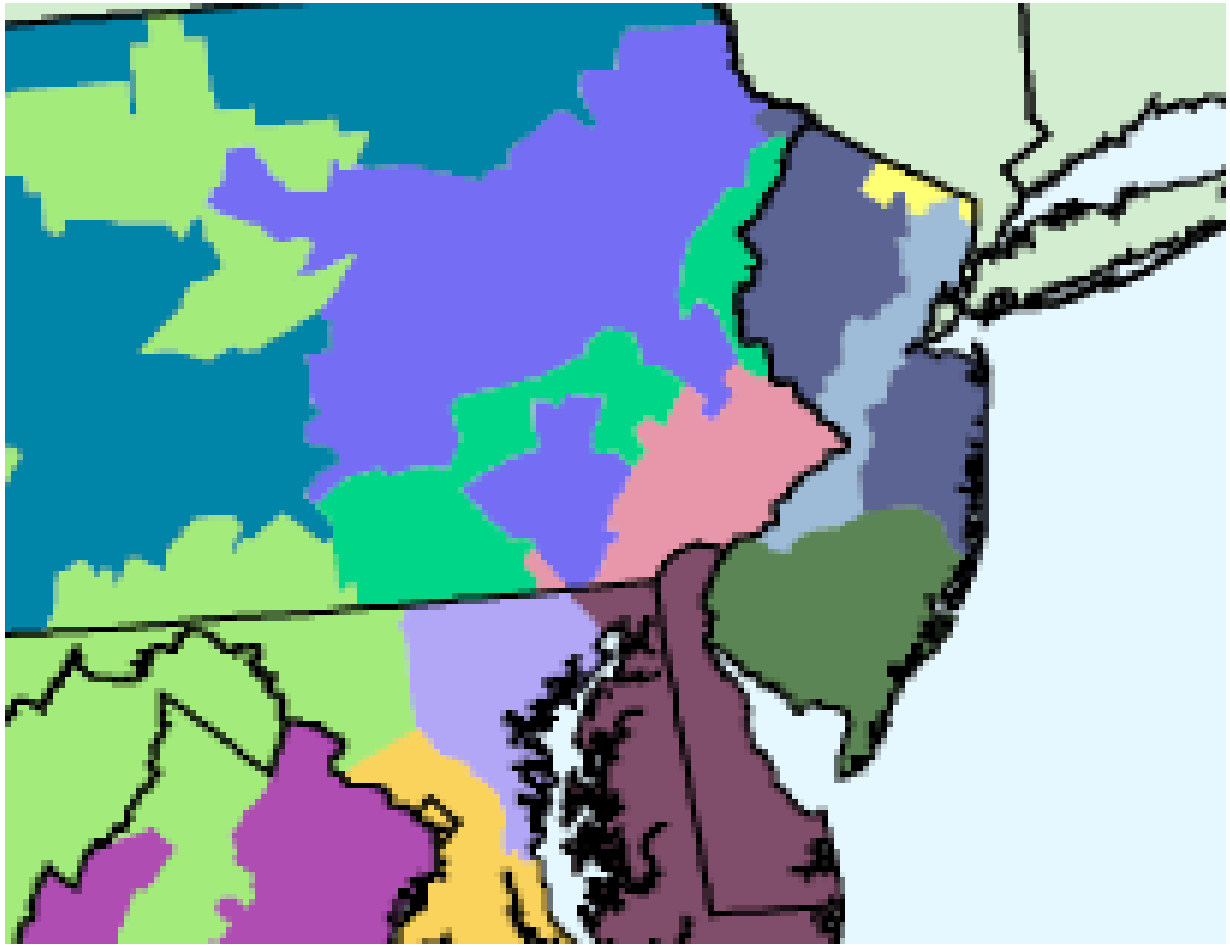


INCENTIVE: Reduced Consumption Lowers Price for all Users in PJM Zone

MECHANISM: Aggregation of Small Conservation Efforts into Price Movers

ENERGYSHED

AN ORGANIZATIONAL CAPACITY TO GOVERN THE ENERGYSHED:



ENERGYSHED

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AN ORGANIZATIONAL CAPACITY TO GOVERN THE ENERGYSHED:

A NEW SUSTAINABLE ENERGY AUTHORITY (similar to Delaware SEU

WITH CAPACITY TO:

- Finance and Optimize Energy Efficiency Investments
- Bundle Environmental Attributes and Credits for Trading
- Aggregate Purchasing Power and Manage Load
- Benchmark Performance and Transfer Innovation/Knowledge