

Low Carbon Energy Solutions - Near Term

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Greater Philadelphia RF100
Technical Advisory Team

Description, references and analysis of near term (available now, or very soon) energy solutions, including energy efficiency, available in the Phila area for businesses, institutions, residents and municipal facilities.

Will include a growing list of contacts for: alternative grid electric generation providers, local solar, private generation fuel cells, contractors, auditors, etc.

Keep in mind that energy efficiency initiatives are often paired with renewable energy initiatives. The savings from the reduced energy use helps pay for the startup costs of the renewable energy systems.

Elec grid generation choices

- National wind
- Local wind
- Local solar
- Landfill gas - RECs
- Buy RECs from a REC supplier or aggregator
 - Buy shares of a wind turbine or solar farm (is this different than buying RECs?)

Private generation

- Per Facility
 - Solar hot water
 - Net-metered solar
 - Rooftop solar PV
 - Ground based PV
 - Vertical wall based (building or dividing walls)
 - Off-grid solar with storage (batteries)
 - Fuel cell generator w/ combined heat
 - Low temp - demand offset
 - High temp - baseload
 - Solar or wind combined with nat gas plant or fuel cell
 - Small scale wind (like Linc Financial)

- Per community
 - Community solar array
 - Owned by municipality
 - Owned by shareholders
 - Owned by developer
 - Owned by solar co.
 - Small wind turbine - rural setting
 - Fuel cell generator w/ combined heat
 - Backup to solar array

- Methane from water treatment works

Alternative Fuels

- Mobile
 - Bio Diesel
 - From waste cooking oil
 - Soy products
 - Ethanol
 - From corn
 - Recycled engine oil - (cleanburn?)
- Stationary
 - Wood burning (stove or boiler)
 - Compressed recycled paper/wood pellets or blocks - burning
 - Straw bales burning (to check if local, air pollution standards?)
 - Trash to steam
 - Methane captured from landfills

Efficiency

- Building Envelope
 - [Background Info](#)
 - Passive Haus
- Transportation
 - High mpg vehicles
 - Hybrid electric vehicles
 - Plug-in hybrid vehicles
 - Electric vehicles
 - Nat gas or propane trucks & buses
- Lighting
 - LEDs (Act 129 - rebates)
- Heating/cooling systems - *ASHPs*
 - *Ground Source Heat Pumps (GSHP)*
 - *Desiccant systems with Heat Pumps or geothermal/solar thermal*
 - Split systems (SEER over 20)
 - Variable Refrigerant Flow
- Smart design
- Energy Star Appliances (Act 129 - rebates)
- Passive and Net-Zero
 - Solarwall air heating

Penn Power offers subprograms for nonresidential customers that included prescriptive-based incentives for efficient HVAC equipment, ENERGY STAR® appliances and electronics, appliance recycling, lighting, food service equipment, agricultural equipment, building shell and systems improvement, multi-family building appliance replacement and audit, energy audits, and energy efficiency kits.

Building Codes

The updated 2012 IECC and 2015 IECC and ASHRAE 90.1-2010 and ASHRAE 90.1-2013 have not been adopted by Pennsylvania, although some provisions of the 2015 IECC have been adopted in the residential code. As shown in Figure 48, Illinois, Michigan, Vermont, New Jersey, and Maryland have adopted the 2015 IECC for residential buildings, and California, Washington, Nevada, Minnesota, Iowa, Florida, Delaware, Massachusetts, and Rhode Island have adopted the 2012 IECC.

Green building codes can also be adopted by cities to supplement statewide building codes by including additional energy efficiency and renewable energy provisions, such as requiring that new buildings meet LEED certification standards or include an on-site renewable energy system. In 2009, Philadelphia enacted a green building code requiring all new construction or major renovation earn LEED Silver certification if a majority of the construction costs are funded by the city. New construction must also meet or exceed ENERGY STAR cool roof standards.

Energy savings performance contracting

Local governments, schools, and other agencies can receive state funding to enter into an energy savings performance contract, which guarantees energy savings reductions through the implementation of specified efficiency measures without going through a time-consuming formal bid process.

Alternative and clean energy program

Businesses, economic development organizations, and political subdivisions (including municipalities, counties, and school districts) in Pennsylvania are eligible to apply for a grant or loan under the state's Alternative and Clean Energy (ACE) Program: Loans, Grants and Loan Guarantees. While the ACE Program can be used for implementing energy efficiency and renewable energy projects, projects related to fossil fuels (e.g., construction of compressed natural gas and liquefied natural gas fueling stations) are also eligible to apply.

High performance building incentives program

The Department of Community and Economic Development and the Department of Environmental Protection, under the direction of the Commonwealth Finance Authority, jointly administer this \$25 million grant and loan program. Financing is provided for new construction and major renovations for buildings achieving LEED Gold certification.

KeystoneHELP

The KeystoneHELP program provides fixed, low-interest loans to homeowners to finance energy efficiency upgrades.

Small business advantage grant program

The Small Business Advantage Grant Program provides matching grants to businesses for up to \$9,500 for projects that improve energy efficiency.

Sustainable energy fund

As part of electric utility restructuring in Pennsylvania, four sustainable energy funds were created to promote renewable energy and clean-air technologies, including energy efficiency.

Weatherization assistance program

Residential customers can have an on-site energy audit conducted to determine which energy efficiency measures are most cost-effective for their homes.¹⁷⁴ Through the program, weatherization services include air sealing, installation of insulation, heating system replacement, minor repairs, and customer education. Customers earning less than 200 percent of the federal poverty line are eligible to apply,

Municipal Permitting and Siting Opportunities

Home Rule

Local governments retain significant autonomy to pass laws pertaining to its self-governance, including zoning codes. Specifically, Pennsylvania municipalities retain control over many siting and permitting regulations related to renewable energy systems by enacting zoning or subdivision and land development controls to regulate renewable energy systems.

Reduce Permitting Fees

Permitting fees themselves (i.e., for building and electrical permits) can also be meaningful costs for small renewable energy projects, and widespread discrepancies exist in permitting fees and times across Pennsylvania.

Use State Permit Models

Model solar and wind zoning ordinances and a model solar permit have been already developed for Pennsylvania.

Set Goals for Renewable Energy

Local government planning can include goals for growing renewable energy and action steps to realizing its clean energy goals through changes to zoning ordinances. Additionally, site planning guidelines and smart building codes can encourage renewable energy development by designing buildings to ensure they allow for renewable energy development. For example, guidelines can promote lot and building orientation so that solar energy access is maximized and can include solar-ready building standards to ensure rooftop suitability for a future solar energy system.

Improve Clarity of Ordinances

Clarifying how renewable energy systems are treated in existing zoning ordinances can eliminate regulatory ambiguity and provide clarity to developers.

Spell It Out In Land-Use Codes – “This Would Be A Good Place For Solar”

Since large-scale renewable energy systems have different impacts on land use and can present other concerns, like impervious surface coverage, tree and habitat loss, transmission infrastructure, construction impacts, noise, glare, aviation impacts, and

wildlife impacts, land-use codes can specify where this type of development is permitted and what mitigation of potential nuisances is required.

Incentives

On-site renewable energy systems can be added to currently in-place lists of development amenities that are eligible for obtaining density or floor area ratio bonuses.

Solar easements, access permits, fences, and rights

As there is no federal property right to sunlight, states and local jurisdictions can develop their own solar easement, access permit, fencing, and rights laws or ordinances to provide a guarantee to a solar energy system owner access to solar light.

- Enable online permitting process
- Charge fair permitting fees
- Provide a fast turnaround time
- Avoid community-specific licenses
- Ensure a narrow inspection appointment window
- Eliminate excessive inspections
- Train permitting staff

Under-Utilized Land

Landfills and brownfields are two varieties of typically under-utilized land that can serve to host utility scale renewable energy projects without invoking criticisms often levied against projects sited in the un-built environment (e.g., agricultural lands, rural undeveloped land).

New State Policies To Push For

Energy efficiency resource standard

Energy efficiency resource standards (EERS) are one of the most effective policy tools to achieve energy savings.¹⁷⁵ In order to attain 100 percent renewable energy, Pennsylvania can expand on its existing EERS, the EE&C program, and the associated program incentives by ratcheting up its existing goal and setting targets for natural gas efficiency.

Continued updates to building codes

Pennsylvania can use more stringent building codes to encourage energy efficiency. Improving building efficiency in the design stage is easier and less expensive than renovating buildings to be more efficient after construction, thus incorporating strong efficiency standards into state building codes can be one of the most cost-effective ways in which states can make efficiency improvements.

Appliance standards

Pennsylvania can set strong efficiency standards for appliances and equipment sold in the state. National standards have been set for many appliances, but some states adopt more stringent efficiency

Supportive financing programs

Financing programs can provide the upfront capital needed to help consumers make investments in efficiency upgrades.

PACE financing

Property assessed clean energy (PACE) is a financing mechanism designed to overcome challenges associated with traditional loan programs by avoiding down-payments and simplifying repayment for property owners.

Green bank

A green bank is a financing institution that typically combines public and private funds to support clean energy projects through long-term financing. Green banks leverage public funds to attract private investment, multiplying the effectiveness of public funds.

Electric Utility Changes To Push For

On-bill financing

On-bill financing is a loan program option that allows customers to repay their energy efficiency loans through their utility bills.

Building energy disclosure

Building energy disclosure or benchmarking laws make building energy use data available to property owners, potential buyers, program administrators, and policymakers.

Inclining or inverted block rates

An inclining block rate electricity rate design, also referred to as an inverted block rate design, charges higher prices for higher levels of electricity use within a billing (i.e., monthly) period.

Reduced or eliminated fixed charges

A typical electric utility customer's rate contains a monthly fixed charge, energy charges (based on kWh consumed), and in the case of many nonresidential customers, a demand charge (based on a customer's peak demand in kW). Fixed charges are unavoidable and discourage energy efficiency.

Energy efficiency as a priority resource

In order to establish a solid foundation for other policies that support energy efficiency, energy efficiency itself must be acknowledged as a resource and established as a priority. Many states have done this in some form, for instance, requiring demand-side resources to be evaluated in utility integrated resource plans (IRPs).

Decoupling

Because energy efficiency measures reduce end-use energy consumption, and therefore utility revenues, traditional ratemaking policies schemes discourage utilities from promoting energy efficiency. Decoupling policies seek to overcome this barrier by disconnecting utility profits from its sales volume, in theory making a utility indifferent—rather than opposed—to efficiency and conservation by minimizing its throughput incentive.

Performance-based ratemaking

In traditional cost-of-service regulation, regulators allow a utility the opportunity to earn a fair rate of return on its capital expenditures, thereby creating an incentive for the utility to have high sales and large capital expenditures. In contrast, performance-based ratemaking provides a financial incentive to the utility to reduce its costs.

interconnection reforms

- requirement that a pre-application report be made available to developers for a fee of \$300.
- Fast-Track eligibility from 2 to up to 5 megawatts,
- addition of a supplemental review process for applications that fail the “15 percent rule,”

Beyond reform: planning to support distributed generation

Several utilities across the country have developed interconnection maps which provide developers with important information about the interconnection potential for solar, EVs, and battery storage in a given area of their service territory. This is sometimes referred to as “hosting capacity,”

The state of Pennsylvania can take steps to improve the siting process by helping foster enhanced consistency across local government regulation.

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Level the Playing Field –

eliminate incentives for fossil fuel based energy (a long list)

Community Scale PPAs

http://blog.rmi.org/blog_2017_02_28_Community_Scale_Solar_Across_The_Nation