U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

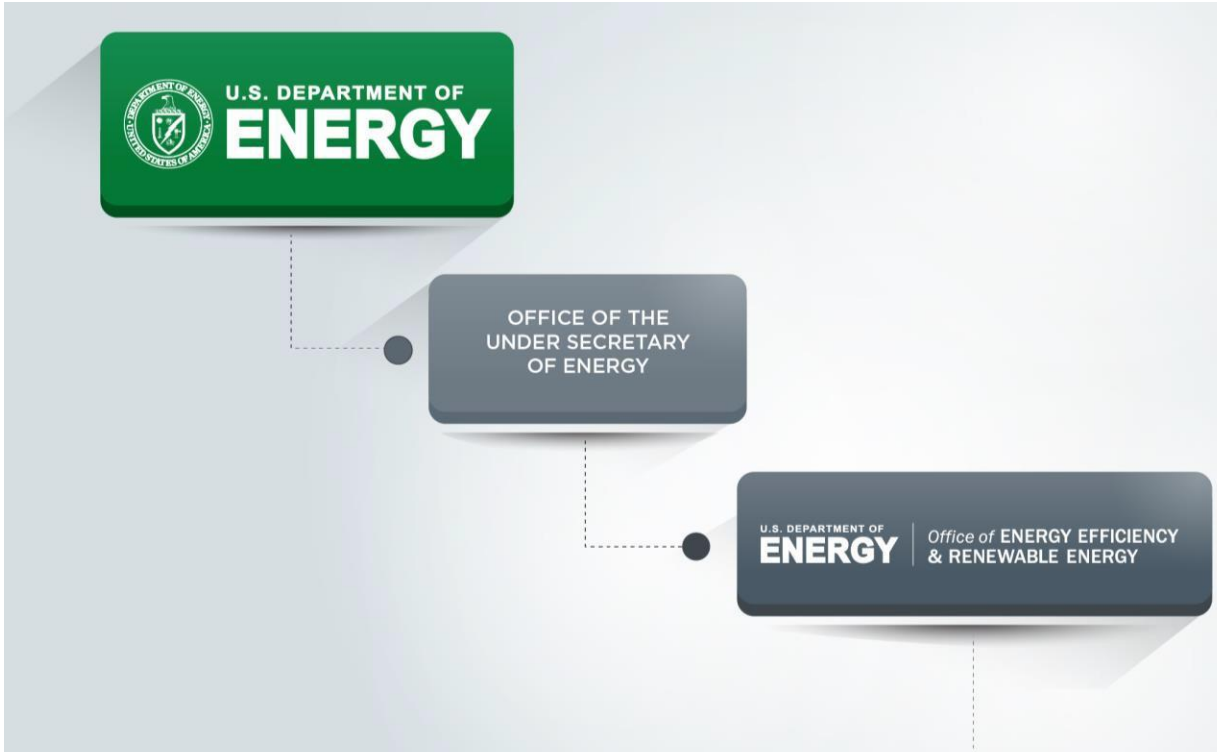
How the U.S. DOE's Office of Energy Efficiency and Renewable Energy's Programs Improve Air Quality

Amy Royden-Bloom

State Energy Program Manager

NACAA Fall Meeting, October 22, 2019

Office of Energy Efficiency and Renewable Energy



ENERGY EFFICIENCY

- Advanced Manufacturing
- Buildings
- Federal Energy Management
- **Weatherization and Intergovernmental**

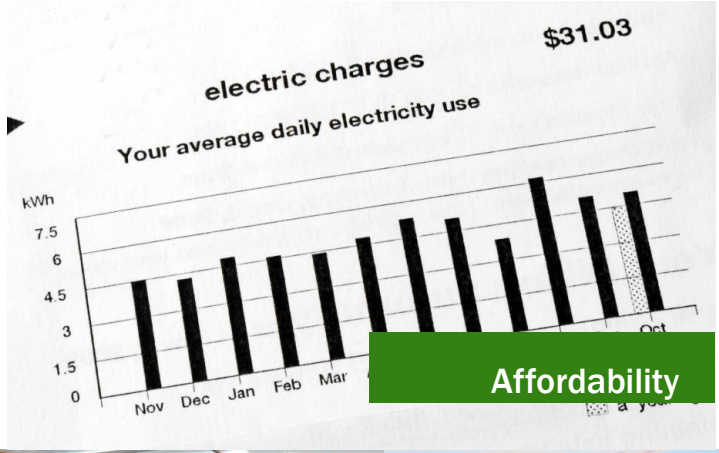
RENEWABLE POWER

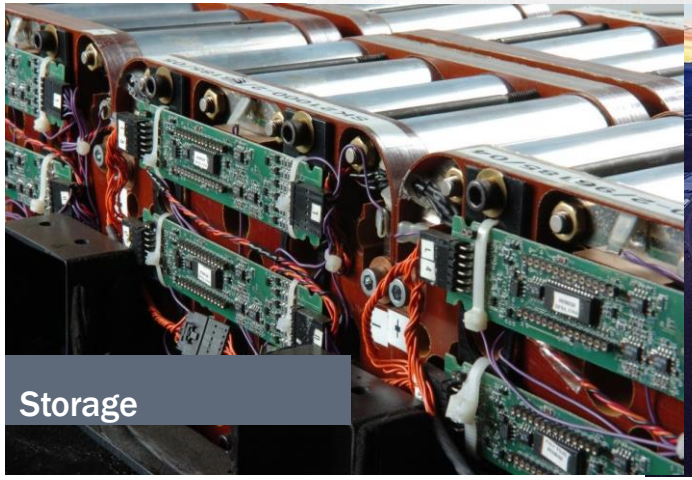
- Geothermal
- Solar
- Wind
- Water

SUSTAINABLE TRANSPORTATION

- Bioenergy
- Hydrogen and Fuel Cells
- Vehicles

EERE Priorities





SEP Mission

SEP provides funding and technical assistance to 56 states, territories, and the District of Columbia to:

- enhance energy security,
- advance state-led energy initiatives, and
- maximize the benefits of increasing energy efficiency.

SEP creates jobs

- 1 job created per $2500 invested
  - *Example: Texas Clean Energy Incubators*

SEP is cost effective

- $4.50 saved per $1 invested
  - *Example: Illinois Wastewater Treatment Facility Program*

SEP Competitive Projects

- **New Jersey (FY17)**
  - Underserved Communities Electric Vehicle Affordability Program
  - One of NJ's goals in this effort is improved air quality in underserved communities
- **Hawaii (FY16)**
  - Hawaii Advanced Energy Visualization Network (HAVEN)
  - A visualization tool to help HI move to an advanced energy system and support the state's goal of reducing GHG emissions to 1990 levels by 2020
- **Minnesota (FY15)**
  - Energy Policy Planning Resources to Local Governments (LOGO-PEP)
  - Goal is to help local governments develop and implement strategies to reduce GHG emissions
- **Tennessee (FY15)**
  - National Energy Efficiency Registry (NEER)
  - A flexible and transparent way for states to track and report energy efficiency
- **New York (FY15)**
  - A Roadmap for Multi-State Cooperation on Offshore Wind Development
  - Partners: Maine, Massachusetts, and Rhode Island

State and LOcal Planning for Energy (SLOPE) Platform

A platform for state- and locally-specific comprehensive energy planning data in the areas of energy efficiency, renewable energy, and sustainable transportation

Capabilities

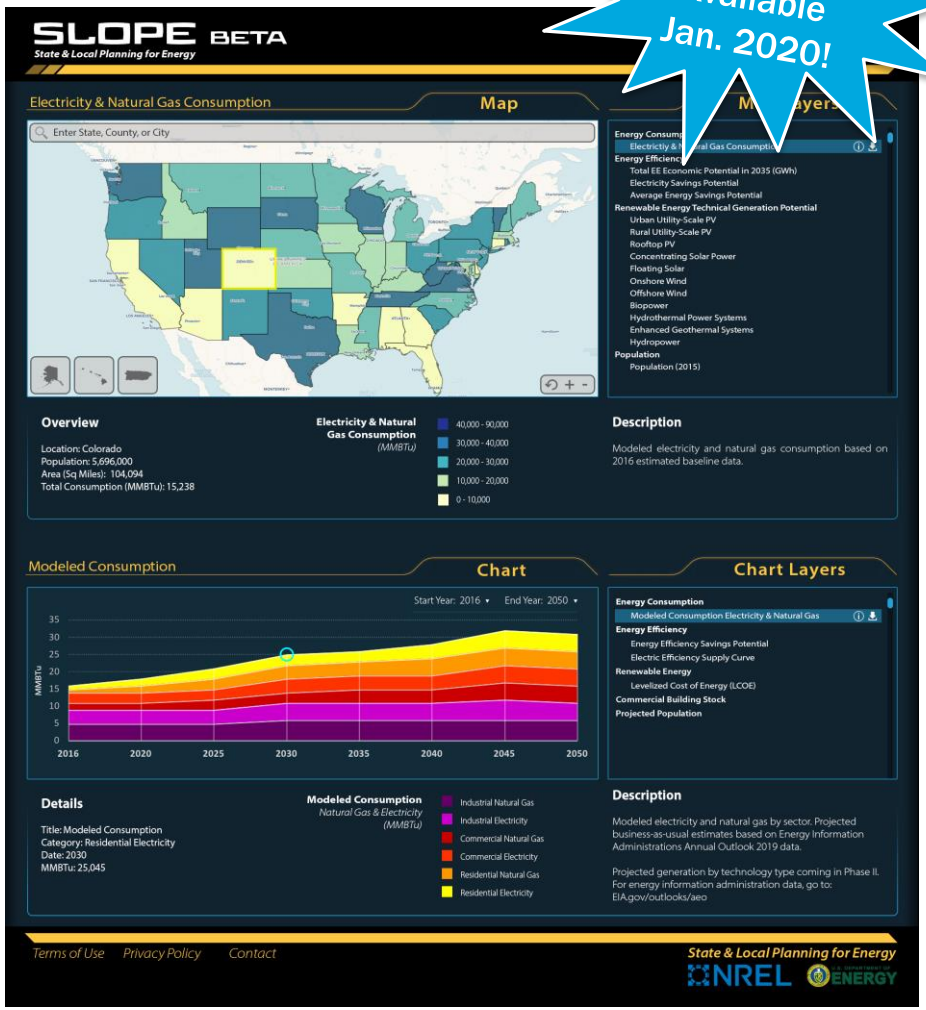
- Enables "apples-to-apples" comparisons of adjustable energy futures with inputs from variety of data points, such as:
  - Electricity and natural gas consumption
  - Renewable energy generation potential
  - Levelized cost of energy (LCOE)
  - Projected population

- **Phase 1:** Projection data available (Jan. 2020)

- **Phase 2:** Integrated, granular platform with adjustable settings and transportation and generation mix data (begins 2020)

Phase I: Mock up

Phase I: Available Jan. 2020!



NASEO Energy Efficiency Pathway Templates

- Facilitate energy office-air quality regulator discussion on EE
  - How can the EE program or policy support multiple objectives, including air quality?
  - Range of consideration
    - » Broad planning/projections ←→ formal "credit" (SIP, NOx allowances)
  - How does the program or policy work?
  - Who performs the EE? Responsibilities and authorities?
  - Voluntary or mandatory? Incentivized?
  - Are there targets? Consequences for underperforming?
  - Are or can energy savings be projected? Estimated? Measured and verified?
  - Are or can energy savings/impacts be translated into avoided air emissions?
  - Other information needs, gaps? Can they be addressed?

http://naseo.org/ee-pathways

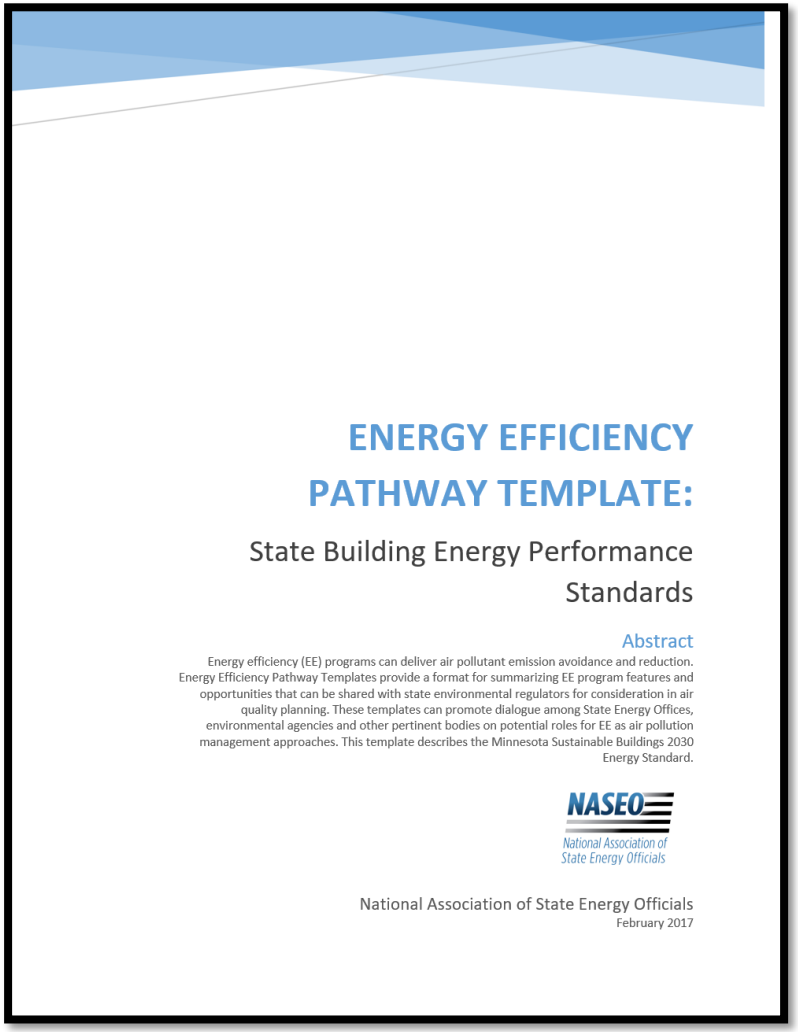
NASEO Energy Efficiency Pathway Templates

Samples:

- Virginia Energy Savings Performance Contracting
- Illinois Building Energy Codes
- Minnesota state lead-by-example (Sustainable Buildings 2030 standard)
- Boulder, CO SmartRegs

- "Blanks" of above to fill-in

- Generic template—adapt to other pathways/program types



ENERGY EFFICIENCY PATHWAY TEMPLATE:

State Building Energy Performance Standards

Abstract

Energy efficiency (EE) programs can deliver air pollutant emission avoidance and reduction. Energy Efficiency Pathway Templates provide a format for summarizing EE program features and opportunities that can be shared with state environmental regulators for consideration in air quality planning. These templates can promote dialogue among State Energy Offices, environmental agencies and other pertinent bodies on potential roles for EE as air pollution management approaches. This template describes the Minnesota Sustainable Buildings 2030 Energy Standard.

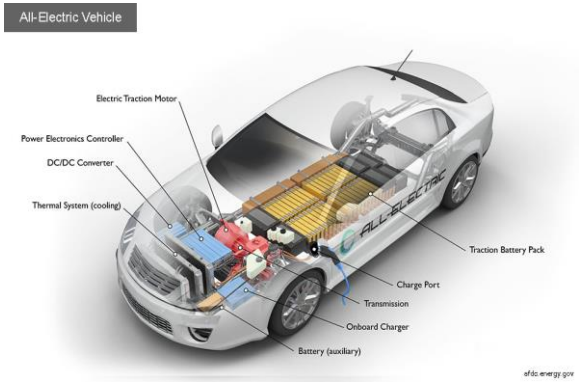
NASEO
National Association of State Energy Officials

National Association of State Energy Officials
February 2017

Transportation Electrification Toolkit

- Designed to support states with the planning, distribution, and evaluation of funds received from the Volkswagen (VW) Clean Air Act Settlement.
- Key topics/information
  - Background information on EVs, infrastructure and electrification.
  - Top barriers for understanding the settlement and using associated funding– as identified by states.
  - Examples of key strategies to help address barriers or challenges.
  - Relevant case studies aligned with each key barrier/mitigation action.
  - List of publicly-available guides and tools to support emissions reductions.
- Developed in partnership with NREL, EERE's Vehicle Technologies Offices/Clean Cities

Coming in early 2020!

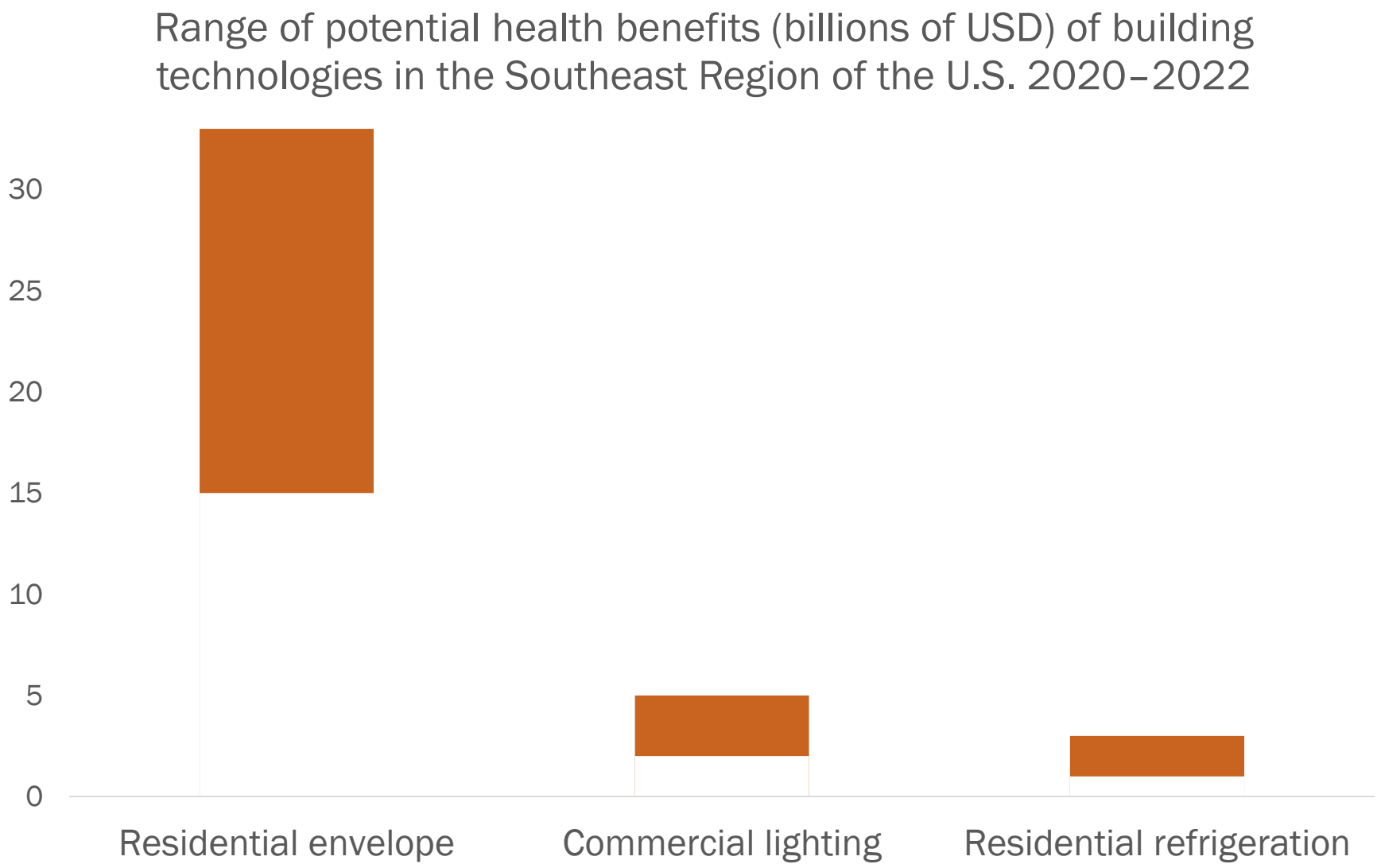


Scout Tool

- Scout is a software program for estimating the national (and regional) energy and CO_2 impacts of building energy efficiency measures.
- Scout places emerging and existing building technologies into a broader energy efficiency policy context.

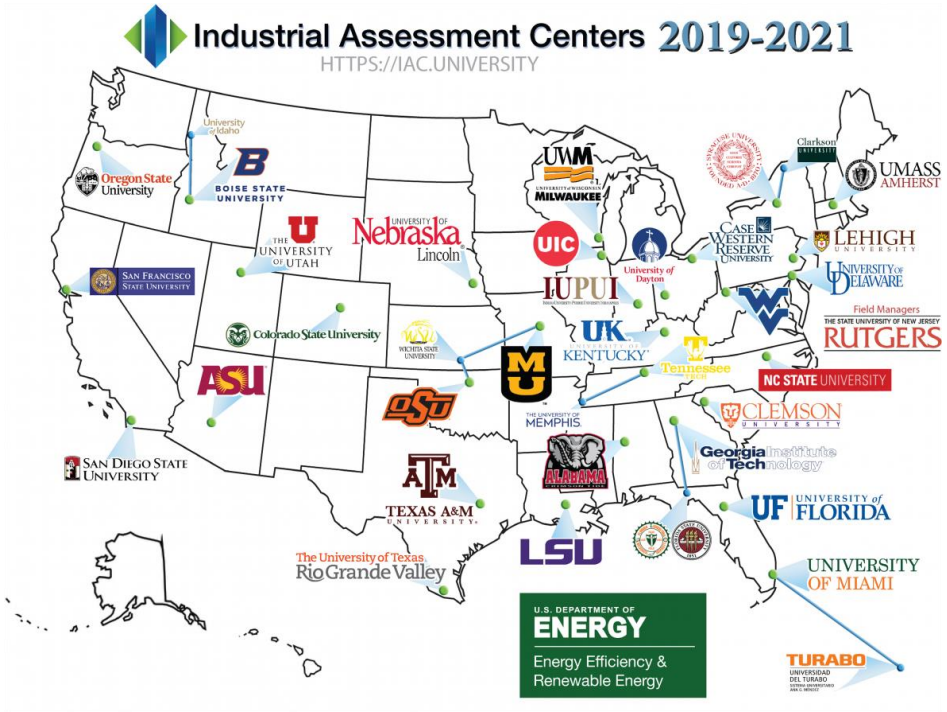
Use the Scout tool here: scout.energy.gov

Scout Tool: Example analysis



Industrial Assessment Centers (IACs)

- **Small- and medium-sized manufacturers may be eligible to receive a no-cost assessment by IACs to:**
  - Improve productivity,
  - Reduce energy consumption,
  - Reduce water and energy waste, and
  - Reduce CO_2 waste.



IAC Assessment of Pennsylvania since 2010

Average Energy Totals per Assessment*

	Plant Usage	Recommended Saving	%	Implemented Savings	%
Electricity (kWh)	8,700,000	1,400,000	17	520,000	6
Natural Gas (MMBtu)	58,000	8,000	13	1,300	2.3

Average CO_2 Totals (kg) per Assessment*

	Plant Usage	Recommended Saving	%	Implemented Savings	%
Electricity	3,900,000	1,000,000	25	350,000	9
Natural Gas	3,000,000	420,000	13	70,000	2.3
Total	7,000,000	1,400,000	20	420,000	6

*all numbers have been rounded to 2 significant digits

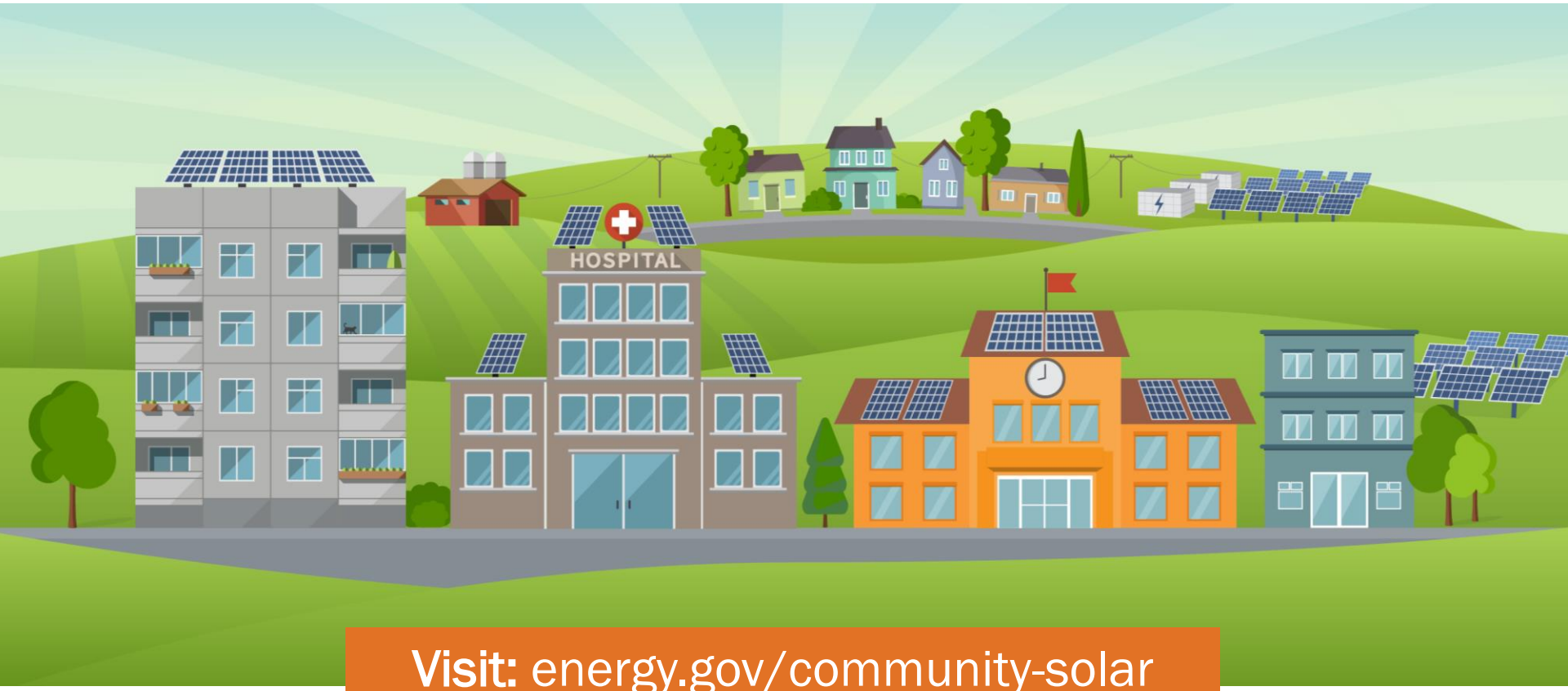
AFLEET Tool to Analyze AFV Costs & Benefits

- Examines light-duty & heavy-duty vehicle:
  - Air pollutant emissions
  - GHG emissions
  - Petroleum use
  - Cost of ownership

- Contains 18 fuel/vehicle technologies
  - Conventional
  - Hybrids
  - Plug-in electrics
  - Alternative fuels: CNG, LNG, LPG, H2, ethanol, biodiesel, renewable diesel
- Includes 7 Major Vehicle Types
  - Cost, MPG, & VMT data on 26 truck types and configurations to support movement of people and goods
- AFLEET Tool Online and Spreadsheet; HDVEC available at: afleet-web.es.anl.gov

National Community Solar Partnership

The National Community Solar Partnership is a coalition of community solar stakeholders working to expand access to affordable community solar to every American household by 2025.



Visit: energy.gov/community-solar

Email: community.solar@ee.doe.gov

Solar Energy Innovation Network

The Solar Energy Innovation Network is a collaborative research program that supports multi-stakeholder teams to research and share solutions to real-world challenges associated with solar energy adoption.

SOLAR ENERGY INNOVATION NETWORK
U.S. DEPARTMENT OF ENERGY

APPROACH

- Teams identify local and regional challenges, and receive technical and financial assistance to formulate and test innovations, and validate new models
- Teams meet in person for several multiday work sessions to further refine solutions and learn from other teams
- Research and innovative solutions shared through peer network

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

BERKELEY LAB
Lawrence Berkeley National Laboratory

OBJECTIVE

- Develop innovative solutions that make solar energy adoption easier and enable stakeholders across the United States facing similar challenges to replicate them.

ROCKY MOUNTAIN INSTITUTE

Solar Energy Innovation Network

- Products and tools from Round 1 will be available soon at: https://www.nrel.gov/solar/solar-energy-innovation-network.html
- Learn more about Round 2 at: www.nrel.gov/solar/solar-energy-innovation-network-round-2.html

WINDExchange

WINDExchange Engagement & Web Resources

*Provide communities the resources to **weigh the benefits and costs of wind energy**, understand the deployment process, and **make wind development decisions supported by science- and fact-based information.***

Virtual Resources

- Wind resource, potential, and installed capacity maps for each state at various turbine heights
- Wind ordinances library, webinars, rural focused podcasts, and fact sheets, e-newsletter
- Community Siting and Project Development Information

JEDI Tools and Economic Analysis

- Analysis of impact of wind on jobs and the economy.
- www.nrel.gov/analysis/jedi/wind.html

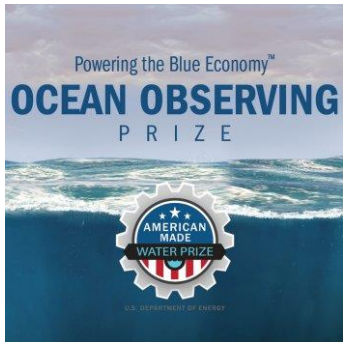
Reports and Technical Assistance

- Special Topic Slide shows i.e. Offshore Wind Development
- Latest publications, i.e. 2018 DOE Market Reports!
- Contact: windexchange@nrel.gov

WPTO – Marine Energy

- WPTO supports the development of marine hydrokinetic technologies that can provide reliable, cost-effective power for the grid.
- And this year, the program launched the Powering the Blue Economy Initiative, using prizes and other mechanisms to support non-grid markets where marine energy is uniquely suited. This includes three announced prizes this year, with topics such as desalination and ocean observing.
- And through WPTO funding, Ocean Renewable Power Company (ORPC)'s RivGen® was deployed in the Kvichak River, in the remote community of Igiugig, Alaska in July 2019.

POWERING the BLUE ECONOMY™



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