BCA Resource Portfolio

Better Communities®
U.S. DEPARTMENT OF ENERGY

This Resource Portfolio has been curated based on topics identified by **Better Communities Alliance (BCA)** local government partner requests for guidance and technical assistance.

Each of the tabs corresponds to the category of U.S. Department of Energy (DOE) resources that can supplement current local government activities and help inform future progress.

Please note that each tab does not list the entire breadth of resources available through DOE. A more comprehensive set of resources can be found under the **Resource Library** tab.

For questions about the resources in this portfolio, please contact stateandlocal@ee.doe.gov.

January 2018

Energy Planning

Initiatives

Cities Leading through Energy Analysis and Planning (Cities-LEAP): An initiative that delivers standardized, localized energy data and analysis that enables cities to lead clean energy innovation and integrate strategic energy analysis into decision-making.

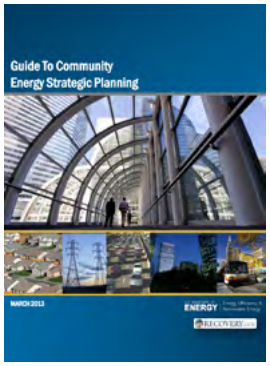
State & Local Energy Efficiency Action Network (SEE Action): A state and local effort facilitated by the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) that has created resources and technical assistance on a range of energy efficiency topics.

Resources

City Energy Profiles: A tool for accessing energy use and activity data that can help your city plan and implement clean energy projects. A city's energy profile includes summary reports on multiple topics: policies and incentives; transportation, buildings, and industry data; renewable energy resource potential; natural gas and other fuel source costs; electricity generation; and greenhouse gas emissions. Part of the Cities-LEAP initiative.

Database of State Incentives for Renewables & Efficiency (DSIRE): A database of information on incentives and policies that support renewable energy and energy efficiency in the United States.

Energy Planning Resources on the Better Buildings Solution Center: Resources and information related to energy planning from local government Better Buildings Challenge Partners.



Guide to Community Energy Strategic Planning: A step-by-step process for creating a robust strategic energy plan for local governments and communities that can help save money, create local jobs, and improve national security. The guide offers tools and tips to complete each step and highlights examples from successful planning efforts around the country addressing numerous topics:

- Establishment of a Leadership Team
- Identification and Engagement with Stakeholders
- Developing an Energy Vision
- Assessing the Current Energy Profile
- Developing Energy Goals and Strategies
- Identification and Prioritizing Actions
- Financing Strategy
- Developing a Blueprint for Implementation
- Evaluation Plans
- Developing, Adopting, and Publicizing the Plan

Local Energy Toolbox: A cataloged, customizable list of actions to help local communities make strategic energy decisions. Categories include buildings & efficiency, renewable power, transportation & land use, municipal operations, electricity use & infrastructure. Part of the Cities-LEAP initiative.

SEE Action Resources by Implementation Goals: A one-page guide to some of the most actionable SEE Action Network resources, organized by policy goal including development of robust energy efficiency practices, effective delivery mechanisms, incentives and barrier reduction to market participation, and establishment of measurement and verification (M&V) mechanisms.

State and Local Solution Center: Develop an Energy Plan: A compilation of resources and information related to energy planning.

Buildings

Commercial Buildings

Initiatives

Better Buildings Accelerators: Time-limited collaborations with market leaders to overcome specific barriers to energy efficiency. The accelerators relevant to commercial buildings are:

- Data Centers Accelerator: Data center owners and operators are working to accelerate the adoption of system metering and associated energy tracking and reduction, while developing best practice approaches for various data center configurations and demands.
- Smart Labs Accelerator: Partners collaborating to develop best practice approaches to increase energy efficiency in laboratories with an integrated approach to building and laboratory equipment and operational practices.
- Zero Energy Districts Accelerator: Since 2016, city and district developers have worked through the Accelerator to demonstrate how to cost-effectively meet zero energy goals by completing a detailed energy master plan, business case, and development pathway. Webinars and materials are available on the website.
- Zero Energy Schools Accelerator: School districts and their partners will work together to develop a road map for zero energy schools. The Zero Energy Schools Accelerator aims to make Zero Energy K-12 schools mainstream, while enhancing the educational environment for our nation's students.

Better Buildings Alliance Technology Solutions Teams: The seven Better Buildings Alliance Technology Solutions Teams feature participants collaborating with one another and with the DOE national laboratories to focus on specific technical opportunities and challenges. Communities can tap into the expertise of the Better Buildings Tech Team members and the resources they have developed:

- Building Envelope
- Energy Management Information Systems (EMIS)
- Lighting & Electrical
- Plug and Process Loads (PPLs)
- Refrigeration
- Renewables Integration
- Space Conditioning

Better Buildings Challenge: Organizations partner with DOE through the challenge and commit to at least 20% energy or water savings over 10 years or less. Partners are nationally recognized, profiled broadly in media, and featured for their sharing of solutions.

Building Energy Codes Technical Assistance: A technical assistance program to help states and local code enforcement jurisdictions adopt, upgrade, implement, and enforce their residential and commercial building codes. DOE is also conducting a series of research studies investigating energy code implementation in residential and commercial buildings. For more information, visit Energy Code Field Studies.

Resources

Local Government Better Buildings Page: A collection of case studies and other resources for developing energy-saving programs and projects for public sector buildings.

State and Local Energy Benchmarking and Disclosure Policy: Information on how state and local governments are expanding the practice of benchmarking energy use beyond their own facilities to include nongovernment buildings.

State and Local Solution Center: Building Energy Use Benchmarking: A compilation of resources and information related to building energy benchmarking.

Evaluation of U.S. Building Energy Benchmarking and Transparency Programs: Attributes, Impacts, and Best Practices: A recent report on benchmarking.

Continued on the next page.

Buildings

Resources (continued)

Zero Energy Buildings: Information on DOE zero energy building resources, including a common national zero energy building definition with supporting nomenclature and guidelines to facilitate its use. A Zero Energy Resource Hub is also being developed.

Residential Buildings

Initiatives

Better Buildings Accelerators: Time-limited collaborations with market leaders to overcome specific barriers to energy efficiency. The accelerators relevant to residential buildings are the following:

- Clean Energy for Low Income Communities Accelerator (CELICA): CELICA, launched in May 2016, aims to lower energy bills in low income communities through a voluntary partnership with state and local governments to demonstrate a wide range of locally designed energy efficiency and distributed renewable energy solutions.
- Home Energy Information Accelerator: Partners are working to expand the availability and use of reliable home energy information at relevant points in residential real estate transactions to make energy-related information available to home buyers and sellers.
- Home Upgrade Program Accelerator: Designed to help administrators of home energy upgrade programs leverage data management strategies that minimize costs while improving overall program effectiveness. Accelerator partners are working to demonstrate and document significant reductions in administrative costs associated with home energy upgrade data collection and review.

Better Buildings Residential Network: Connects energy efficiency programs and partners to share best practices and learn from one another to increase the number of homes and multifamily buildings that are energy efficient.

Home Performance with ENERGY STAR (HPwES): Local program sponsors qualify all contractors that participate in HPwES and independently verify the quality of contractors' work. Homeowners can feel confident in their contractors' recommendations and in the effectiveness of the home improvements they pay for.

Zero Energy Ready Home: Since 2008, the DOE Zero Energy Ready Home program has recognized hundreds of leading builders for their achievements in energy efficiency, resulting in over 14,000 energy efficient homes and millions of dollars in energy savings. The DOE Zero Energy Ready Home program represents a whole new level of home performance, with rigorous requirements that ensure outstanding levels of energy savings, comfort, health, and durability.

Resources

Heat Pump Systems: This webpage provides a detailed explanation of heat pump options, primarily for the residential sector.

Residential Program Solution Center: The Better Buildings Residential Program Solution Center is a repository for lessons learned, resources, and knowledge from program administrators and industry experts across the country.

Data and Workforce

Data

Commercial Resources

Building Energy Asset Score: A national standardized tool for assessing the physical and structural energy efficiency of commercial and multifamily residential buildings. The Asset Score generates a simple energy efficiency rating that enables comparison among buildings and identifies opportunities to invest in energy efficiency upgrades.

Building Performance Database: This database provides public access to anonymized real-building data for customizable queries and peer-to-peer comparisons. It is the world's largest building energy database with nearly 1 million buildings.

Standard Energy Efficiency Data (SEED) Platform: The SEED Platform provides public agencies and other organizations with a standardized, cost-effective, secure, enterprise data platform to manage portfolio scale building performance data from a variety of sources.

Residential Resources

Data Privacy and the Smart Grid: A Voluntary Code of Conduct: Smart grid technology offers new opportunities and benefits for utilities, consumers, and vendors due to the numerous data it provides and the emerging products and services that use that data. Capturing and utilizing this data to optimize electricity delivery and to offer innovative products and services to consumers to better manage and control their electricity use can provide tremendous value. Associated privacy concerns, however, must be addressed. Preserving consumer privacy protections is critical. DataGuard Energy Data Privacy Program (**DataGuard**) provides companies with a consumer-facing mechanism for demonstrating their commitment to protecting consumers' data and thus increasing consumer confidence.

Home Energy Score: The score is a rating designed to help homeowners and homebuyers gain useful information about a home's energy performance. Based on an in-home assessment that can be completed in less than an hour, the Home Energy Score Report also provides guidance of cost-effective home energy upgrades that will improve the home's score.

Workforce

Resources

2017 U.S. Energy and Employment Report: The U.S. Energy and Employment Report (USEER) is the first accurate survey of energy jobs. This report updates employment information normally gathered by the Bureau of Labor Statistics, recognizing new employment codes and professions generated within all energy fields, including energy efficiency, transmission, fossil, nuclear, utility operations, and renewable generation sources.

Better Buildings Workforce Guidelines: Voluntary, national guidelines to improve the quality and consistency of commercial building workforce credentials for four key energy-related jobs: Building Energy Auditor, Building Commissioning Professional, Building Operations Professional, and Energy Manager. Communities can reference or cite the guidelines.

Solar Training: Website highlighting training materials the Solar Energy Technologies Office created to develop a skilled workforce that will enable the solar industry to meet growing deployment demands. The solar office addresses the critical need for high-quality, local, accessible training in solar energy system design, installation, sales, and inspection, as well as power systems engineering and related professions like real estate and finance.

Vehicle Technology Office Education and Workforce Development Website: This website offers a variety of resources and opportunities for students, university researchers, and professionals.

Finance

General Energy Financing

Resources

Better Buildings Financing Navigator: There are many ways to finance energy efficiency projects in buildings you own or occupy. The Navigator helps you cut through this complexity to secure financing that works for you.

Commercial Property Assessed Clean Energy (C-PACE): A Fact Sheet for State and Local Governments: A quick 2-page resource that briefly explains commercial property assessed clean energy for state and local governments.

Current Practices in Efficiency Financing: An Overview of State and Local Governments: This report reviews the landscape of existing financing mechanisms and specific considerations for state and local policymakers.

Energy Investment Partnerships Fact Sheet: Energy Investment Partnerships are a form of Public Private Partnerships and are based on the principle of leveraging public funds and resources to attract private capital to invest in clean energy resources.

Energy Investment Partnerships Report: Report on emerging public-private partnerships with the authority to raise capital through a variety of means and the ability to align clean energy finance initiatives and traditional development finance tools to maximize the impact of public funds in accelerating clean energy deployment and economic development.

Energy Savings Performance Contracting: Improving Infrastructure & Turning Waste into Wins: This fact sheet provides an overview of energy savings performance contracting (ESPC) along with market success stories and links to additional ESPC resources for state and local leaders.

Local Government Financing Strategy Implementation Models: This link collects implementation models that highlight successful approaches to overcoming barriers to energy efficiency in local government.

State and Local Solution Center (Pay for Energy Initiatives): These webpages provide resources about financing for state, local, and tribal governments that are designing and implementing energy financing programs. Information included on:

- Bonding Tools (includes QECBs)
- Energy Efficient Mortgages
- Energy Savings Performance Contracting (ESPC)
- Leasing Arrangements
- Loan Loss Reserves and Credit Enhancements
- On-Bill Finance and Repayment
- Property-Assessed Clean Energy (PACE) - (including 2016 report Best Practice Guidelines for Residential PACE)
- Revolving Loan Funds

Energy Savings Performance Contracting (ESPC)

Resources

Energy Savings Performance Contracting Toolkit: The ESPC Accelerator achieved public sector energy efficiency investments of more than $2 billion in three years using energy savings performance contracting. An outcome of the accelerator, the ESPC Toolkit provides resources for ESPC decision-making. One such resource is the Virtual Technical Assistant, an interactive resource that guides users through the ESPC process. The ESPC Accelerator is one of the Better Buildings Accelerators, which are time-limited collaborations with market leaders to overcome specific barriers to energy efficiency.

eProject Builder: Enables energy service companies (ESCOs) and their customers to securely upload, track, and access ESPC project-level information for the life of the performance contract, quickly generate data for project and portfolio reports, and develop project scenarios using standardized amortization calculations.

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Finance

ESPC Resources (continued)

FEMP ESCO Selector: Local governments can make use of this Federal Energy Management Program tool that helps create a Notice of Opportunity (NOO)/ Request for Quotations for ESCO services under a DOE energy savings performance contract (ESPC). The tool generates a customizable and editable NOO and response evaluation form that incorporates the evaluation factors identified in the NOO. Local governments can customize the NOO and evaluation factors to meet their specific needs.

FEMP ESPC Procurement: Local governments can use the same streamlined procurement vehicle used by the FEMP ENABLE program for small facilities: GSA Supply Schedule 84, SIN 246-53. The schedule provides for expedited procurement among 20 ESCOs, including 10 small business firms, three disabled veteran firms, and seven firms participating in FEMP's larger ESPC program. Further information about the available ESCOs and using GSA Supply Schedule 84, SIN 246-53 is available at http://energy.gov/eere/femp/espc-enable.

Solar and Wind

Resources

Federal Financing Programs for Clean Energy: This is a guide to U.S. government programs that support the development of clean energy projects in the United States and abroad.

Leveraging Federal Renewable Energy Tax Credits: This guide focuses on the tax credits for wind and solar energy, which received five-year extensions with built-in phase-downs. The credits will continue to be important in energy-related decisions by state and local governments.

Solar Financing Resources: Solar Outreach Partnership to help communities explore financing mechanisms and other important financial considerations related to solar implementation.

Transportation

Resources

Guide to Federal Funding, Financing, and Technical Assistance for Plug-in Electric Vehicles (PEVs) and Charging Stations: This guidance document was collaboratively developed by the U.S. Department of Energy and Department Transportation to highlight examples of federal programs that support funding and financing for PEVs and charging infrastructure.

Utilities

Resources

Whole Building Energy Data Access: Blueprint for Action Toolkit: Contains resources and examples from local governments who joined forces with their local utilities to make it easier for owners of buildings with multiple tenants & multiple meters to get access to whole building data for the purpose of building performance benchmarking.

- Best Practices for Providing Whole-Building Energy Data: Guide for Utilities
- Better Buildings Energy Data Accelerator Key Accomplishments and Results
- Beyond Benchmarking - Unlocking Value for Utilities
- Guide to Data Access and Utility Customer Confidentiality
- Statistical Analysis of Data Access and Privacy
- Stakeholder Engagement Process Case Study - Philadelphia
- Stakeholder Engagement Strategy Case Study - Salt Lake City
- Stakeholder Engagement Strategy Guide
- Utility Best Practices Case Study - ComEd
- Utility Best Practices Case Study - Eversource

Developed by the State & Local Energy Efficiency Action Network (SEE Action) on working with utilities:

- Energy Use Data Access
- Greater Energy Savings through Building Energy Performance Policy: Four Leading Policy and Program Options
- Ratepayer-Funded Efficiency through Regulatory Policy
    - Analyzing and Managing Bill Impacts of Energy Efficiency Programs
    - Using Integrated Resource Planning to Encourage Investment in Cost-Effective Energy Efficiency

Working with Utilities on Residential Efficiency: The Better Buildings Residential Program Solution Center contains over 200 well-categorized resources from programs and organizations around the nation. Found under the keyword "Working with Utilities," the resources can be quickly filtered to find resources relevant to your community.

Better Buildings Neighborhood Program Working with Utilities Peer Exchange Call Presentations and Webinars:

- Collaborating with Utilities on Residential Energy Efficiency: Program experience and lessons learned from the Local Energy Alliance Program (LEAP) and the Energy Coordinating Agency of Philadelphia.
- Partnering with Utilities and Other Ratepayer-Funded Energy Efficiency Program Administrators
- Working with Smaller Municipal Utilities
- Partnering with Utilities, Part 1 – Successful Partnerships and Lessons from the Field: Local experience from Allegheny County, Pennsylvania and Denver, Colorado.
- Partnering with Utilities, Part 2 – Topics for Local Governments – Creating Successful Partnerships with Utilities to Deliver Energy Efficiency Programs: Local experience from California (Cities of Berkeley and Freemont, and Pacific Gas & Electric) and Orlando, Florida (City of Orlando and Orlando Utilities Commission)

Utilities Power Change (PDF): Learn how New Jersey's Public Service Electric and Gas Company, and Southern Company's subsidiary Georgia Power are launching workplace charging programs for their commercial customers.

Infrastructure

Initiatives

CHP Technical Assistance Partnerships (TAPs): DOE's seven regional CHP TAPs can provide education and technical assistance to communities interested in CHP. Educational resources are available and provide information on the energy/non-energy benefits and applications of CHP to state and local policy makers, regulators, energy end-users, trade associations, and others. Technical assistance is available to help end-users consider CHP, waste heat to power, and/or district energy with CHP in their facility, including assisting project development from initial CHP screening to installation.

Climate Change and Electricity Sector: Guide for Climate Change Resilience Planning: This guide can provide a framework for utilities partnering with the local governments to identify critical assets and development of a community-wide energy reliability plan.

Combined Heat and Power (CHP) for Resiliency Accelerator: Supports consideration of CHP and other distributed generation solutions for critical infrastructure resiliency planning at the state, local, and utility levels. As a collaborative effort with stakeholders, the Accelerator is developing tools, templates, and other resources to promote deployment of CHP at critical infrastructure facilities. This effort is part of the Better Buildings Accelerators, which are time-limited collaborations with market leaders to overcome specific barriers to energy efficiency.

Electricity Policy Technical Assistance Program: The types of assistance offered and activities supported include Analysis, Stakeholder Convened Discussions, Education and Training, and Consultations.

State and Regional Energy Risk Assessment: Initiative aims to help states better understand risks to their energy infrastructure so they can be better prepared to make informed decisions about their investments, resilience and hardening strategies, and asset management.

The Grid Project Impact Quantification (Grid Project IQ): This screening tool provides versatile insight into smart grid related technology deployments. Implementing new policies or installing new technologies in the grid can have surprising and significant effects throughout the interconnected power system, driven not only by the project details, but also by its geographical location and other context. Grid Project IQ helps users quickly explore the outcomes of adding a new project to an existing power system from a web browser. The tool guides users through steps to understand how specific projects will change the baseline electric load profile, and traces such changes through to their impacts on system performance. Grid Project IQ supports quick comparisons of varying grid scenarios.

The Role of Microgrids in Helping to Advance the Nation's Energy System: The Energy Department has a comprehensive portfolio of activities that focuses on the development and implementation of microgrids to improve grid reliability and community resiliency.

Manufacturing

Initiatives

Better Plants: The U.S. Department of Energy's Better Buildings, Better Plants Program is an important partnership which consists of close to 180 industrial companies, representing about 2,400 facilities and 11.4% of the total U.S. manufacturing energy footprint. Partners also include several water and wastewater treatment organizations. Leading manufacturers and industrial-scale energy-using organizations demonstrate their commitment to improving energy performance by signing a voluntary pledge to reduce their energy intensity by 25% over a ten year period.

General Infrastructure

Resources

Industrial Assessment Centers: Small and medium-sized manufacturers in your community may be eligible to receive a no-cost energy, productivity, and waste assessment by a regional team of university-based faculty and student engineers. After the site visit, a comprehensive report is developed that provides specific details on all cost-saving opportunities identified during the assessment, including applicable rebates and incentives.

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Infrastructure

General Infrastructure Resources (continued)

Industrial Superior Energy Performance® (SEP®) Accelerator: Utilities and administrators are deploying SEP programs across their service territories and manufacturers are implementing SEP across a corporation or multiple plants. This effort is part of the Better Buildings Accelerators, which are time-limited collaborations with market leaders to overcome specific barriers to energy efficiency.

Water and Wastewater

Initiatives

Superior Energy Performance® Water and Wastewater Pilot Project: Building on the SEP experience in the manufacturing sector, this pilot project will test the implementation of ISO 50001 and SEP with water and wastewater treatment partners. Through the pilot, facilities will integrate energy management into their business operations and culture through a systematic approach to managing energy. This approach enables continual improvement in water and wastewater treatment facilities, reducing costs, and lowering demand for energy.

Sustainable Wastewater Infrastructure of the Future Accelerator (SWIFt): This Accelerator will work over three years with state, regional, and local agencies to improve the energy efficiency of their participating water resource recovery facilities by at least 30 percent and integrate at least one resource recovery measure. This effort is part the Better Buildings Accelerators, which are time-limited collaborations with market leaders to overcome specific barriers to energy efficiency.

Outdoor Lighting

Initiatives

Lighting Energy Efficiency in Parking (LEEP) Campaign: Offers free guidance and recognition for installing high-performance, cost-saving lighting in your parking lots and garages. Participating building owners and managers agree to identify potential parking lots or parking structures that can apply high-efficiency lighting technology, and to install high-efficiency lighting where feasible and cost-effective.

Municipal Solid-State Street Lighting Consortium (MSSLC): An international knowledge base and peer group collaborating to develop resources and tools and to share experiences and best practices. Membership is open to municipalities, utilities, and energy efficiency organizations, with participation at various levels for other interested parties.

Resources

Adaptive Street Lighting Controls: This two-part DOE Municipal Solid-State Street Lighting Consortium webinar focused on LED street lighting equipped with adaptive control components. In Part I, presenters from City of San Jose, CA, and the California Lighting Technology Center at UC Davis discussed their experiences as early adopters of these smart street lighting systems. In Part II, presenters from the City of San Jose, CA, and PNNL explored the MSSLC's recently released Model Specification for Adaptive Control and Remote Monitoring of LED Roadway Luminaires.

Financing Guidance for LED Street Lighting Programs: Offers a brief introduction to the various financing models and tools that are available, presents case studies of municipalities that have used those tools, and provides links to resources that offer additional information.

Outdoor Lighting Challenges and Solution Pathways Guide: This report primarily focuses on solutions that municipalities are adopting for LED conversions; however, most of the solutions discussed can apply to any level of government responsible for providing outdoor lighting.

Outdoor Lighting Toolkit: Toolkit developed within the framework of the Outdoor Lighting Accelerator to ensure state and local governments have the technical and resources necessary to increase uptake of LED technologies.

- Outdoor Lighting Decision Tree Tool: Provides an interactive and visual representation of possible approaches and decisions that will typically be encountered in upgrading/replacing a public outdoor lighting system.

Solar

Initiatives

SolSmart: Provides recognition and no-cost technical assistance to help local governments reduce barriers to solar energy growth. Local governments that achieve these goals are eligible for SolSmart designation, providing national recognition that they are "open for solar business."

SunShot Prize: Solar in Your Community Challenge: A $5 million prize competition that aims to expand solar electricity access to low and moderate-income households and community organizations that have not participated in the booming solar market.

Tools

Community Solar Scenario Tool (CSST): The Community Solar Scenario Tool provides a "first cut" analysis of different community or shared solar program options. The tool has been created primarily with smaller municipal utilities, electric cooperatives, and state and local organizations in mind. This model allows users to see how various inputs, such as system size, location, and project costs. It also illustrates the impact the economics of a project from both a potential customer's perspective as well as the sponsoring utility's. For more complex financial modeling options, check out NREL's System Advisor Model (SAM).

Energy Modeling 101 Presentation: This presentation covers the basics of power sector capacity expansion modeling, and briefly touches on other types of modeling and analytical tools available to provide data on the electric power system, including energy efficiency.

Regional Energy Deployment System: A long-term capacity expansion model for the deployment of electric power generation technologies and transmission infrastructure throughout the contiguous United States.

Solar Technical Assistance for States: The Solar Technical Assistance Team (STAT) Network gathers NREL solar technology and deployment experts to provide unbiased information on solar policies and issues for state and local government decision makers. STAT provides online educational resources, as well as direct technical assistance to state and local governments, to answer a time-sensitive question or provide expert testimony on policy best practices.

Resources

Community and Shared Solar: Webpage that provides resources on community and shared solar including group purchasing, offsite group solar, financial models, multi-unit buildings. Notable resources include (scroll to the bottom of the webpage):

- A Guide to Community Shared Solar: Utility, Private, and Nonprofit Project Development
- The Solarize Guidebook: A Community Guide to Collective Purchasing of Residential PV Systems

Solar Energy Resource Center: Library that contains work developed by DOE, national laboratories, and solar office awardees. It contains over 100 unique documents which provide information on model standards and codes, utility policies, solar facilities, financing, incentives, market analysis, solar basics manufacturing, workforce development, shared solar, planning, zoning, permitting, and interconnection.

Solar in Your Community Challenge Resources Page: This resource page, aimed at teams participating in the Solar in Your Community Challenge, contains an extensive list of resources related to community solar. The resources cover topics such as financing, permitting, interconnection, and project design.

Transportation

Initiatives

Clean Cities: Connects transportation stakeholders with objective information and experts to assist with reducing petroleum use through electric vehicles, alternative fuels, fuel economy improvements, and emerging transportation technologies. Find your local coalition here.

Energy Efficient Mobility Systems (EEMS): Program aims to identify and support technologies and innovations that encourage a maximum-mobility, minimum-energy future in which a city's transportation systems may be automated, connected, electric, and/or shared (ACES).

Resources

Alternative Fuels Data Center: A vehicle technologies program resource that provides information, data, and tools to help fleets and other transportation decision makers find ways to reduce petroleum consumption through the use of alternative and renewable fuels, advanced vehicles, and other fuel-saving measures.

- Alternative Fuels Data Center - Electricity: Provides resources and information on electric vehicles for states & municipalities, employers, fleets, electrical contractors & inspectors, utility companies, and consumers.

National Idling Reduction Network and Newsletter: Provides information on limiting truck, bus, and other vehicle idling to improve energy and environmental sustainability. Includes discussion of idling near schools and residential areas.

State Planning for Volkswagen (VW) Settlement Funds: The purpose of this quick reference guide is to help states develop a productive stakeholder engagement process for state planning related to the VW Clean Air Act Civil Settlement.

The Transforming Mobility Ecosystem: Enabling an Energy-Efficient Future: A report that examines four possible mobility futures that could exist in 2050 and the positive and negative impacts of these futures on energy consumption and the broader economy.

Resource Libraries

Better Buildings Solutions Center: A collection of resources, technical guidance and best practices, and implementation models from DOE and Better Buildings partners, including local governments.

Energy Efficiency and Renewable Energy Resources for State and Local Leaders: Download the resource guide to learn more about the State and Local Solution Center.

State and Local Energy Efficiency (SEE) Action Network: Offers resources, discussion forums, and technical assistance to state and local decision makers as they provide low-cost, reliable energy to their communities through energy efficiency.

State and Local Solution Center: Provides resources to support the energy priorities of state and local governments.

State and Local Spotlight: WIP's monthly newsletter for state, local, and K-12 officials that provides updates on relevant news, resources, and events with over 10,000 subscribers.

State, Local, and Tribal Technical Assistance Gateway: An access point to DOE's technical assistance and cooperative activities with state, local, and tribal officials.

Additional Resources

EERE Funding Opportunity Exchange: A webpage that lists all EERE's funding opportunity announcements.

Revolution Now: The Future Arrives for Five Clean Energy Technologies 2016 Update: This U.S. DOE report documents how the cost of land-based wind power, utility-scale and distributed photovoltaic (PV) solar power, light-emitting diodes (LEDs), and electric vehicles (EVs) has fallen by as high as 94% since 2008. Combined, wind, utility-scale, and distributed PV accounted for over 66% of all new capacity installed in the nation in 2015.

Advanced Tools

DOE's National Labs have developed a set of advanced, city-centric tools to streamline energy planning, data collection and analysis, and modeling. It is recommended that individuals with advanced knowledge in each of the specific topic areas be leveraged in their application.

Array of Things (AOT)

Category: Data tool

Developer: Argonne National Laboratory (ANL)

The Array of Things is an urban sensing project jointly developed by the University of Chicago and ANL. It is a network of interactive, modular sensor boxes that will be installed in cities to collect real-time data on the city's environment, infrastructure, and activity for research and public use. AOT will essentially serve as a "fitness tracker" for the city, measuring factors that impact livability in cities such as climate, air quality, and noise. The first pilot project is in Chicago, IL, with pilots in several other cities around the world to follow soon.

Building Energy model (BEND)

Category: Energy planning, data tool

Developer: Pacific Northwest National Laboratory (PNNL)

Based on EnergyPlus, BEND estimates hourly building electricity and natural gas demands for a given geographic zone. BEND combines detailed building thermal simulations with geostatistical analysis of regional climate, populations, building types, and building technologies to provide scale-flexible characterization of regional building energy demands. It is usually calibrated by electricity supply zones or balancing authorities such that the aggregated building load matches the system load curve. Furthermore, BEND uses EIA and census data to match the number of buildings by building types in a geographic area.

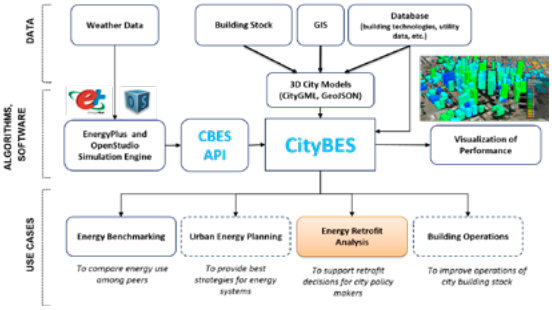
The Eastern Interconnection shown subdivided into 100 climate similar regions (CSR). While not all 100 colors are depicted here, each CSR shown has a unique climate.

City Building Energy Saver (CityBES)

Category: Energy planning, data tool

Developer: Lawrence Berkeley National Laboratory (LBNL)

CityBES is an open web-based data and computing platform to support cities' building energy efficiency programs. CityBES builds upon CityGML (the international standard of 3D city models), and integrates LBNL's Commercial Building Energy Saver and DOE's OpenStudio and EnergyPlus, to provide three main features: (1) visualization of city's building performance dataset (e.g., data from local ordinance) (2) benchmarking portfolio of buildings using DOE's Building Performance Database (BPD) and (3) evaluation and prioritization of technologies for building retrofit energy savings and investment.



Commercial Building Agent Model (COBAM)

Category: Energy planning

Developer: Argonne National Laboratory (ANL)

COBAM is an open source software package to study the market adoption of energy efficient building technologies. COBAM is an agent-based model (ABM) that simulates the decision processes of building owners with regards to the adoption of building technologies including economic, energy, and non-energy characteristics of building technology. The model can be used by governments, utilities, and portfolio managers, and industry to study the effects of prices, availability, reliability, availability, energy, and non-energy benefits on the market adoption of technologies.

Distributed Energy Resources – Customer Adoption Model (DER-CAM)

Category: Infrastructure

Developer: Lawrence Berkeley National Laboratory (LBNL)

DER-CAM handles two fundamental microgrid problems: (1) Investment & Planning-Optimal energy supply solutions for buildings and microgrids and (2) Operations-Optimal dispatch of existing energy supply technologies in buildings and microgrids. Access the tutorial to learn more or download the tool.

Continued on the next page.

Advanced Tools

Advanced Tools (continued)

Microgrid Design Toolkit (MDT)

Category: Infrastructure

Developer: Sandia National Lab (SNL)

The Microgrid Design Toolkit is a decision support software tool for microgrid designers in the early stages of the design process. MDT uses powerful search algorithms to identify and characterize alternative microgrid design decisions in terms of user-defined objectives such as cost, performance, and reliability. Using the MDT, a designer can search effectively through large design spaces for efficient alternatives, investigate the simultaneous impacts of several design decisions, derive defensible, quantitative evidence for decisions, and gain a quantitative understanding of the relationships between design objectives and the tradeoffs associated with alternate technological design decisions. The tool can be downloaded here.

PlanetSense

Category: Energy planning, data tool, infrastructure

Developer: Oak Ridge National Laboratory (ORNL)

PlanetSense is designed to harvest, analyze, visualize, and share massive amounts of crowd, social, sensor, and Volunteered Geographic Information data quickly and reliably for generating real-time geo-spatial intelligence. Potential uses include mapping special events population, occupancy modeling, urban land use, critical infrastructure analysis, and environmental factors monitoring.

POLARIS

Category: Transportation, data tool

Developer: Argonne National Laboratory (ANL)

POLARIS is a high-performance, open-source agent-based modeling framework designed to simulate large-scale transportation systems including new forms of mobility such as transportation as a service, connected vehicles, and autonomous vehicles. It features an integrated network-demand model, in which all the aspects of travel decisions (departure time, destination choice, route choice, planning, and rescheduling) can be modeled simultaneously including the effects of changing driver behavior and reaction to traffic events.

REopt

Category: Renewable Energy, Microgrids, Resilience

Developer: National Renewable Energy Laboratory (NREL)

REopt is typically used by NREL to conduct behind-the-meter techno-economic optimization for DER deployment. Given the customer's thermal and electric loads, as well as their specific utility policies, tariff structures, costs (capital, O&M), and incentives, REopt is used to determine cost-optimal sizes and operating strategy of energy assets that most cost-effectively meet defined energy goals, determine the optimal operating strategy for dispatchable energy assets, and evaluate and optimize assets for energy security.

ResStock

Category: Energy planning, data tool, infrastructure

Developer: National Renewable Energy Laboratory (NREL)

Combining the use of large public and private data sources, statistical sampling, detailed OpenStudio/EnergyPlus building simulations, and high-performance computing, ResStock provides highly granular modeling of the energy use and demand of the U.S. residential building stock, allowing policymakers, program designers, and manufacturers to identify upgrades with the highest potential for cost-effective savings in a particular state, region, or city. ResStock also allows users to identify customer segments for targeted marketing and deployment. When paired with hyperlocal building stock data, ResStock can evaluate city energy goals beyond saving energy—such as impacts on the distribution grid and passive survivability. ResStock currently models single-family buildings. Expansions for the multifamily and commercial building sectors are being considered.

Continued on the next page.

Advanced Tools

Advanced Tools (continued)

Toolkit for Urban Mobility Simulations (TUMS)

Category: Infrastructure

Developer: Oak Ridge National Laboratory (ORNL)

Agent-based transportation model that can simulate any city in the world

- Evacuate citizens during extreme events as a part of emergency planning and response
- Model evacuations in horizontal and vertical transportation systems
- Develop the capability to simulate evacuation scenarios in any city in the world
- Implement activity-based traffic assignment with more accurate representation of vehicles accessing problems
    - Trip Distribution Modeling
    - Travel Demand Modeling

Urban Climate Adaptation Tool (Urban-CAT)

Category: Energy planning, infrastructure

Developer: Oak Ridge National Laboratory (ORNL)

Urban-CAT leveraged open government data resources to build tools that will make America's communities more resilient to changing environmental conditions and extreme weather events. They prototyped the development of Urban-CAT through collaboration with the City of Knoxville, Tennessee. The tool's initial focus is on strategic and informed emplacement of green infrastructure to alleviate urban flooding and costly storm water management. Ultimately, Urban-CAT will help urban governments to: (1) understand emerging environmental impacts on urban infrastructure, (2) identify and prioritize adaption options for minimizing projected impacts, and (3) explore potential benefits of the adaptation options under different scenarios related to urban growth and infrastructure evolution. The capabilities developed in Urban-CAT will provide a platform to facilitate communication among urban policy decision makers, promote science-driven policies and regulations for updating urban infrastructure, help to quickly identify, adapt for, and mitigate emerging environmental problems, and provide guidance for planning judicious urban development.

URBANopt

Category: Energy planning, infrastructure

Developer: National Renewable Energy Laboratory (NREL)

URBANopt is an energy master planning tool for high-performance buildings and energy systems within one geographically cohesive area within a city (e.g., a city block or district). Currently being developed by NREL, URBANopt is used to investigate detailed energy tradeoffs between building locations and geometry, building energy efficiency features, building and district energy storage strategies and technologies, aggregated grid services such as dynamic and responsive loads, district energy system locations, and district energy system performance characteristics to identify best approaches for reaching site-wide energy goals. Contact Ben Polly (ben.polly@nrel.gov) for information about the release date.

UrbanSENSE

Category: Data tool

Developer: Oak Ridge National Laboratory (ORNL)

A multi-sensor platform technology and set of analytics to support measuring real-time population dynamics along with associated environmental and energy behaviors. The technology enables greater situational understanding of urban dynamics and enables smarter communities and cities. A prototypic software and hardware architecture are developed and the team is currently working with City of Oak Ridge for deployment and testing. Ultimately, UrbanSENSE will help cities to deploy sensor networks at scale to enable decision-makers to access real-time data on population density, environmental parameters, and their change over time.