

# Toward a New Energy Paradigm

*a regulatory and finance perspective*

IREC Grid Edge Workshop

April 7, 2023

C. Baird Brown  
eco(n)law LLC



## We Are Here

- We need an energy system that
  - Supports customers and communities playing a central role in determining and meeting their energy needs – and meets those needs
  - Operates safely within the limits of natural environmental systems – and ideally is restorative
- We are failing on both counts
- We need to
  - Rebuild legacy systems – which requires investment
  - Reinvent legacy regulation – which requires new regulations and/or creative adaptation of the rules we have

# The Grid of the Future

- Decarbonization
  - Beneficial electrification of buildings
  - Electrification of transportation
- Massive increase in DER – Investment by and on behalf of customers and communities
- DER provide grid services on parity with utility scale resources
- Distribution system capacity (both physical and informational – status and pricing) support DER and smart buildings

# The Investment Need

- Requirement for private investment
  - The Deep Decarbonization Pathways Project reports for the United States call for an annual decarbonization investment requirement ranging from “under \$100 billion today to over \$1 trillion in a span of about 20 years.” This includes more than \$200 billion annually for each of commercial and residential building efficiency, and more than \$600 billion annually for low-carbon electric power-generating resources.
  - Consistent with current McKinsey estimates for 50% decarbonization
- Low-income and environmental justice communities
  - Turning energy burden into wealth building
  - Use energy payments to pay debt for improvements

# The Microgrid Agenda

- Perfect building block for the grid of the future
  - Resilience, reliability and affordability
  - Uses local investment
- Markets for Microgrid Services
- Create a level playing field
  - Performance-based standards
  - Technology Neutrality
  - Eliminate discriminatory charges
- Interconnection
  - A single controllable resource
- Community microgrids



# A Transactive Energy Tariff

- Provides local, real-time prices for demand response and energy export
- Protects the system by pricing congestion on the transmission and distribution system
- Reduces customer cost
  - Efficient use of generation, storage by shaping load
  - Reduces operation and maintenance cost
  - Uses lower cost local resources

# Marginal Cost Price

- Wholesale energy price
  - Based on generator and storage resource bids to inject energy
  - Transmission constrained least-cost dispatch of system resources
  - When constraint prevents using external resources, price is set by lowest cost resource behind the constraint
  - Difference between system low price and actual price behind the constraint is the congestion cost (always positive)
- Distribution congestion price
  - Should work the same as wholesale congestion price
  - Not bids but price responses (can be positive or negative)

# Implementation

- Utility, Community Choice Aggregation (CCA), Virtual Power Plant (VPP), Distribution System Operator (DSO)
- Utility or DSO directly prices distribution congestion
- CCA or VPP must go through aggregator to RTO/ISO
  - Order 2222
  - Ability to sell at retail
- All different types must face the same disaggregated distribution congestion charge (benefit)
  - Aggregator faces different prices for different locations



# DOE Building Standard Retrofit and New Build

- DOE proposes to eliminate scope 2 emissions in benefit count
  - Emissions from on site generation count
  - Avoided emissions don't count
- Theory – grid will be decarbonized by 2035
- Contrary to IPMVP which DOE originated
  - Required for energy savings performance contracts
- Excludes BUGs from the Calculation
- Military wants microgrids for all facilities by 2035

# Working Around the Edges

- Philadelphia Energy Authority
- Municipal Authority with NGO green bank affiliate
  - LED Streetlights
  - Solarize
  - Built to Last
  - Virtual Power Plant
- CCA for PA
- Cooperatives

# Philly Streetlight Improvement Project

- Citywide replacement of 120K high pressure sodium streetlights with more efficient, longer-lasting LEDs
- All new and existing LEDs connected to a lighting management system
- Three year, budget neutral project using the Guaranteed Energy Savings Act
- Single largest energy conservation project to date, reduces municipal carbon emissions by 9%



# Built to Last Home Program

## Basic Systems

Roof  
Electric  
Plumbing (interior/exterior)  
HVAC + Hot Water  
Structural Issues

## Energy Efficiency

Weatherization  
Insulation (esp. attic)  
LED lighting  
Efficient windows/doors  
Low-flow water fixtures

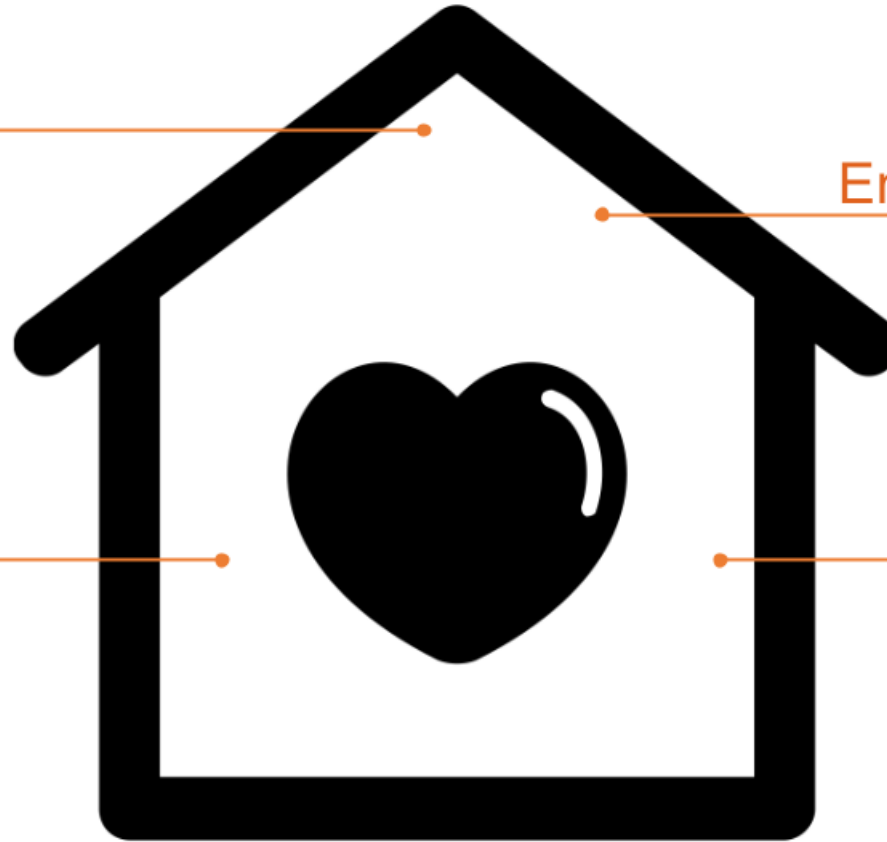
## Enhanced Energy Measures



Solar (where feasible)  
Heat pump (heat + AC)  
Fuel switching

## Health and Safety

Trip and fall hazards  
Excess moisture  
Lead paint  
Mold  
Pests







# Highlights

- Completed 50-home pilot, average energy burden 19%
- Phase 2 commenced in early 2023 to complete 50 homes
- Avoided Weatherization deferrals in 25% of projects
- Completed partial or full electrification in 30% of projects
- Solar viable at all homes assessed to date, anticipating 25-50% will receive
- Funding obtained for upcoming phases via Federal appropriation, DOE grant, PA Whole Home Repairs Program in partnership with PHDC





# Progress to Date (Residential)



Contracts Signed as of  
Today



Contracted Solar  
Capacity



\$ Invested in Philly's  
Clean Energy Economy



Households Signed up



Direct Jobs Created

Phases 1-4

**779**

**3.9 MW**

**\$13+ million**

**6,500+**

**98**

Phases 5  
and 6

**529**

**3.1 MW**

**\$11+  
million**

**14,000+**

**~72**

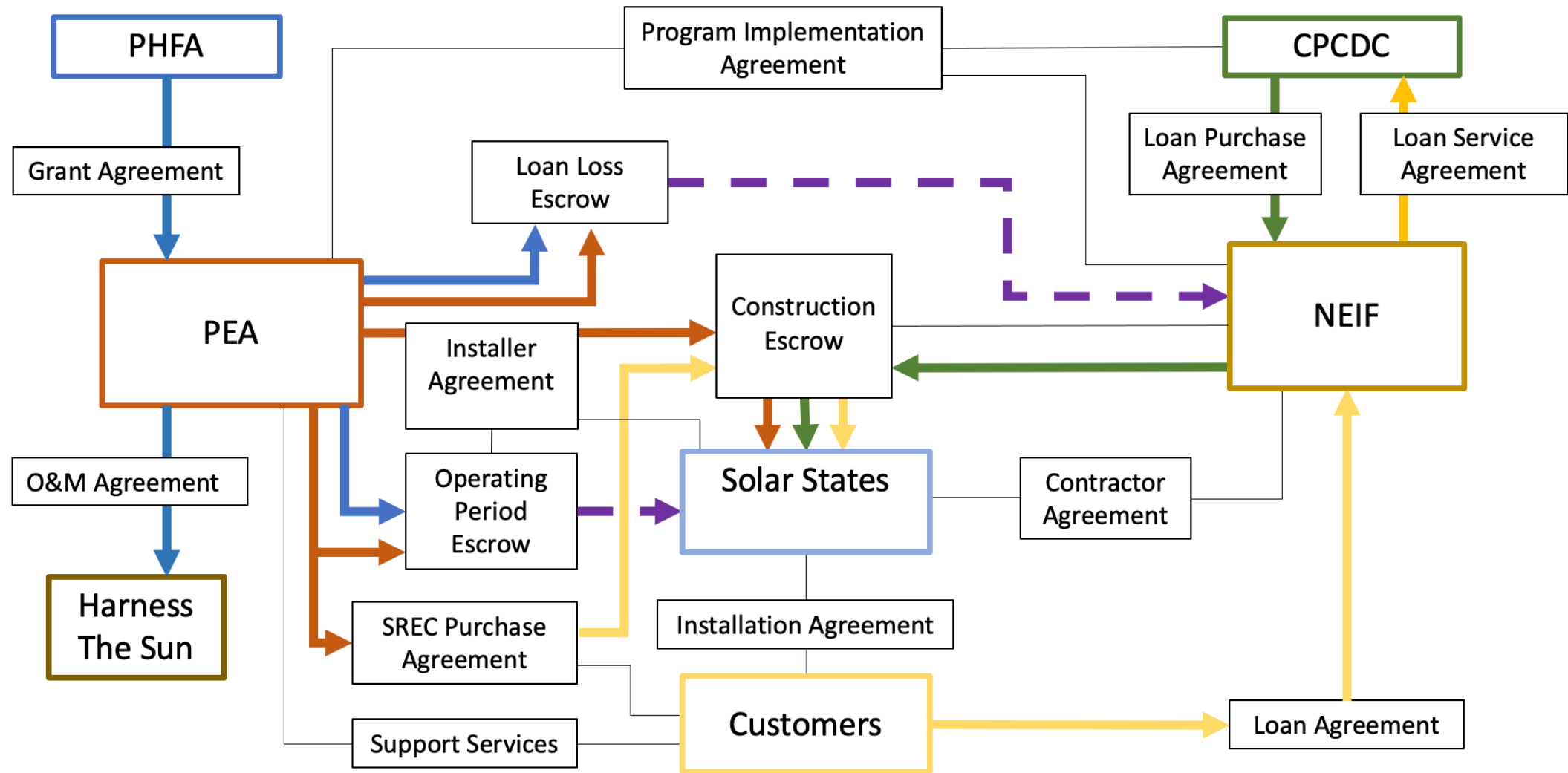


## Phase 5+6 (2022)

- Introduced a solar lease option with PosiGen
- Launched Commercial Solarize w/ Solar States and EDPR (which includes new PPA option)
  - 85 commercial projects in pipeline
- Goals for Phase 7, launched Jan 2023:
  - LMI Residential: 250 homes
  - Market Rate Residential: 500 homes

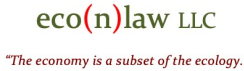


# PEA LOW INCOME SOLAR PILOT





# 3. The CCA Borough Model



## Pennsylvania Borough Code Authorization

§ 24A02. General powers.

(a) Electric plants and projects.--A borough may, either singly or jointly, manufacture or purchase electricity for the use of its inhabitants and own, construct, acquire by lease, purchase or otherwise gain an interest in, operate and manage or cause to be operated and managed an electric plant or project located within or without this Commonwealth.

\* \* \*

(c) Additional sources.--A borough may conduct studies as necessary to determine the feasibility and cost of any additional sources and supplies of electric power and energy and may cooperate with private power companies, other boroughs, electric cooperative corporations and other public or private electric power entities, within or without this Commonwealth, in the development of electric power and energy.

(d) Consent of borough to supply electricity.--No person, partnership or corporation may introduce electric current for light, heat or power purposes, without the consent of the council, into the limits of any borough that is furnishing electric current to its inhabitants. This subsection shall not apply to any person, partnership or corporation manufacturing electricity exclusively for its own use.



# 3. The CCA Borough Model



"The economy is a subset of the ecology."

## Act 138 Authorization

§ 2805. Regionalism and reciprocity

(b) Electric cooperatives, municipalities and other electric generation suppliers.

\* \* \*

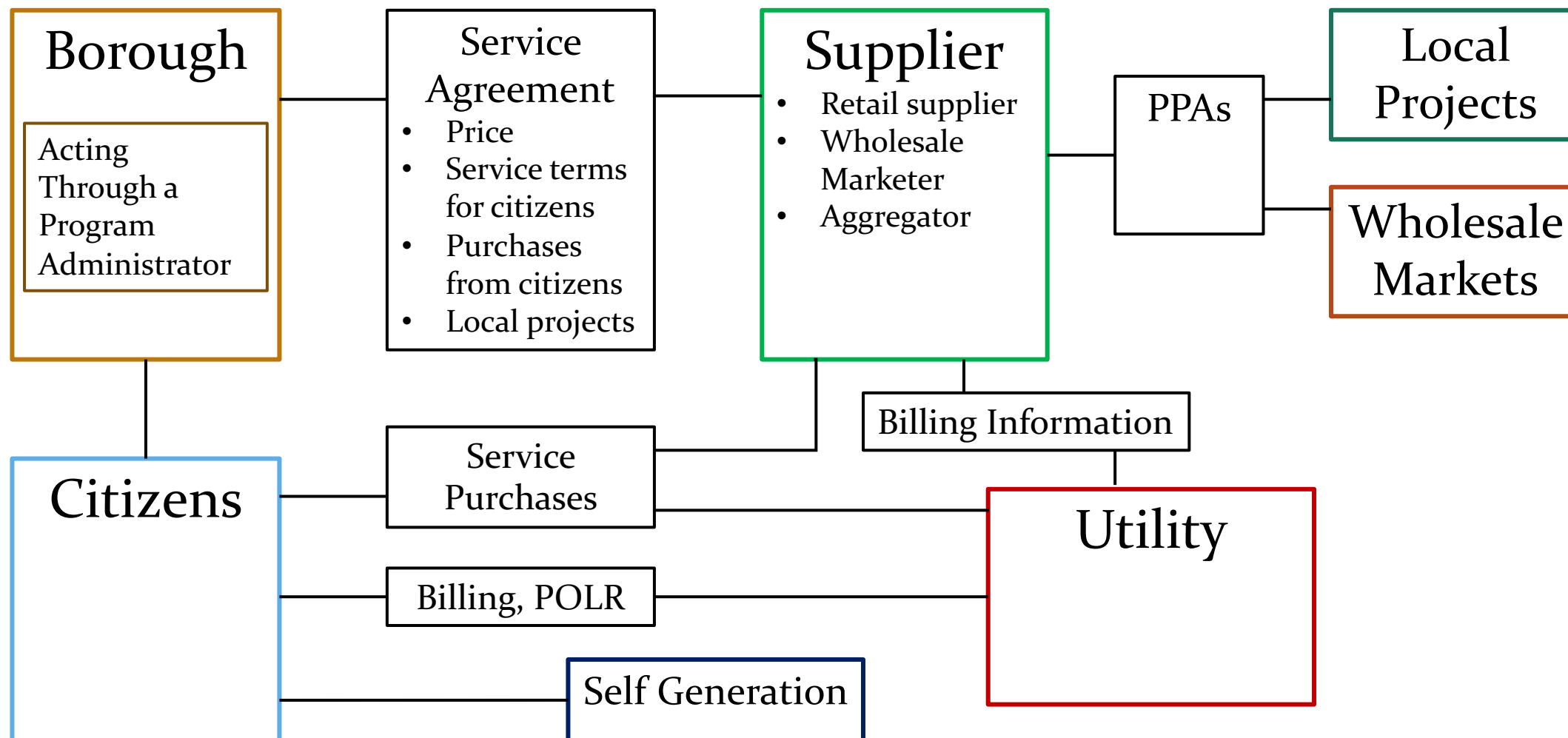
- (i) Consistent with 15 Pa.C.S. Ch. 74 (relating to generation choice for customers of electric cooperatives), no electric cooperative or municipality which distributes electricity to end-use customers may utilize the transmission or distribution system of an electric utility regulated by the commission for the purpose of supplying electricity to an end-use customer unless the electric cooperative or municipality provides open and nondiscriminatory access and allows other electric generation suppliers to utilize its facilities, including any facilities it is entitled to provide to third parties pursuant to contract, to make sales to the end-use customers it serves. A borough may prohibit electric generation suppliers from serving end-use customers within its borough limits; however, such a borough shall be prohibited from providing generation service to end-use customers outside of its borough limits which it did not serve prior to the effective date of this chapter.

§ 2809. Requirements for electric generation suppliers.

License requirement.--No person or corporation, including municipal corporations which choose to provide service outside their municipal limits except to the extent provided prior to the effective date of this chapter, brokers and marketers, aggregators and other entities, shall engage in the business of an electric generation supplier in this Commonwealth unless the person or corporation holds a license issued by the commission.



# Borough CCA Model





## Legal Implementation

- All of the relationships between the Citizens, the Supplier and the Utility reflect existing operations under PA's retail choice laws
- The CCA proposal utilizes the Borough Code authorization to allow the Borough to direct the actions of the Supplier for the benefit of its citizens
- The Borough would conduct a procurement to select a supplier to perform under a service contract that:
  - Determines price and service terms for its citizens
  - Gives it the right to help define any local projects serving the Borough
  - May provide for purchase of services by the Supplier from citizens
- While the Borough has the right to be the exclusive provider, it can provide citizens with the ability to opt out. Legislation may require it.



# Cooperatives

- California
  - An “electrical cooperative” is defined as “any private corporation or association organized for the purposes of transmitting or distributing electricity exclusively to its stockholders or members at cost.” CAL. PUB. UTIL. CODE § 2776
  - Limited Regulation CAL. PUB. UTIL. CODE § 2776
- Pennsylvania
  - Public utility definition “does not include . . . any bona fide cooperative association which furnishes service only to its stockholders or members on a nonprofit basis.” 66 PA. CONS. STAT. ANN. § 102.
  - Pennsylvania’s statutes provide general provisions for forming for profit and nonprofit cooperative corporations. 15 PA. CONS. STAT. ANN. § 7101 *et seq.*
- 50 State source: <https://lpdd.org/resources/lpdd-memorandum-public-utility-definition/>

# Questions?

C. Baird Brown

eco(n)law LLC

p. 215-586-6615

[baird@eco-n-law.net](mailto:baird@eco-n-law.net)

“The economy is a subset of the ecology.”