Calculate Your Potential: Data Tools to Identify Opportunities for Your Energy Objectives

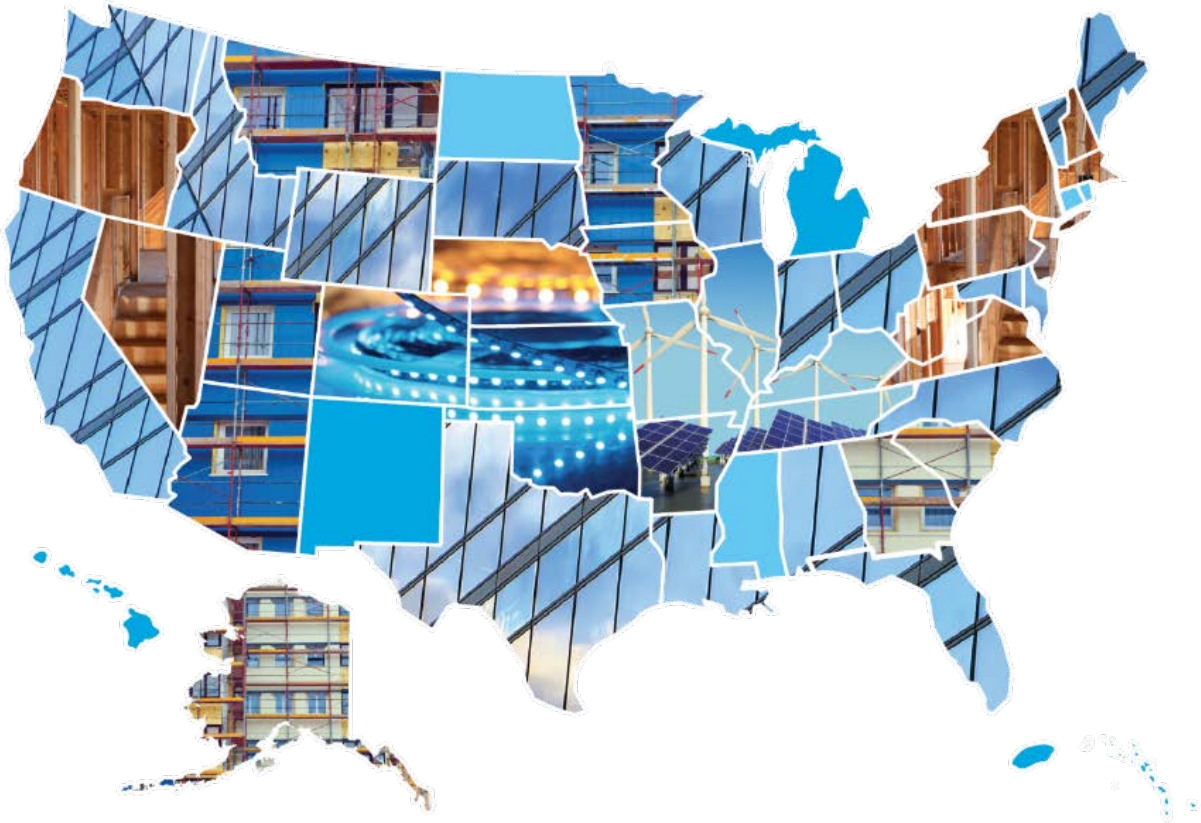
Day: Wednesday, July 10

Time: 3:30 – 5:00pm

Panel

- Julia Dumaine, Connecticut Department of Energy and Environmental Protection
- Lindsay Anderson, Minnesota Department of Commerce
- Elizabeth Doris, National Renewable Energy Laboratory
- Greg Dierkers, U.S. Department of Energy (moderator)

State Energy Program



About DOE State Energy Program - Competitive Awards

About State Energy Program

- DOE SEP supports State Energy Offices and partners achieve their goals.
- SEP Competitive Awards (SEP-C) support state innovation and regional collaboration.

Outcomes

- Since 2014, 34 states have received SEP-C awards totaling $14.9M.
- Developed 9 Implementation Models that serve as “how-to” guides for states who wish to replicate the programs achieving energy efficiency savings.

Tools

- SEP awardees created or contributed to resources, such as guides, models, and tools, that can be utilized by other states or stakeholders to further advance EERE goals.
- 45 total resources.

State Energy Program Competitive Award Generated Resources

Home » State Energy Program Competitive Award Generated Resources

As part of the U.S. Department of Energy's (DOE) State Energy Program (SEP) competitive awards, states contributed to or created resources, such as guides, models, and tools, that can be utilized by other states or stakeholders to further advance energy efficiency or renewable energy goals. Filter the table below to highlight specific resources based on your interests.

Search:

Filter by Category

- Benchmarking and Disclosure
- Combined Heat and Power
- Energy Planning
- Evaluation, Measurement, and Verification
- Financing
- General Energy Management Resources
- Offshore Wind
- Rural
- Stakeholder Engagement and Collaboration

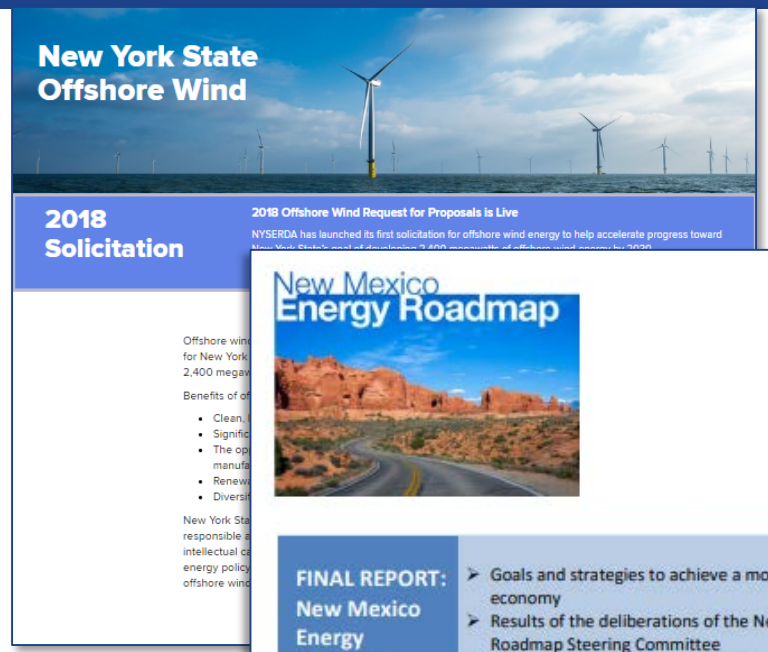
RESOURCES

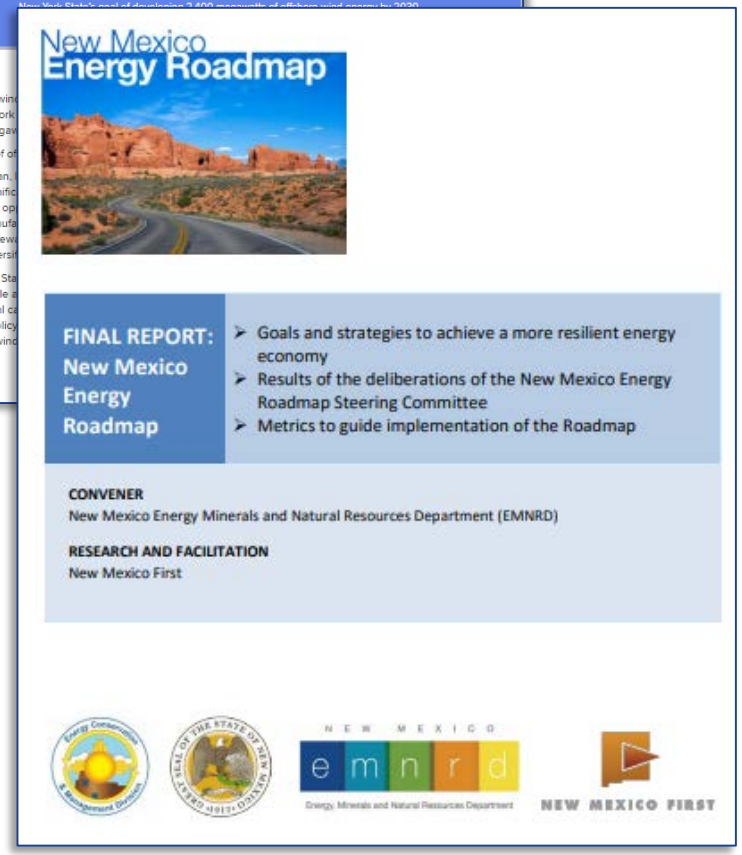
Showing 1 to 15 of 45 entries

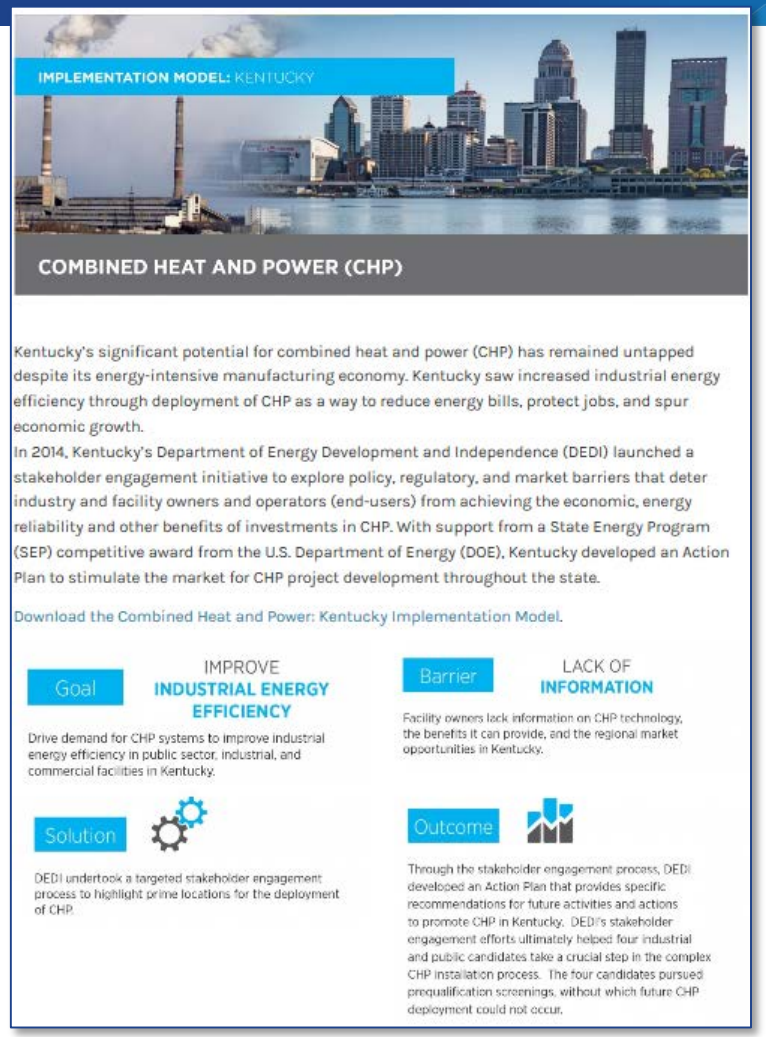
RESOURCE	STATE	DATE PUBLISHED	CATEGORY
Bridging the Rural Efficiency Gap: Expanding Access to Energy Efficiency Updates in Remote and High Energy Cost Communities This report provides data about the rural energy efficiency gap, identifies barriers to energy efficiency in rural communities, and highlights strategies that are helping to bridge the gap by making it easier for residents in cold climates to increase comfort and safety in their homes while also reducing energy bills. REPORT & GUIDES	Maine	2018	Energy Planning; Rural
Overcoming Barriers to Rural Energy Efficiency This solutions library reviews the challenges associated with rural energy efficiency and provides examples from multiple states, implementation processes, and programs that have been used to overcome common barriers. TOOLS	Maine	2018	Energy Planning; Rural
Stakeholder Engagement Guide: California Assembly Bill 802 Data Access and Benchmarking Policy As recommendations to the California Energy Commission (CEC), this guidance document covers how to engage stakeholders throughout the rulemaking process. While the CEC has the internal capacity to actively lead stakeholder engagement, this plan highlights key partners and contractors who can provide assistance in augmenting the efforts of staff. REPORTS & GUIDES	California	2017	Benchmarking and Disclosure; Stakeholder Engagement and Collaboration
Advancing Energy Efficiency in States: State of Iowa Implementation Model This document describes the process Iowa used to engage public facility owners and utilities to expand its benchmarking project and use the project's web-based benchmarking tool as the basis for energy efficiency project decisions in public buildings. CASE STUDIES	Iowa	2017	Benchmarking and Disclosure
Advancing Energy Efficiency in States: State of Mississippi Implementation Model This Implementation Model describes how Mississippi benchmarked institutes of higher learning facilities' energy use in the state's central database for state facility energy consumption data. The database allows all state agencies to assess their energy use and make	Mississippi	2017	Benchmarking and Disclosure

Source: https://www.energy.gov/eere/wipo/state-energy-program-competitive-award-generated-resources

Roadmaps and Implementation Models



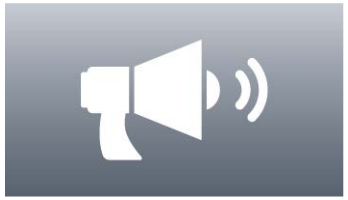




SEP Quarterly Update

Tailored to SEO staff and consists of new helpful resources and tools, upcoming event reminders, and state successes!

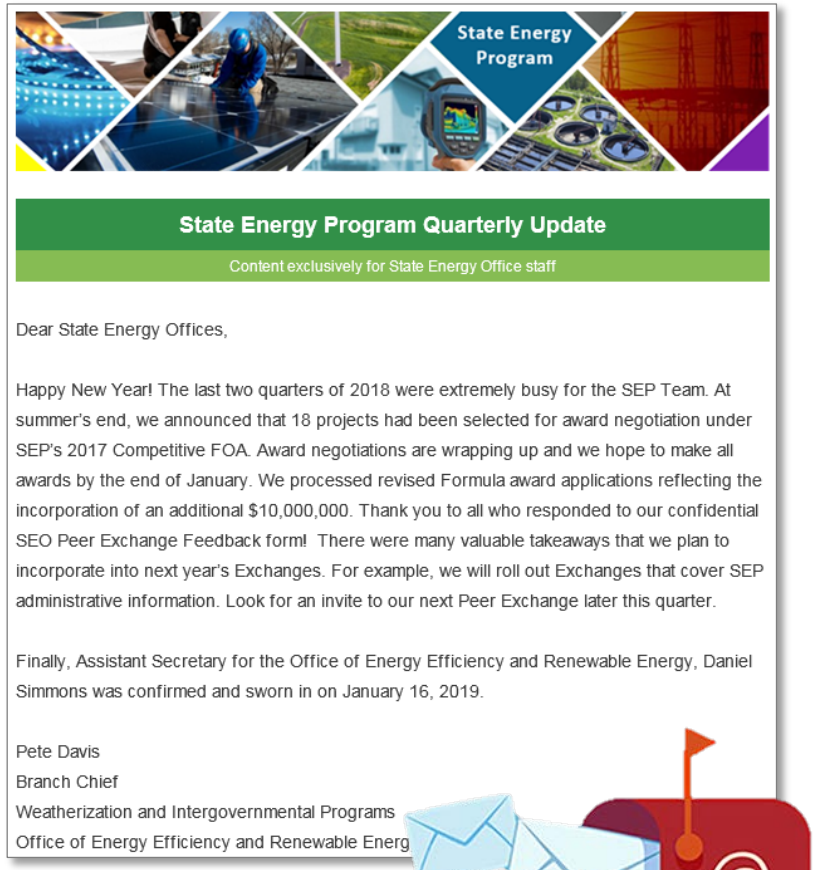
Hot Topics



Announcements

Tools & Resources

State Showcase



State Energy Program Quarterly Update

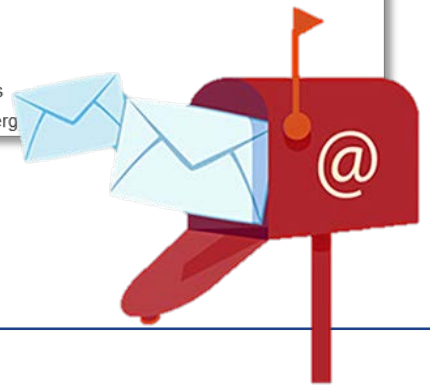
Content exclusively for State Energy Office staff

Dear State Energy Offices,

Happy New Year! The last two quarters of 2018 were extremely busy for the SEP Team. At summer's end, we announced that 18 projects had been selected for award negotiation under SEP's 2017 Competitive FOA. Award negotiations are wrapping up and we hope to make all awards by the end of January. We processed revised Formula award applications reflecting the incorporation of an additional $10,000,000. Thank you to all who responded to our confidential SEO Peer Exchange Feedback form! There were many valuable takeaways that we plan to incorporate into next year's Exchanges. For example, we will roll out Exchanges that cover SEP administrative information. Look for an invite to our next Peer Exchange later this quarter.

Finally, Assistant Secretary for the Office of Energy Efficiency and Renewable Energy, Daniel Simmons was confirmed and sworn in on January 16, 2019.

Pete Davis
Branch Chief
Weatherization and Intergovernmental Programs
Office of Energy Efficiency and Renewable Energ



Panel

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Julia Dumaine

Connecticut Department of Energy and Environmental Protection

U.S. DEPARTMENT OF ENERGY

Market Transformation through Home Energy Labeling

Better Buildings Summit 2019

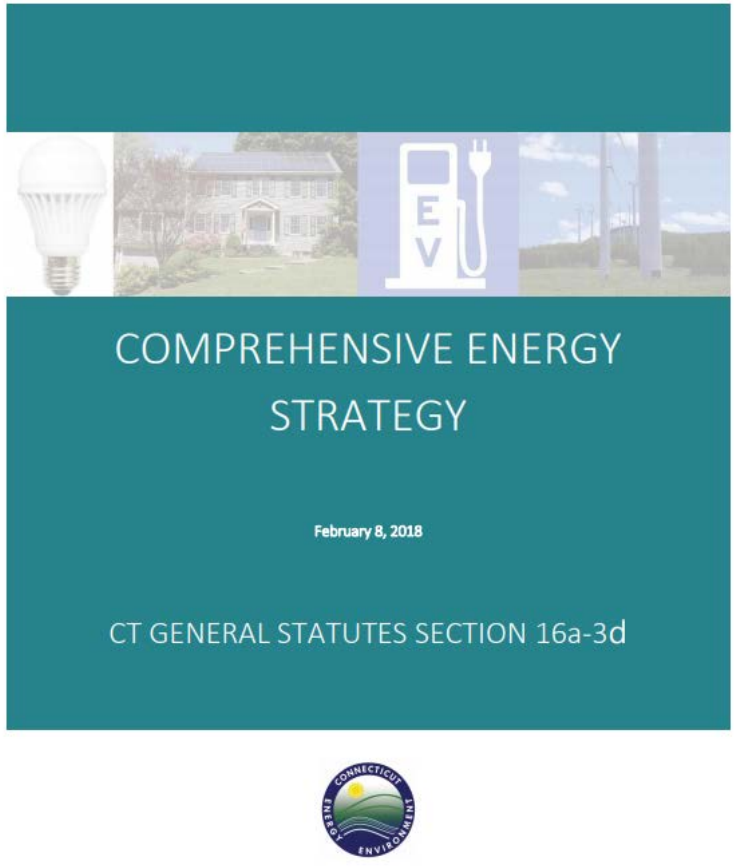
Julia Dumaine

Connecticut Department of Energy and Environmental Protection

2018 CT Comprehensive Energy Strategy

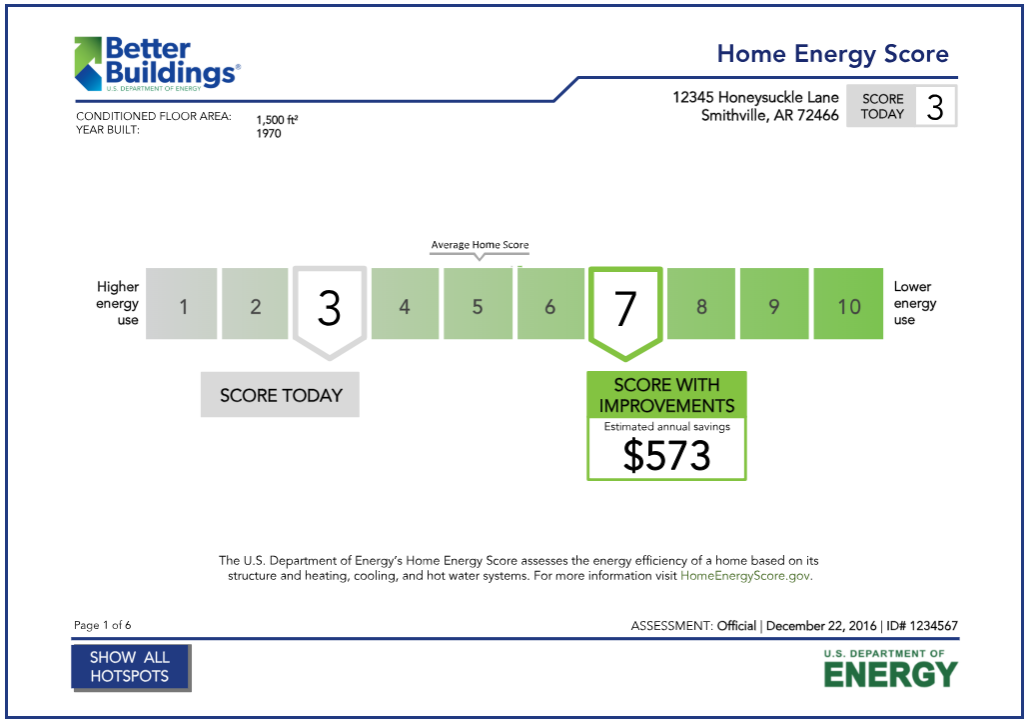
Strategy #2: Advance market transformation of the energy efficiency industry

A. Integrate energy efficiency with real estate market forces
B. Develop a sustainable workforce to meet industry demand
C. Standardize efficiency with energy performance codes, standards, and certifications
D. Transition to cleaner thermal fuels and technologies

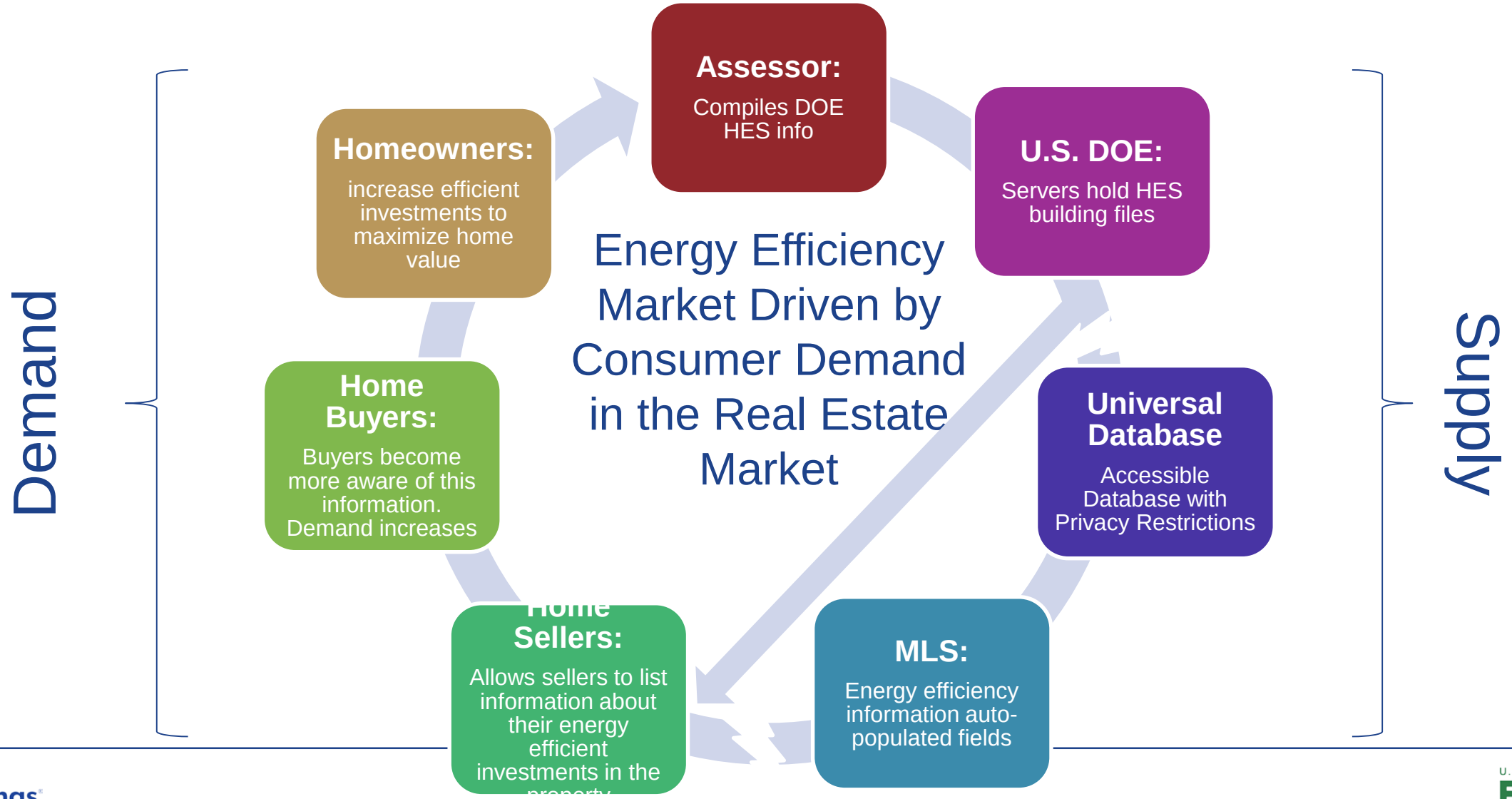


Home Energy Labeling in Connecticut

- Connecticut was first statewide Home Energy Score implementer in April 2015
- Home Energy Score is a feature of all energy assessments in qualifying homes and all lead technicians are required to be Assessors
- Beginning of 2018- moved to opt-in language



Real Estate-Driven Market Transformation



Bridging the Gap: Leveraging the State Energy Program Competitive Award

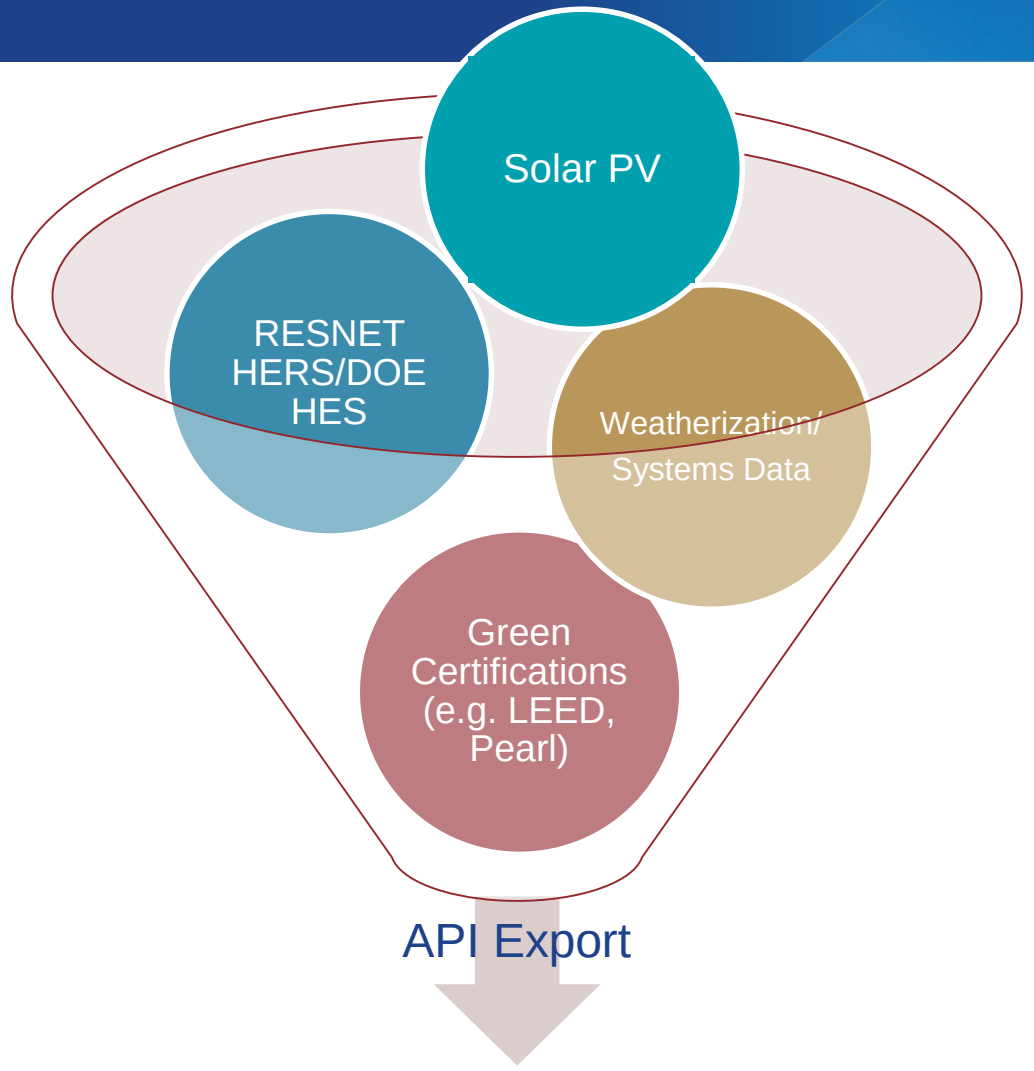
- *Home Energy Labeling Information eXchange (HELIX)*
  - Three-year project to develop the universal database capable of auto-populating real estate listings with home energy information in a standardized format
  - Partnership of seven states (New England + New York) using U.S. DOE SEP Competitive Grant received by Vermont

HELIX

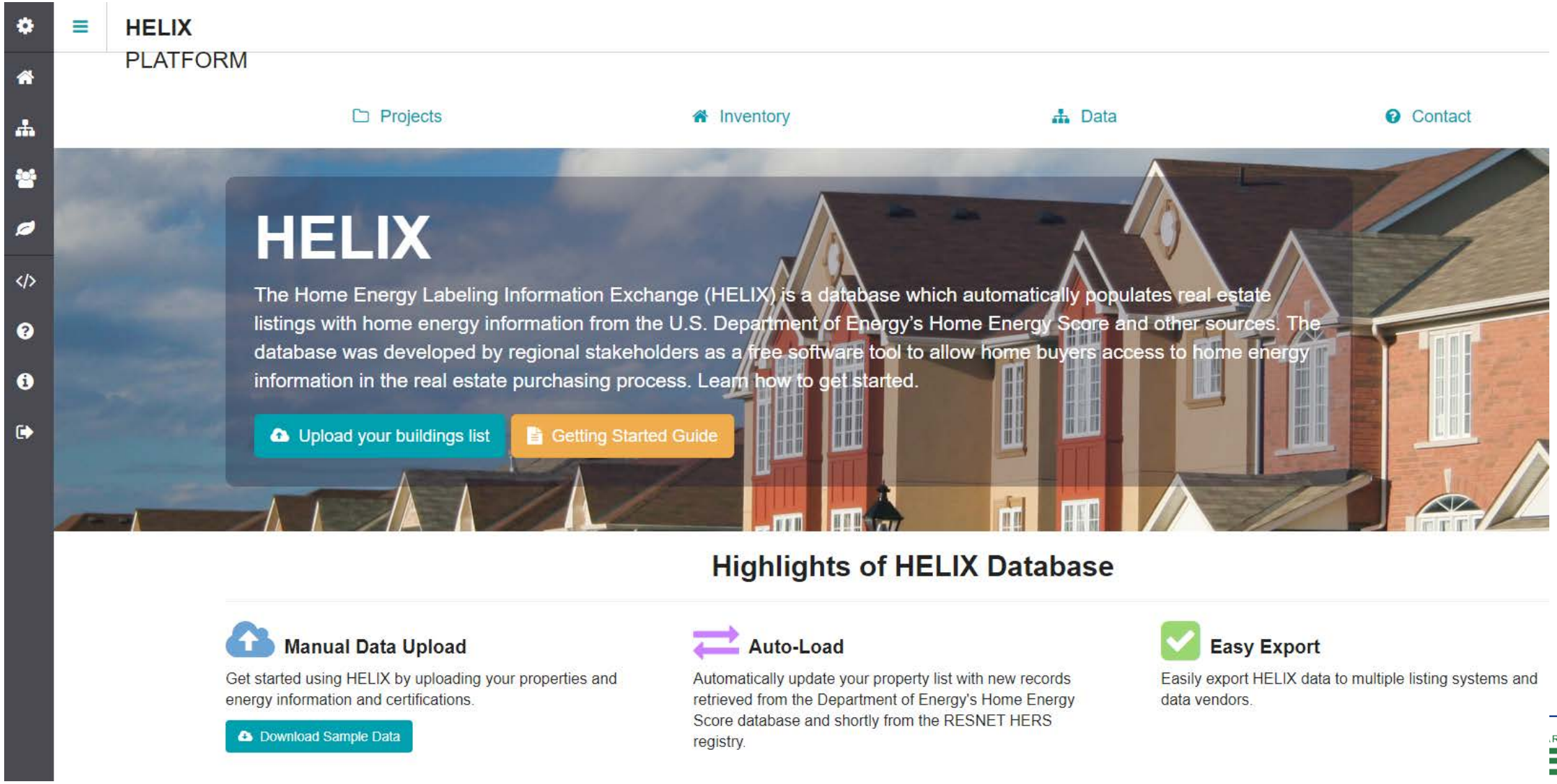
Home Energy Labeling Information eXchange

HELIX Structure

- Expands on the Standard Energy Efficiency Database (SEED) Framework
  - Allows for residential certifications, solar energy consumption data, code compliance, and efficiency measures
- Flexible Policy Management Tool
  - Track/manage compliance
  - Export to local MLS
  - Create custom labels
  - Access for local real estate professionals
  - Trainings and technical assistance



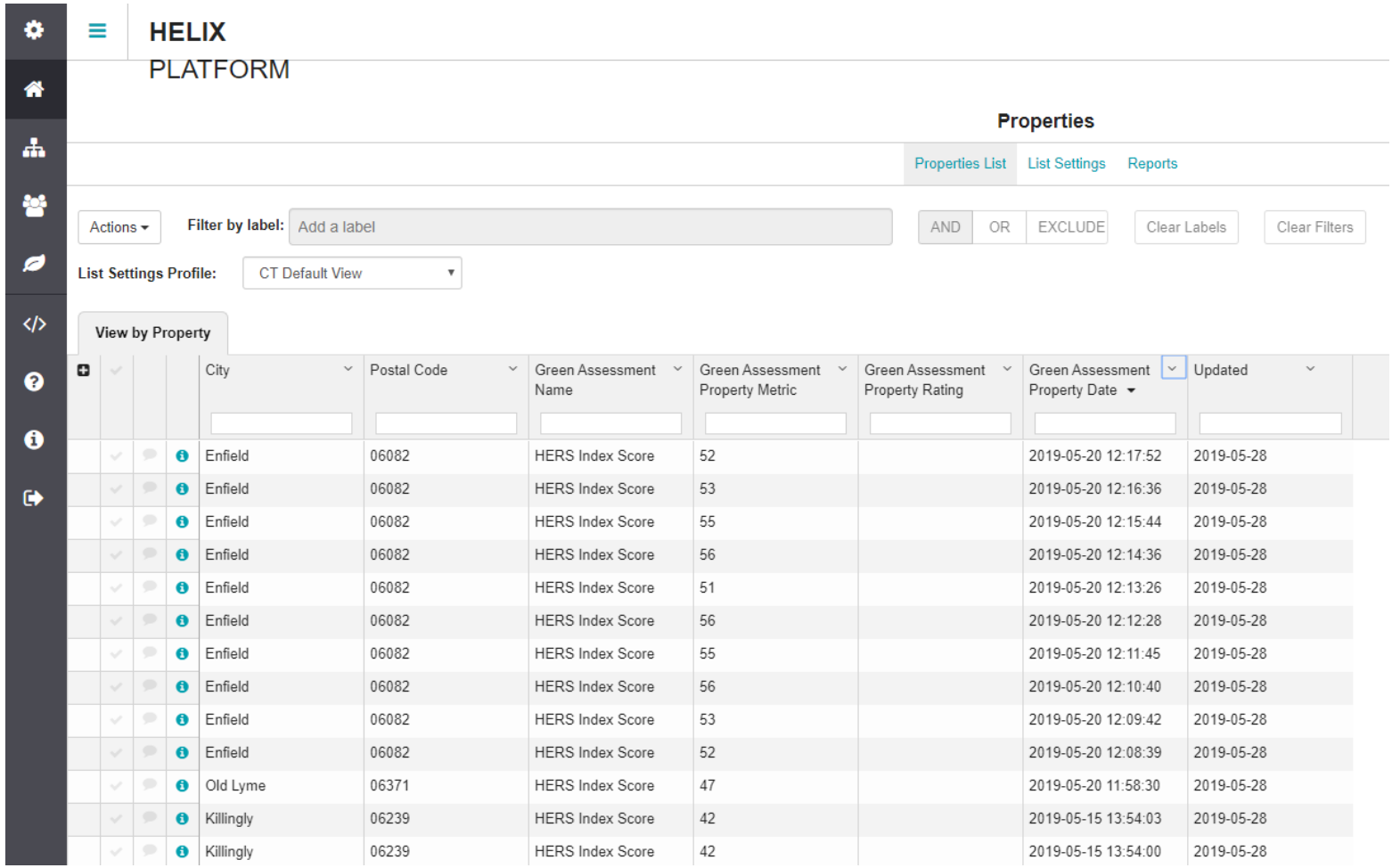
Pilot States Launch Spring 2019



HELIX: Pilot States Launch Spring 2019

- Connecticut has 7,070 property records and counting
  - HERS Index Scores
  - LEED for Homes
  - NGBS New Construction
  - Coming soon: DOE Home Energy Score

- Property records in all 169 CT towns containing:
  - Address
  - Building certification/score/rating
  - Conditioned floor area
  - Info units for MF buildings
  - Will use majority of fields from Home Energy Score



City	Postal Code	Green Assessment Name	Green Assessment Property Metric	Green Assessment Property Rating	Green Assessment Property Date	Updated
Enfield	06082	HERS Index Score	52		2019-05-20 12:17:52	2019-05-28
Enfield	06082	HERS Index Score	53		2019-05-20 12:16:36	2019-05-28
Enfield	06082	HERS Index Score	55		2019-05-20 12:15:44	2019-05-28
Enfield	06082	HERS Index Score	56		2019-05-20 12:14:36	2019-05-28
Enfield	06082	HERS Index Score	51		2019-05-20 12:13:26	2019-05-28
Enfield	06082	HERS Index Score	56		2019-05-20 12:12:28	2019-05-28
Enfield	06082	HERS Index Score	55		2019-05-20 12:11:45	2019-05-28
Enfield	06082	HERS Index Score	56		2019-05-20 12:10:40	2019-05-28
Enfield	06082	HERS Index Score	53		2019-05-20 12:09:42	2019-05-28
Enfield	06082	HERS Index Score	52		2019-05-20 12:08:39	2019-05-28
Old Lyme	06371	HERS Index Score	47		2019-05-20 11:58:30	2019-05-28
Killingly	06239	HERS Index Score	42		2019-05-15 13:54:03	2019-05-28
Killingly	06239	HERS Index Score	42		2019-05-15 13:54:00	2019-05-28

Engaging Utilities

How many utilities are in your state?

- Connecticut has 2 parent utilities; has simplified communication/collaboration

What is your working relationship with them?

- Utilities and Energy Efficiency Board create programs; DEEP reviews and approves

Does your state/jurisdiction have existing labeling policy?

- Connecticut is a non-mandatory labeling state; purely voluntary policy

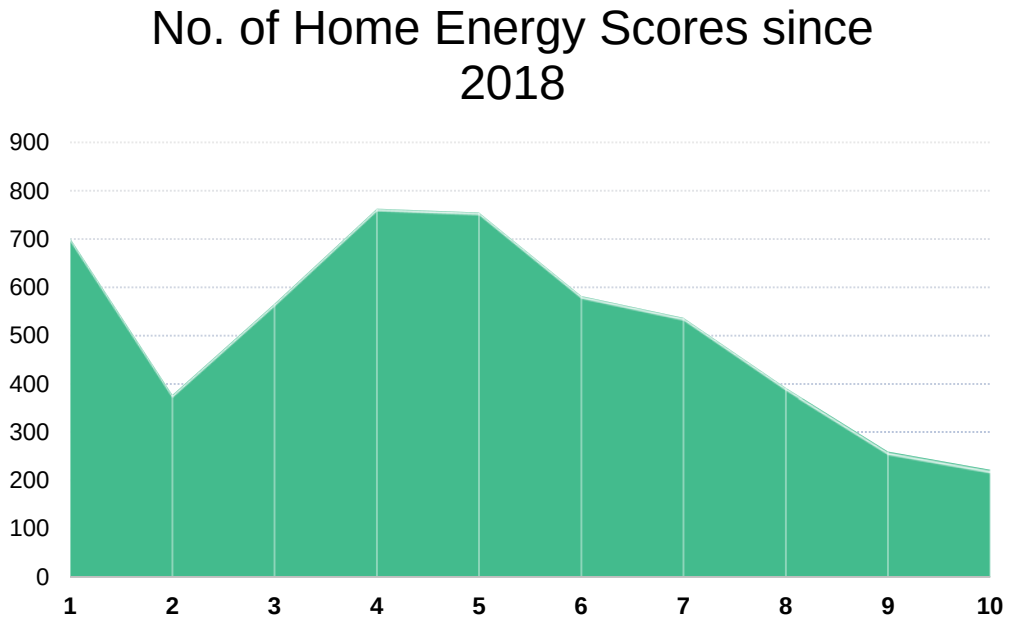
What programs can you build off of?

- Home Energy Solutions energy assessment program

How can you express the benefit to utilities?

- DOE Home Energy Score helps to create a roadmap of deeper energy efficiency measures for customers

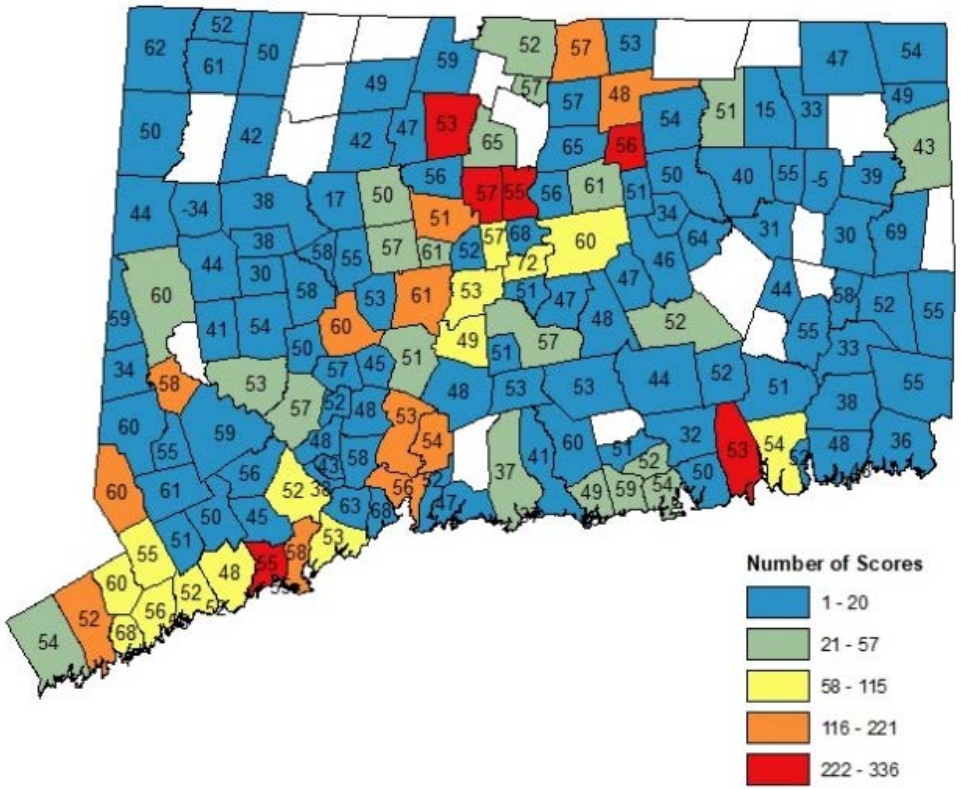
Next Steps: Initial Data Insights



- 6,300 useable scores since February, 2018 (40%)
- Average score ~5 (expected)

Score	Average Baseline Asset Energy (MBTU)	Average Year Built	Average Square Footage
1	181	1949	2,803
5	95	1965	2,011
10	39	1975	1,794

HERS Index Average Score by Town

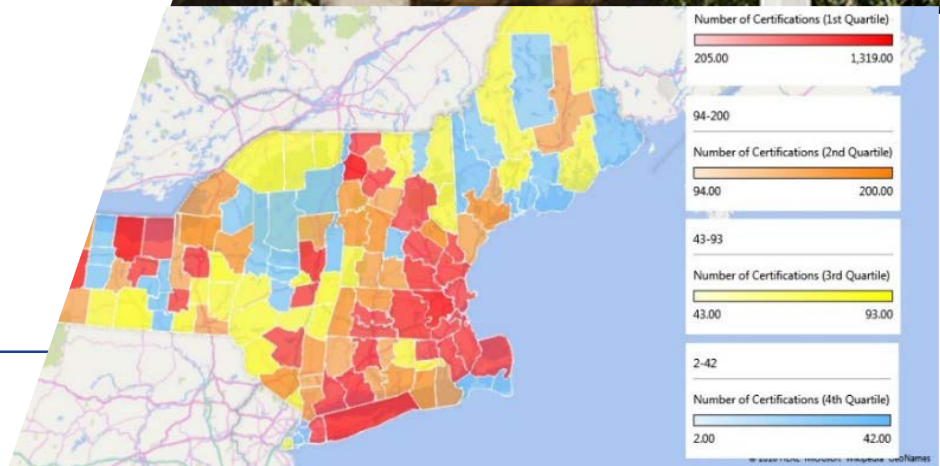


Next Steps: Integrating the Real Estate Industry

- NEEP is helping CT to connect with the real estate industry in two key ways:
  1. The Multiple Listing Service
     - Integrating with the MLS's must include awareness of separate industry timelines, different IT needs, learning curve about the value of energy efficiency
  2. Realtors/Realtor Associations
     - Have provided funding for CT to hire an educator to begin offering training workshops specifically for realtors and how to use and interpret the scores

- HELIX 2.0: NEEP is expanding capabilities to incorporate solar data for VT, MA, NH and CT though a partnership with LBNL and SETO
  - Also going to expand to Mid-Atlantic states

SMART MLS



Graphics Source: Northeast Energy Efficiency Partnerships

Lindsay Anderson

Minnesota Department of Commerce

U.S. DEPARTMENT OF ENERGY

Local Government Project for Energy Planning

LEAD Tool

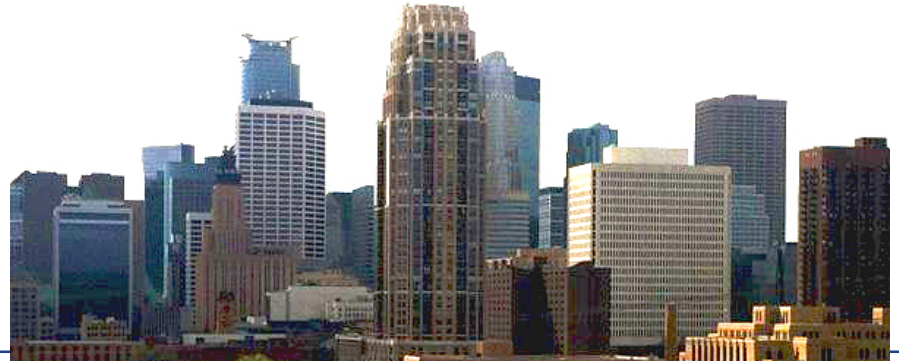
Better Buildings Summit 2019

Lindsay Anderson

Minnesota Department of Commerce, Division of Energy Resources

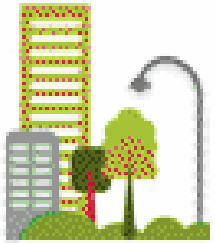
State of Minnesota Goals

Next Generation Energy Act



GreenStep Cities

Voluntary challenge, assistance and recognition program to help cities achieve their sustainability and quality-of-life goals.

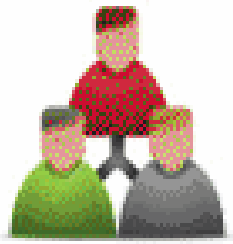


BUILDINGS AND LIGHTING

LAND USE

TRANSPORTATION

ENVIRONMENTAL MANAGEMENT



ECONOMIC AND COMMUNITY DEVELOPMENT

https://greenstep.pca.state.mn.us/

METRICS

ENERGY (IN BTUS): electricity, natural gas, and district energy consumed citywide (subdivided into residential and commercial/industrial)

WATER (IN GALLONS): potable water consumed citywide (subdivided into residential and commercial/industrial)

TRAVEL (IN VEHICLE MILES TRAVELED): on-road distance traveled within city limits

WASTE (IN POUNDS): citywide municipal solid waste managed via recycling, composting, combustion, and landfilling (prorated from countywide data)

COMMON METRICS

GREENHOUSE GAS EMISSIONS (IN TONNES CO_2E): citywide greenhouse gas emissions associated with each of the four indicators

COST (IN DOLLARS): cost estimates associated with each of the four indicators

DEMOGRAPHICS
All data is reported both as a total as well as in units/capita. Residential data is reported in units/household, and Commercial/Industrial data is reported in units/job

AREA
City Area (sf)

WEATHER
Heating Degree Days
Cooling Degree Days
Precipitation (in)

Local Government Project for Energy Planning (LoGoPEP)

Tasks

1) Identify and develop resources on exemplar Minnesota cities,

2) Create resources for city clean energy planning,

3) Engage local governments to embed energy planning into comprehensive plans, and

4) Support continued annual data collection.

- U.S. DOE SEP Competitive Award

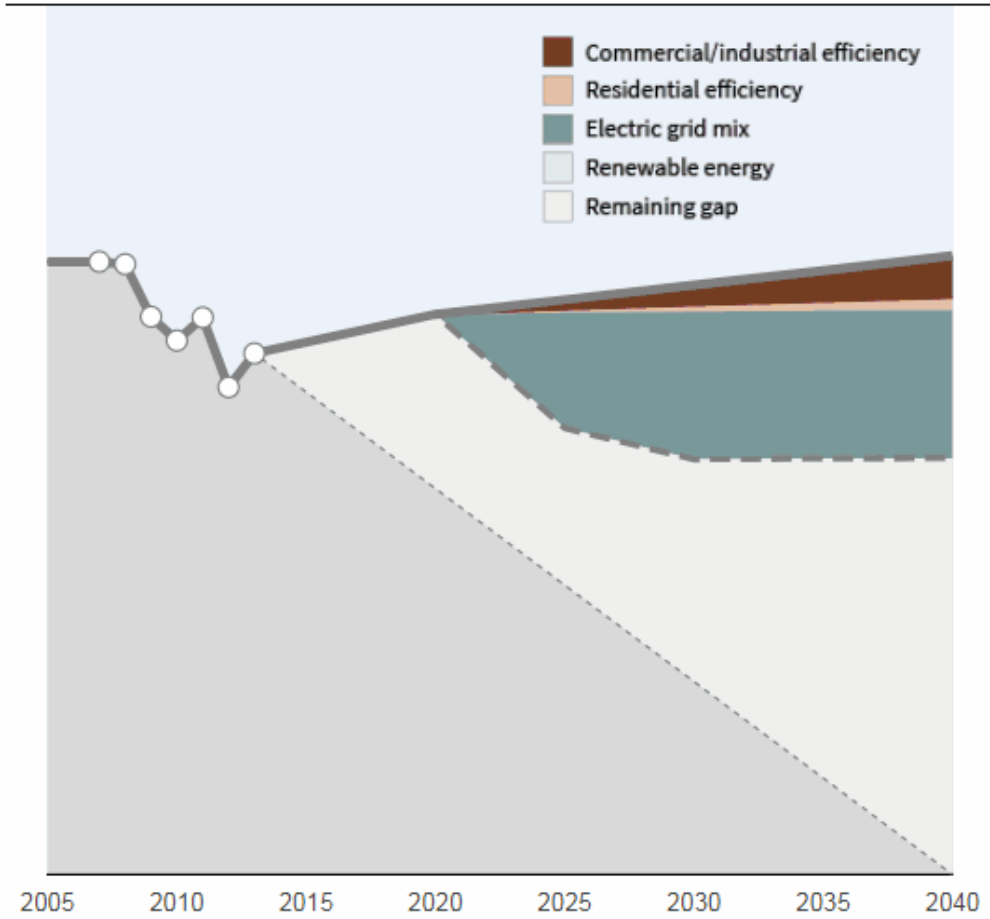
LoGoPEP Energy Planning Tools:

- A brief guide on how to incorporate energy and/or climate resilience in a city's **request for proposals**
- An energy planning **guide** and **workbook**
- An **example analysis of energy existing conditions**
- **Example local government energy goals**
- A **solar energy calculator** to assist in setting solar energy development goals
- A **wedge diagram tool** for energy and greenhouse gas reduction planning with an associated menu of feasible city actions

GREENHOUSE GAS EMISSIONS REDUCTION PLAN | NON-TRAVEL ENERGY

Bloomington

This tool allows users to explore a city's potential energy futures through an interactive diagram that shows forecasted city-wide greenhouse gas emissions from building energy consumption. Starting with historic baseline data and a business-as-usual forecast, users can set reduction goals and visualize the predicted impacts of reduction "wedges" that can be achieved through actions taken by residents, businesses, utilities, and local and state governments. Three reduction strategies that represent the impacts of existing policies are shown by default, including: Commercial/Industrial Energy Code Enforcement, Residential Energy Code Enforcement, and Planned Portfolio Mix Changes. To learn more, check out the methodology document. The tool only evaluates non-travel energy, which comprises 55% of statewide emissions. To comprehensively address city-wide emissions, local governments should also consider vehicle travel, air travel, waste, wastewater, and agricultural emissions.



SELECT CITY Bloomington

SET GOALS

Set greenhouse gas reduction goals for non-travel energy in your city.

- (●) Carbon neutral by 2040
- ( ) Align city goal with Minnesota's goals from the Next Generation Energy Act of 2007
- ( ) Custom goals

SELECT STRATEGIES

- COMMERCIAL/INDUSTRIAL EFFICIENCY
- RESIDENTIAL EFFICIENCY
- ELECTRIC GRID MIX
- RENEWABLE ENERGY

Business-As-Usual Emissions (1,172,572 tonnes CO2e) | Action Plan (33% reduction) | Goal (100% reduction)

Expanding Efforts: LoGoPEP Greater Minnesota

- Refinement and review of resources and methodologies
- Additional data
- Technical energy planning assistance for local governments
- Stories

MINNESOTA LoGo PEP

2018 ANNUAL REPORT

REGIONAL INDICATORS INITIATIVE

60 cities provided with energy data

100 cities provided with travel data

45 cities able to engage in scenario planning using the wedge tool

29 cities provided with a detailed report on their existing energy conditions

AVAILABLE RESOURCES

- Baseline energy, travel, water, waste, and emissions data
- Sample request for proposals
- Energy planning guide and workbook
- Example analysis of energy existing conditions
- Example local government energy goals
- Solar energy calculator
- Wedge diagram tool for energy and greenhouse gas reduction planning
- Local energy action case studies for Maplewood, Rochester, St. Louis Park, and Stearns County
- Annotated list of additional case studies resources for sustainable cities
- Energy planning webinar with wedge diagram tool demo

CITIES

Bemidji
Bloomington
Burnsville
Coon Rapids
Duluth
Eagan
Eden Prairie
Edina
Elk River
Falcon Heights
Hopkins
Kasson
Lake Elmo
Maplewood
Minneapolis
Minnetonka
Oakdale
Richfield
Rochester
Rosemount
Shoreview
Saint Anthony
St. Cloud
St. Louis Park
St. Paul
White Bear Lake
Woodbury

DATA SOURCES

PUBLIC AND PRIVATE UTILITIES
Anoka Municipal Utility
Beltrami Electric Cooperative
CenterPoint Energy
Connexus Energy
Dakota Electric Association
Duluth Comfort Systems
Duluth Steam Cooperative
Elk River Municipal Utilities
Great River Energy
Hennepin Energy Recovery Center
Minnesota Energy Resources
Minnesota Power
Minnesota Valley Electric Cooperative
NRG Energy
Olmsted County Waste to Energy Facility
Otter Tail Power Company
People's Energy Cooperative
Rochester Public Utilities
St. Paul District Energy
University of Minnesota (Southeast Steam)
Western Lake Superior Sanitation District
Xcel Energy

STATE AND LOCAL GOVERNMENT
Duluth Port Authority
Hennepin County
Metropolitan Airports Commission
Metropolitan Council of the Twin Cities
Minnesota Department of Administration
Minnesota Department of Employment and Economic Development
Minnesota Department of Natural Resources
Minnesota Department of Transportation
Minnesota Pollution Control Agency
Rochester International Airport
U.S. Energy Information Administration
University of Minnesota

OTHER
Degree Days.net
ICLEI Local Governments for Sustainability

PARTNERS

LHB PERFORMANCE DRIVEN DESIGN.

Urban Land Institute Minnesota

ORANGE ENVIRONMENTAL

Minnesota Pollution Control Agency

CENTER FOR SCIENCE, TECHNOLOGY, AND ENVIRONMENTAL POLICY

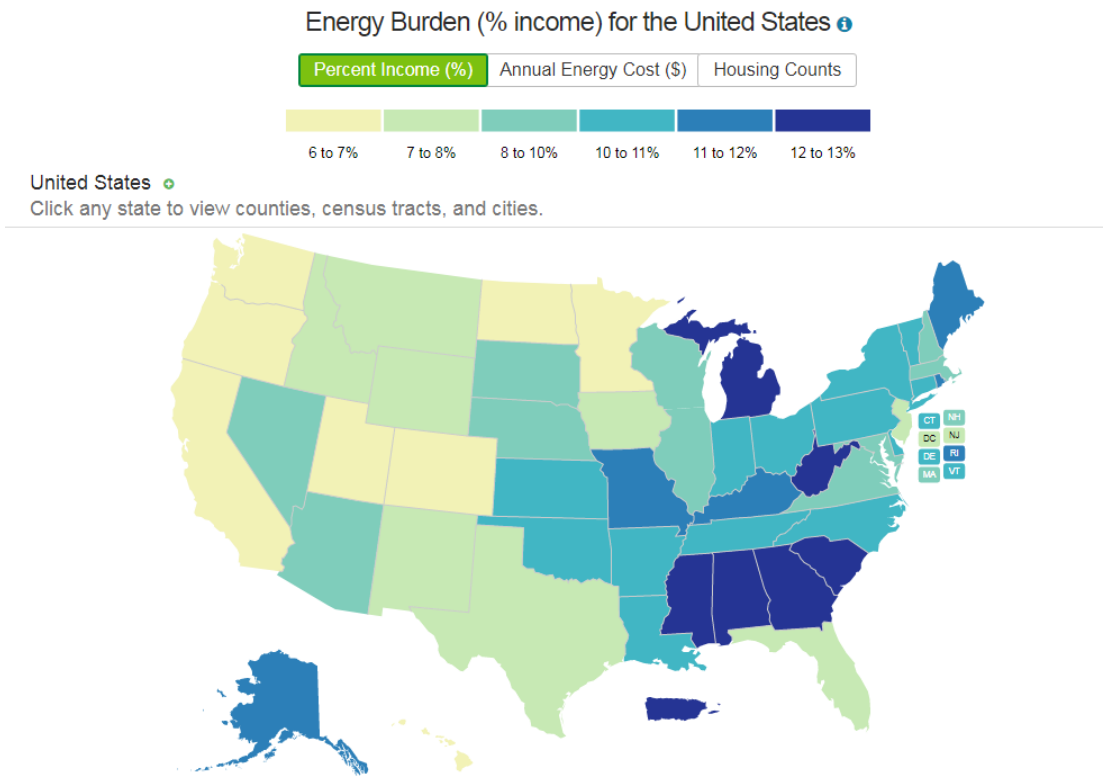
GREAT PLAINS INSTITUTE Better Energy. Better World.

Energy Transition Lab
University of Minnesota
Driven to Discover℠

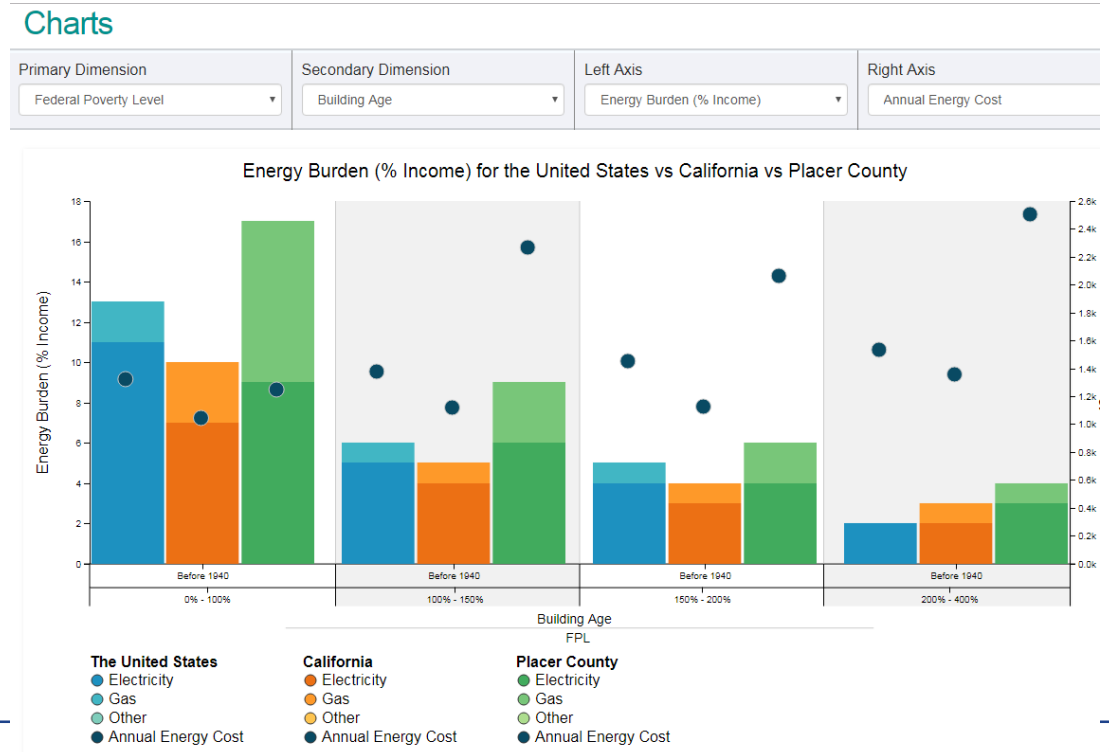
COMMERCE DEPARTMENT

http://www.regionalindicatorsmn.com/

New -- Low-income Energy Affordability Data (LEAD) Tool



Goal: Help stakeholders make data-driven decisions on energy goals and program planning by improving their understanding of low income and moderate income household energy characteristics.



https://www.energy.gov/eere/slsc/maps/lead-tool

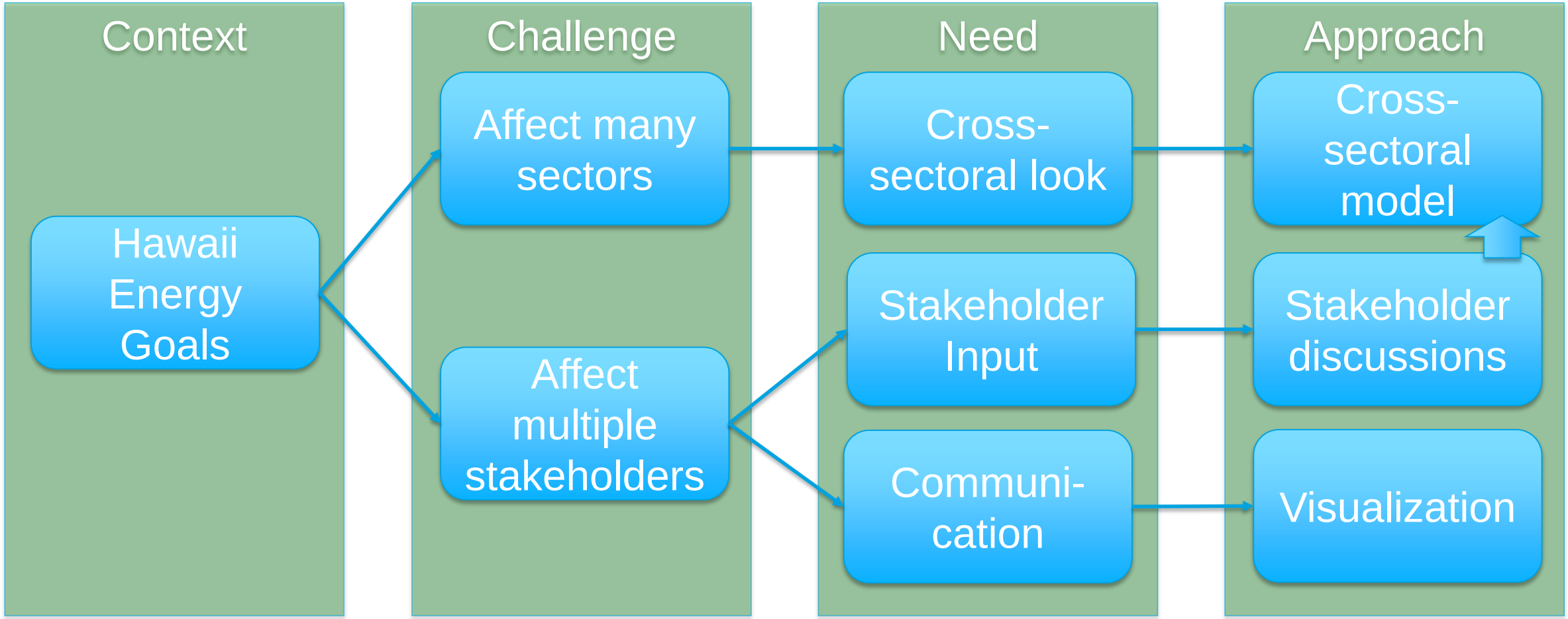
Elizabeth Doris

National Renewable Energy Laboratory

U.S. DEPARTMENT OF ENERGY

Impetus

US DoE Energy Transition Initiative sponsors NREL to support Hawaii State Energy Office Competitive SEP in assessing future pathways



Stakeholder Discussions

Accessibility

Communication

Collaboration

- Hawaii Electric
- Hawaii Energy
- Hawaii Natural Energy Institute
- Kauai Island Utility Cooperative
- State of Hawaii Public Utilities Commission
- Maui County
- Division of Consumer Advocacy
- University of Hawaii

Recurring Areas of Interest

Cross-sectoral model

- Land use & transmission
- Electrification of transportation
- Electric rates

Extensible model

- Fuel consumption and prices – and with decline in use of fossil fuels:
  - Refinery businesses and jobs
  - Effect on aviation
  - Ground transport fuel cost

Larger-scale model

Objectives

Facilitate scenario exploration

- Powerful – larger-scale problems
- Multi-sectoral
- Extensible
- Scenario/data management

Accessible and adaptable

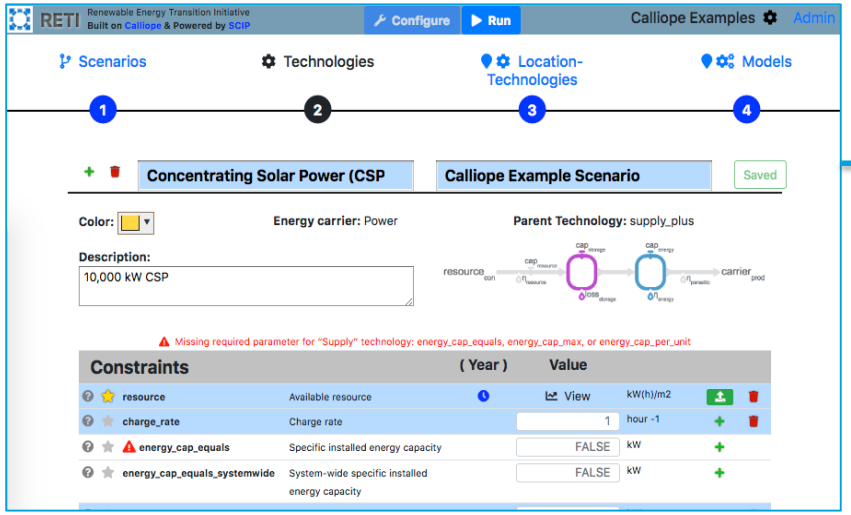
- User-friendly
- Communicative
- Free
- Hosted
- Model in active development
- Open-source

Facilitate collaboration

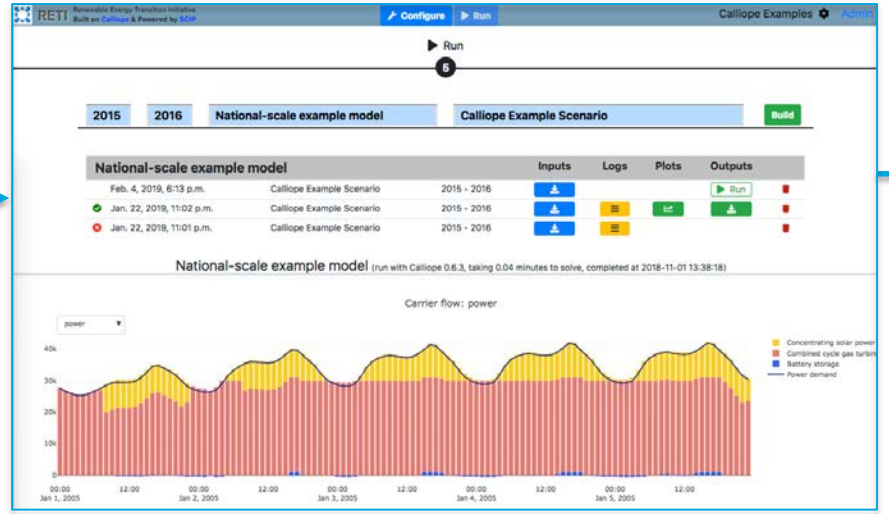
- Across stakeholder groups
- Among teams
- With experts

Architecture & Workflow

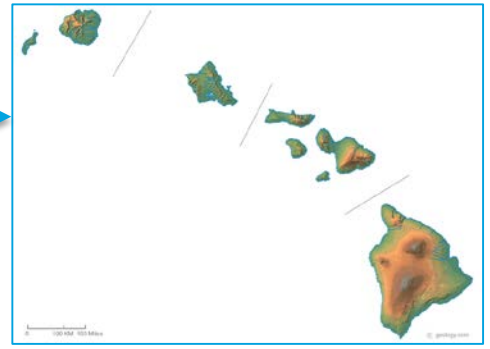
Configuration



Optimization



Visualization
(HAVEN)



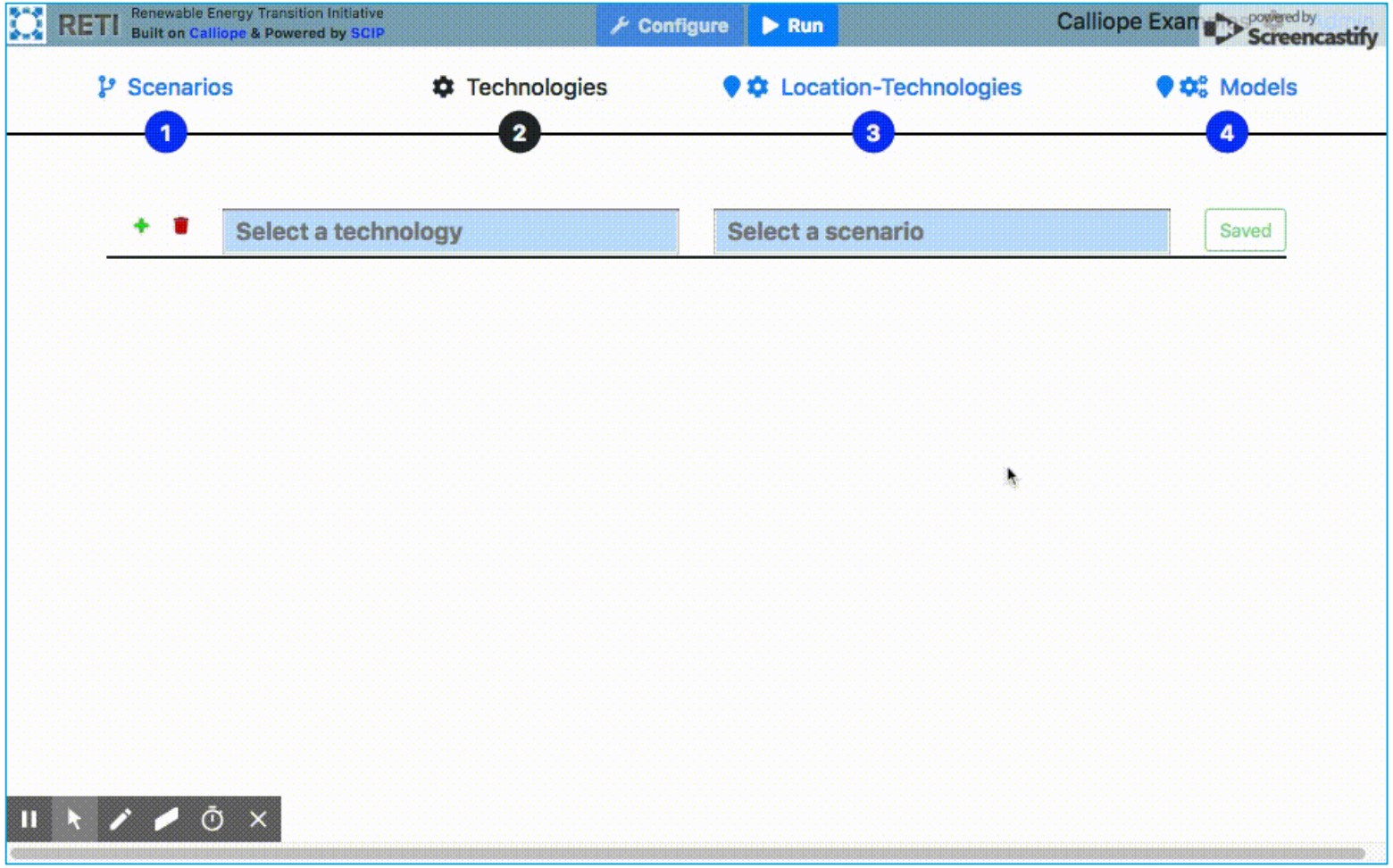
Database
(Cloud-Based)

Optimization Solver
(SCIP)

Modular Extensibility
(Python)

History Objectives Software

A Collaborative Platform

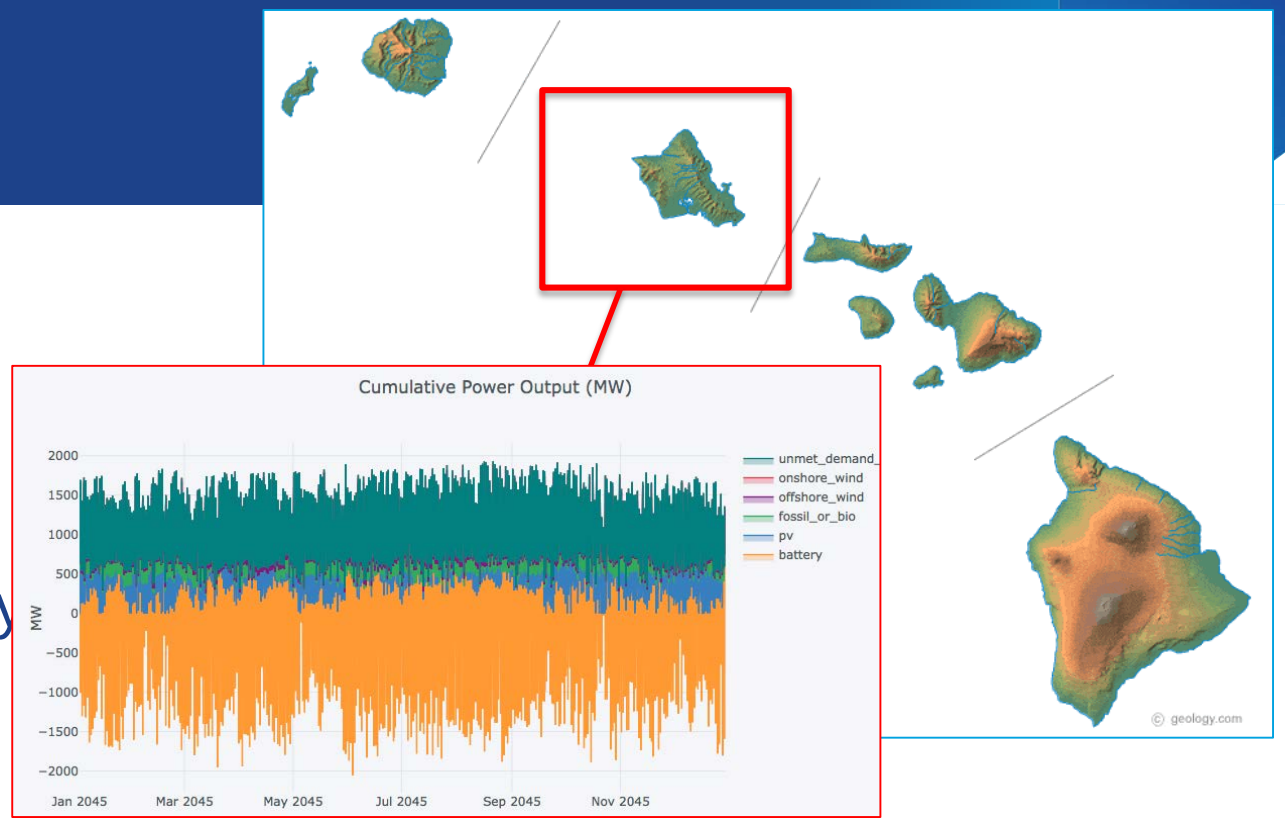


Jon (Hawaii)

Rob (Colorado)

History Objectives Software Applications

Applications



- Multiyear modeling of Oahu
  - Recreating PSIP Scenarios
  - “Copperplate” Model
  - 2030, 2035, 2040, 2045 @ Hourly Resolution
  - Exploratory load scenarios
    - Energy efficiency
    - EV smart-charging
- Capacity expansion 2025-2030
  - Exploring differences between PSIP (IRP) and Energy Office results
  - Day clustering functions in beta version of web application

Technology	Nameplate Capacity (MW)
battery	158
fossil_or_bio	
offshore_wind	-
onshore_wind	482
pv	429

Applications: Data

Hawaiian Electric

- Hawaiian Electric (HECO) collaboratively supplied data and supported
- Utilities are actively using NREL technical support
- Hawaii utilities are key participants in conversations around and the transition to sustainable energy in Hawaii

Inputs

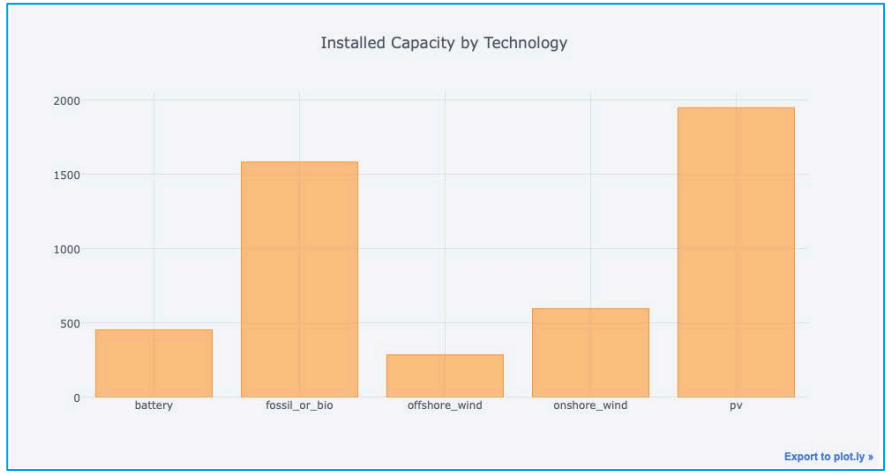
- Demand timeseries
- Resource timeseries
- Capacities
- Resource
  - Resource Efficiency
  - Resource Area (and capacity density)
  - Resource Capacity
- Technology

(Supply, Demand, Storage, Transmission, Conversion)

  - Plant Parasitic Efficiency
  - Efficiency
  - Capacity
  - Capacity Minimum Use
  - Ramping Rate
  - Export Capacity
  - Plant Lifetime
  - Available Resource
  - # Units
  - Energy Capacity per Unit
- Storage
  - Initial SOC
  - Storage Capacity
  - Charge Rate
  - Storage Loss Rate
- Transmission (+ Technology Constraints above):
  - Transmission Energy Loss Rate
- Costs:
  - Cost per Unit Energy Capacity of Storage
  - Cost of Resource Area
  - Cost of Resource Power Capacity
  - Cost of Capacity – cost per unit power
  - Fractional Cost of O&M
  - Cost of Fixed O&M – annual $ per unit of capacity OR as fraction of initial investment
  - Cost of Variable O&M (per unit production (or consumption))
  - Cost of Resource – e.g. fuel cost
  - Cost of Exporting – revenue (specify as negative)
  - Transmission Cost Rate

Applications: Key Outputs

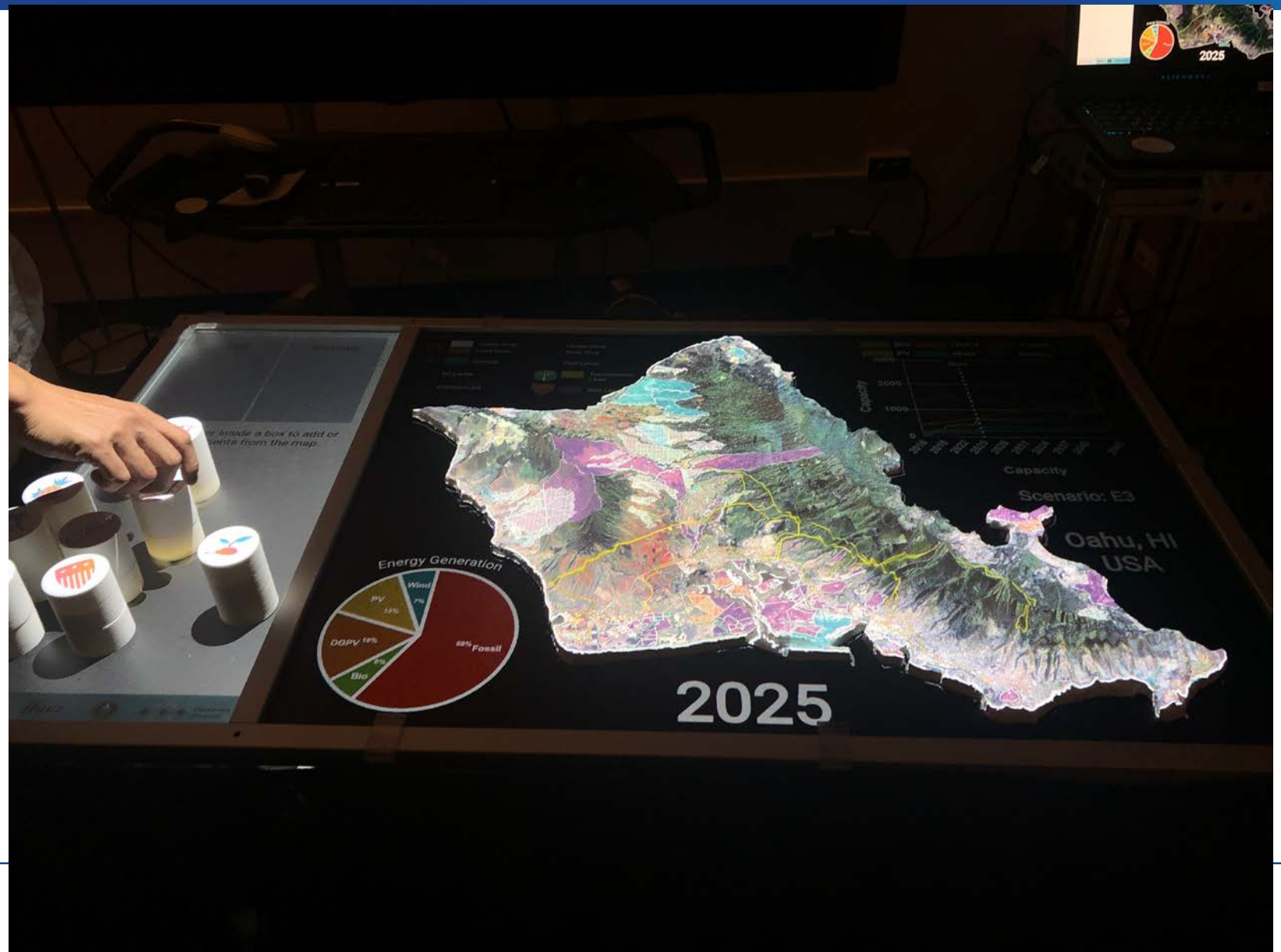
- Operation and demand profiles and aggregate energy productions and consumptions
- Asset capacities
- Costs – capital, variable, levelized



- c_con.csv
- c_prod.csv
- capacity_factor.csv
- costs_variable.csv
- costs.csv
- e_cap_net.csv
- e_cap.csv
- e.csv
- groups.csv
- levelized_cost.csv
- metadata.csv
- metadata.yaml
- operating_units.csv
- purchased_units.csv
- r_cap.csv
- r.csv
- s_cap.csv
- s.csv
- shares.csv
- summary.csv
- time_res.csv

HAVEN Version 1

HAVEN 3D


Energy Generation
Wind
PV
DGPV
Bio
Fossil
Capacity
Scenario: E3
Oahu, HI
USA
2025

Summary

- Powerful, extensible energy planning model for rapid multi-sectoral scenario exploration
- Facilitating communication and collaboration among diverse stakeholder groups, teams, experts
- Accessible and adaptable to user-specific capabilities and applications
- High end visualization in multiple formats for maximum informing

Happening Now: Puerto Rico

- User group model for development
- What Puerto Rico stakeholders are affected by and should have input into IRP decisions?
- Who best represents those stakeholders?
- Will a scenario (optimization) tool such as this potentially empower stakeholders?
- Who might have capabilities to use a capacity planning tool?
- How will modeling data be shared and made available?
- Who might appreciate the opportunity to be a part of broader stakeholder engagement, education, conversations in the planning process with a collaborative model such as this?

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Thank You

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