Overview of Existing EE/IDSM Datasets, Systems and Tools Resource Sheet

FutEE CEDMC Presentation
CEDMC Industry Training, Tuesday, July 23, 2024

I. Overview

1. Key Terms

- Measure – A technology (widget) or service that reduces energy use while providing a similar level of service.
- Deemed Measure – The measure's energy savings are pre-determined and don't require site-specific data collection to determine the measure's savings.
- Custom Measure – The measure's energy savings require site-specific data collection; energy savings calculated based on site-specific conditions.
- Product – Energy efficient Measure sold by a specific company.
    - Measure = clothes washer
    - Product = Maytag clothes washer

2. Key Concepts

- Dataset-Generally, information about measures, such as how much energy an individual measure saves and programs, how much energy a program saved.
- Databases – Studies and reference documents
- Systems – Relational databases that contain measure or program information
- Tools – ***Not a physical tool***, but a calculation that can be used to determine how much energy a Measure, building, etc. uses or saves instead of taking physical measurements.

II. Datasets/Databases Used by Practitioners in California (and elsewhere)

1. Policy Databases

- **US DOE's Database of State Incentives for Renewables & Efficiency (DSIRE)** – Database of State Incentives for Renewables & Efficiency® - DSIRE (dsireusa.org)
    - The most comprehensive source of information on incentives and policies that support renewables and energy efficiency in the United States

- **American Counsel for an Energy Efficient Environment** - ACEEE | Policy Database – State Policies
    - ACEEE's State and Local Policy Database includes comprehensive information on energy efficiency policies currently implemented at the state and local level.
    - Each year, ACEEE ranks states based on how well state policies support clean energy using a variety of metrics.
    - Click on a state and get overview of codes, utilities programs, program policy structures and standards and business model for building state. You can also assess different policy elements and how they compare across states.

2. **Codes and Standards Database – State by State**
    - **US. Department of Energy Building Energy Codes Program** - Building Energy Codes Program | Department of Energy
        - Assesses the savings impacts of model energy codes, calculating energy, cost and carbon savings
        - Tracks the status of energy code adoption across the U.S. and provides technical assistance to states implementing updated codes

3. **Measure and Program Databases – California Specific**
    - **eTRM –** Deemed Measures approved by the CPUC, including savings, costs, other information.
        - https://www.caltf.org/etrm-overview
    - **CET –** Cost-effectiveness calculator for California measures – do the benefits of the Measure exceed the costs?
        - **Link**
    - **CEDARs –** Information about savings from installed measures and program performance since 2016.
        - https://cedars.sound-data.com/

4. **Product Databases – Threshold Standards for Whether a *Product Can Be Sold***
    - **California's MAEDbS** - Modernized Appliance Efficiency Database System (MAEDbS) Enhancements and Improvements (ca.gov) – More Stringent Requirements than Federal
        - Codes and Standards regulated by Title 20 (Appliances)
        - Somebody would what products would meet minimum standards
        - If a new technology is added to Title 20. All different products and efficiency levels. What qualifies, what does not.
        - Some stuff is federally regulated. Added as products get tested and certified.

    - Lots of product information and energy information.
    - What is product draw in different modes.
    - Products have to submit information for compliance.
    - Manufacturers
    - Not allowed to sell products in California if regulated by Title 20 unless submitted to CEC.
- **US DOE's eeCompass** - Consumer Products — Site (doe.gov) and Commercial Equipment — Site (doe.gov)
    - Federal equivalent of this. Whatever if federally regulated. The universe or population that are legal to use. QPL is a subset to qualify for incentive.
    - **Is the Product Energy Efficient (EnergyStar) – Lots of Products, Including Lighting**

5. **Product Database -Is the Product Efficiency (General)**
    - **US EPA's EnergyStar Certified Products -** Energy Efficient Products | ENERGY STAR
        - Meets EnergyStar Designation certified products list. Overall regulated marketplace.
    - **Consortium for Energy Efficiency (CEE) – Efficiency Products Database –** https://cee1.org/program-resources/tiers-and-energy-star/
        - Higher Efficiency thank Energy Star

6. **Product Database – Is a Specific Type of Product Efficient?**
    - **Design Lights Consortium listing** – Design Lights Consortium – Oregon
        - Lighting: DesignLights Consortium - DLC Qualified Products Lists - DesignLights – Industry related.
    - **HVAC**: **AHRI** - AHRI Certification Directory (ahridirectory.org)
        - Generally, align with federal standards for HVAC products. Test procedures that federal standards reference.
    - **HVAC: NEEP Cold-Climate Heat Pumps** - ccASHP Specification & Product List | Northeast Energy Efficiency Partnerships (neep.org)
    - **HVAC: Home Ventilating Institute (Residential Fans)** - HVI-Certified Products Directory - Home Ventilating Institute
    - **Process Fans: Univ. of Illinois' Ag Ventilation Fan database** - http://bess.illinois.edu/search.asp
    - **Commercial Building Products - UC Davis Procurement Hub –** https://energyproductevaluations.org/
        - Information about EE Measures (General)

7. **Federal EE Measures Database – Technical Specifications, Savings, Costs, etc.**

- **NREL's Residential Efficiency Measures DB** - Home - National Residential Efficiency Measures Database | NREL
    - Basic presentation of Measures

8. **Emerging Technology Databases – CA Focus**
    - **CalNext**
    - **CEC EPIC?**
    - **US DOE, Office of Energy Efficiency and Renewable Energy** https://www.energy.gov/eere/buildings/emerging-technologies

9. **DE&I/Equity Databases**
    - **ACEEE Leading with Equity Initiative** - Leading with Equity Initiative aims to ensure climate vulnerable and disinvested communities are included in energy and utility decision-making and planning https://www.aceee.org/energy-equity-initiative#resources
    - **University of Michigan Energy Equity Project (EEP)** - collective of resources for energy efficiency and equity in relation to climate-vulnerable and disinvested communities https://energyequityproject.com/
        - Resources include workbooks on energy equity and justice, frameworks of environmental justice, organizations to partner with, and mapping tools https://energyequityproject.com/resources-2/
        - Mapping tools:
            - **Urban Energy Justice Lab, Energy Efficiency Equity Baseline (E3B)** - E3B estimates equitable utility investment proportionate to the low-income population in the service territory and as a percentage of the total residential energy efficiency investment portfolio. https://umich.maps.arcgis.com/apps/Cascade/index.html?appid=28f6792ea2134ffba888413e70647c0c
            - **US DOE, Energy Justice Dashboard** - Data visualization tool that displays DOE-specific investments in communities across the country experiencing disproportionate environmental effects https://www.energy.gov/justice/energy-justice-dashboard-beta
            - **US DOE, Low-Income Energy Affordability Data (LEAD) Tool** - Maps out energy burden, energy cost, income, demographics, and education level for any area in the US. https://www.energy.gov/scep/slsc/lead-tool
    - **US EPA, EJ Screen Tool** – This EPA tool allows the user to visualize different environmental justice indicators across a region of choice

including factors like demographics (age, income, education level, race), climate risk (flooding, wildfire, extreme heat), health disparities (asthma, heart issues, cancer), environmental burden (exposure to PM2.5, hazardous waste, toxins), and more. https://ejscreen.epa.gov/mapper/

- **California EPA, CalEnviroScreen 4.0 -** https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40
    - The California EPA's CalEnviroScreen tool is an environmental health mapping tool release in October 2021. This tool helps identify California communities that are climate vulnerable and disproportionately affected by climate change.
    - CalEnviroScreen is used for compliance with SB 535. SB 535 directed that at least a quarter of proceeds from California's Cap and Trade Program benefit disadvantaged communities, and at least 10% of funds go to projects located within those communities.

10. California Evaluation, Measurement, and Verification Reports

- **CPUC Evaluation Studies Public Database -** https://pda.energydataweb.com/#!/
    - Users can find the current master evaluation plan, specific research plans, and draft reports, and also provide comments on active documents
- **California Measurement Advisory Council (CALMAC) -** https://www.calmac.org/
    - New publications, weather data, MA&E reports, and customer load shapes can be searched for in their database. Users can also post reports and publications.
    - Contains evaluation reports back to 1994.

III. Tools

1. Measure Tools – California

- **California Technical Forum** - https://www.caltf.org/
    - Is working on including measure tools into its repertoire

2. Building Simulation Tool – California

- **EnergyPlus** - https://energyplus.net/
    - EnergyPlus allows users to model energy consumption from heating, colling, ventilation, lighting, and plus and process loads, and water use.
    - Meets specific criteria for thermal zones, HVAC systems, heat balance-based solutions, advanced fenestration models, illuminance and glare, functional mock-ups, and detailed output reports.

- Used in Building Energy Asset Score
- Open source

3. **Program Tools – Federal Government**
    - **EnergyStar Portfolio Manager** - https://portfoliomanager.energystar.gov/pm/login.html
        - Tool that enables you to benchmark the energy use of any type of building, all in a secure online environment. Nearly 25% of U.S. commercial building space is actively benchmarking in Portfolio Manager.
        - Identify underperforming buildings to target for efficiency improvements; replicate energy-saving practices from most efficient buildings in underperforming buildings.
        - Set investment priorities using a built-in financial tool to compare cost savings across buildings in your portfolio.
        - Verify savings and prevent snapback
        - Earn ENERGY STAR scores, from 1-100, and certification for ENERGY STAR score of ***80 or higher*** (goes into effect August 26th, 2024)
        - Share performance documents and data, and run custom reports for insights on your performance
        - Measure and track water, waste and materials, and greenhouse gas emissions
        - Free, online web tool
    - **Building Energy Asset Score** - https://buildingenergyscore.energy.gov/
        - Provide a simple, standardized scoring metric to help building owners understand their buildings' current and potential performance: 1-10 with 10 being most efficient
        - Provide a cost-effective way to quickly evaluate a building's integrated performance and to encourage deep retrofits and programs toward the net zero goal
        - "Energy asset score" evaluates the physical characteristics of a building "as built" and its overall energy efficiency independent of its occupancy and operational choices (building use schedules and plug loads).
        - Input known building characteristics, infers missing characteristics
        - Free, online web tool; uses EnergyPlus as its central modeling engine
    - **Audit Template (feature of Building Energy Asset Score)** - https://help.buildingenergyscore.com/support/solutions/articles/8000053354-overview

    - Collect, store and report building energy audit data. Cities can use this tool to collect standardized data from many buildings by specifying which fields are required and which are optional.
    - Collect standardized set of inputs; asks for ENERGY STAR Score as part of General Building information
    - Output data for many in standardized format for analysis/review.
    - Free, online web tool.
- **SEED Platform** - https://seed-platform.org/
    - Lower the financial and labor burden on cities implementing energy programs by streamlining the process of collecting and managing data from large groups of buildings.
    - Identifies which buildings must comply with a jurisdiction's program
    - Organizes and cleans the data that comes in
    - Interfaces with other programs to provide energy recommendations to building owners and decision makers.
    - Open source, web-based platform
    - Host yourself or using a hosting service
    - Import data from ENERGY STAR Portfolio Manager
- **Better and Expansion (Building Efficiency Targeting Tool for Energy** - https://better.lbl.gov/
    - Enables building operators to quickly, easily identify the most cost-saving energy efficiency measures in buildings and portfolios using readily available building and energy data, allowing for future focus on audits and studies
    - Benchmarks a buildings or portfolio's energy use against peers
    - Quantifies energy, cost, and greenhouse gas (GHG) reduction potential
    - Recommends energy efficiency measures (technological and operational) for individual buildings or portfolios.
    - Open-source web application, API, and analytical source code
    - Free, online web tool
- **ComStock and ResStock** - https://resstock.nrel.gov/ and https://nrel.github.io/ComStock.github.io/
    - When a city, state, utility, or national policymaker, company, or researcher wants to know: "How much energy are the buildings using, for what, and when for XYZ location?" or "What's the (energy, carbon, etc.) impact of changing XYZ in my building stock?" They can get a credible, defensible answer from ComStock and ResStock datasets.
    - Characteristics of existing building stock
    - Modeled energy consumption per county by fuel, building type, and end use at 15 min. resolution
    - Modeled energy impact of a variety of technologies

- CA buildings used DEER assumptions as starting point