



## National Residential Efficiency Measures Database Unveiled

Welcome to the Webinar! We will start at 12:00 Noon Eastern Standard Time

Be sure that you are also dialed into the telephone conference call:

**Dial-in number: 888-394-4822 ; Pass code: 7170033**

**(If asked for a PIN #, press \*0)**

Download the presentation at <http://www.buildings.energy.gov/webinars.html>

**There will be a Q&A session at the end. Questions will be submitted electronically and answered verbally. Submit your questions by selecting “Q&A” on the menu at the top, click in the top box, type your question and click “Ask.”**

## Today's Speaker



**Dave Roberts is a Senior Engineer at the National Renewable Energy Laboratory (NREL).** He currently supports the U.S. Department of Energy's (DOE) Building America Program technical activities, including the National Residential Efficiency Measures Database and BEopt residential design optimization software development efforts. David has been working in the area of energy efficiency in buildings since 1989 and is a registered Professional Engineer in Colorado. He has expertise in building energy simulation, building science and software development. Prior to joining NREL, Dave worked for Architectural Energy Corporation where he led energy simulation and software development projects, and served as product manager for the REM/Rate™ home energy rating software.



# National Residential Efficiency Measures Database



**Progress Update**

**January 18, 2011**

# Measures Database Overview

- Initial Concept
- Background
- Current Status
- Looking Ahead
- A Call for Data



# Initial Concept

Integrate several existing DOE databases of residential building retrofit measures into a unified national database

- LBNL's Home Energy Saver
  - Tool used in DOE's Home Energy Score pilot program
- NREL's BEopt
  - Optimization tool used to guide residential efficiency research
- ORNL's Weatherization Assistant
  - Used in Weatherization Assistance Program

Available to DOE labs and public

- Standardized format
- Improve technical consistency and accuracy
- Support external building science R&D
- Enhance public transparency

Centralized, regularly-updated information

- Performance parameters (e.g., U-value, SEER, etc.)
- Costs
- Hosted by NREL

# NREL Team

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- Residential Research Group Leader: Ren Anderson
- Database Project Manager: Dave Roberts
- Development Team: Sean Casey, Shauna Fjeld, Mike Gestwick, Neal Kruis, Noel Merket, Richard So, Jenni Sonnen, Gail Werren
- Advisors: Marcus Bianchi, Scott Horowitz

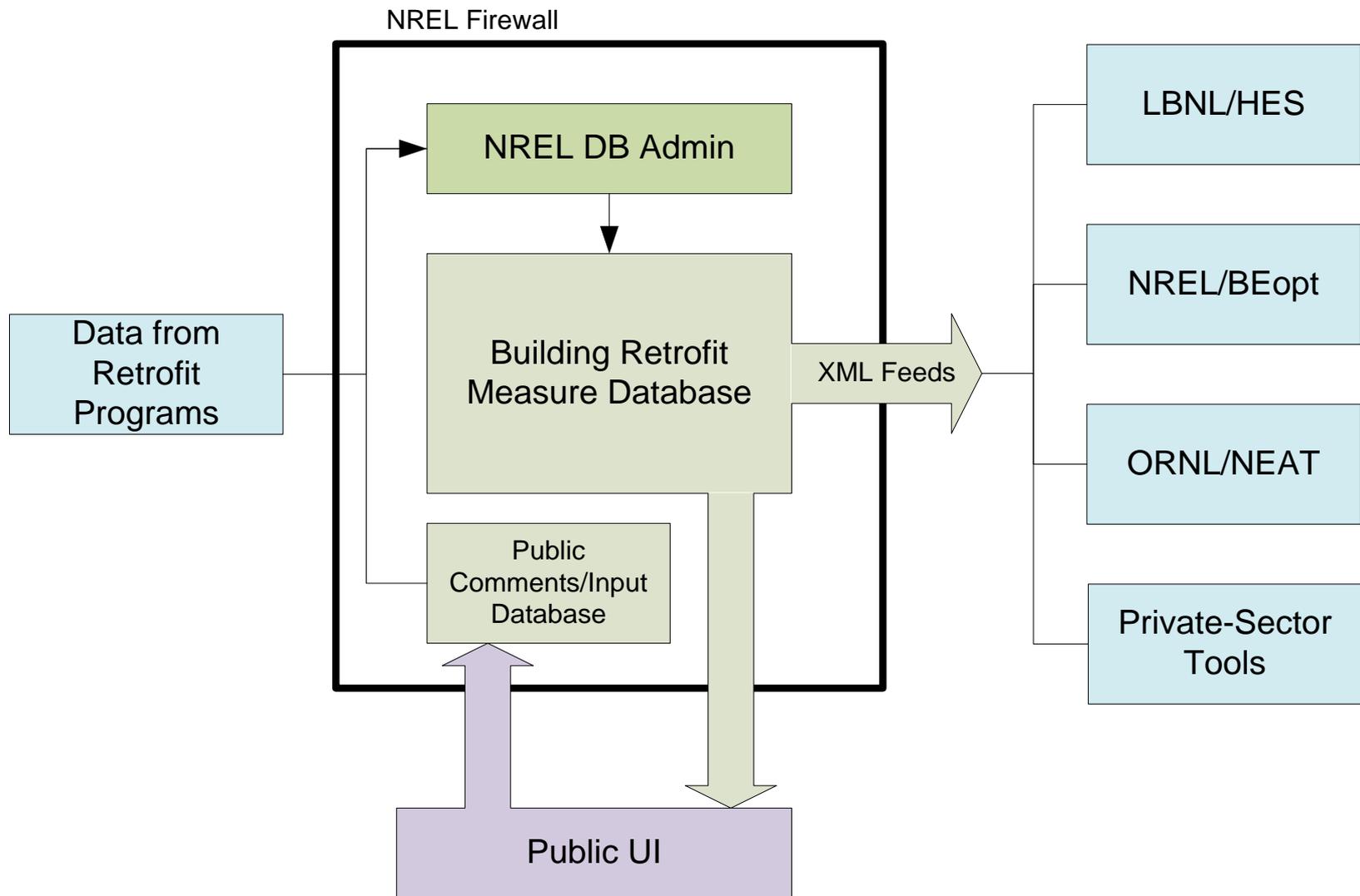
# Advisory Group

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## Participants

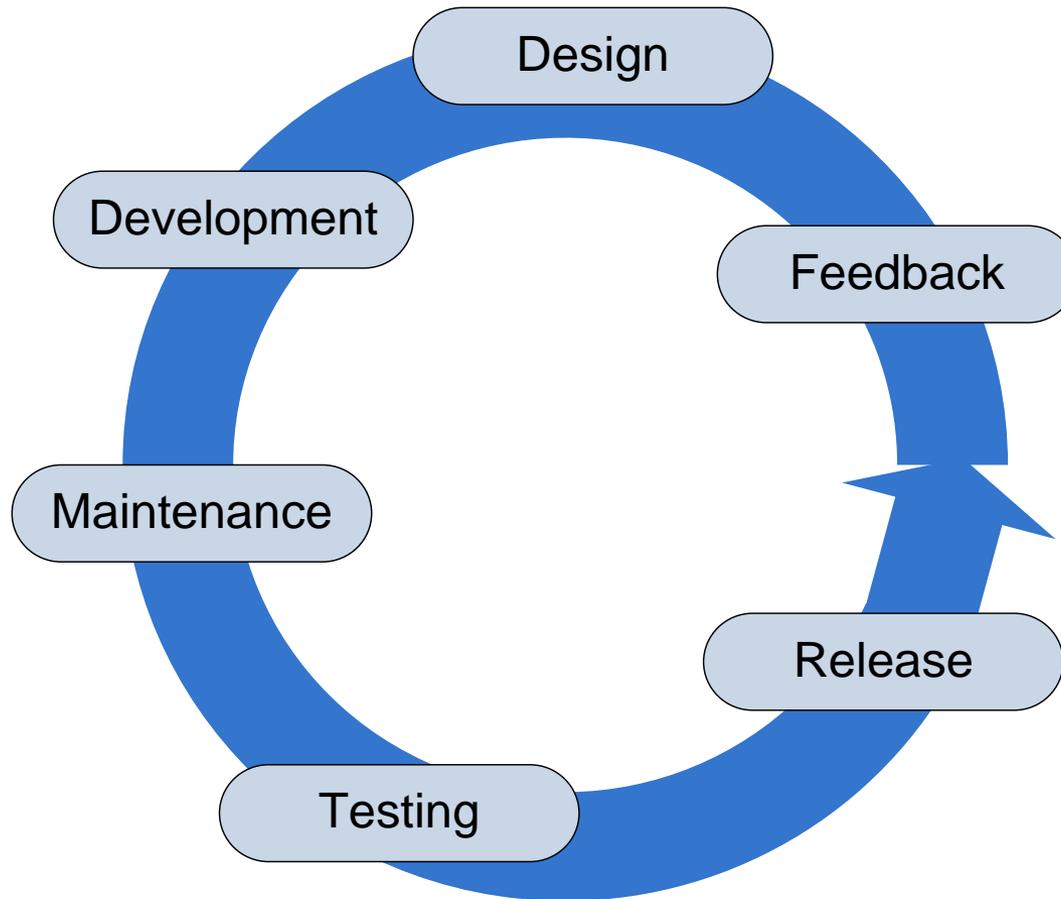
- LBNL
- ORNL
- CA Database for Energy Efficient Resources (DEER)
- TREAT residential audit software vendor
- REM/Rate HERS/audit software vendor
- Affordable Comfort Incorporated (ACI)
- Recurve Inc.
- GreenHomes America
- Select Building America Teams
  - Building Science Corporation
  - Steven Winter Associates

# System Overview



# Development Cycle

~6-month cycle

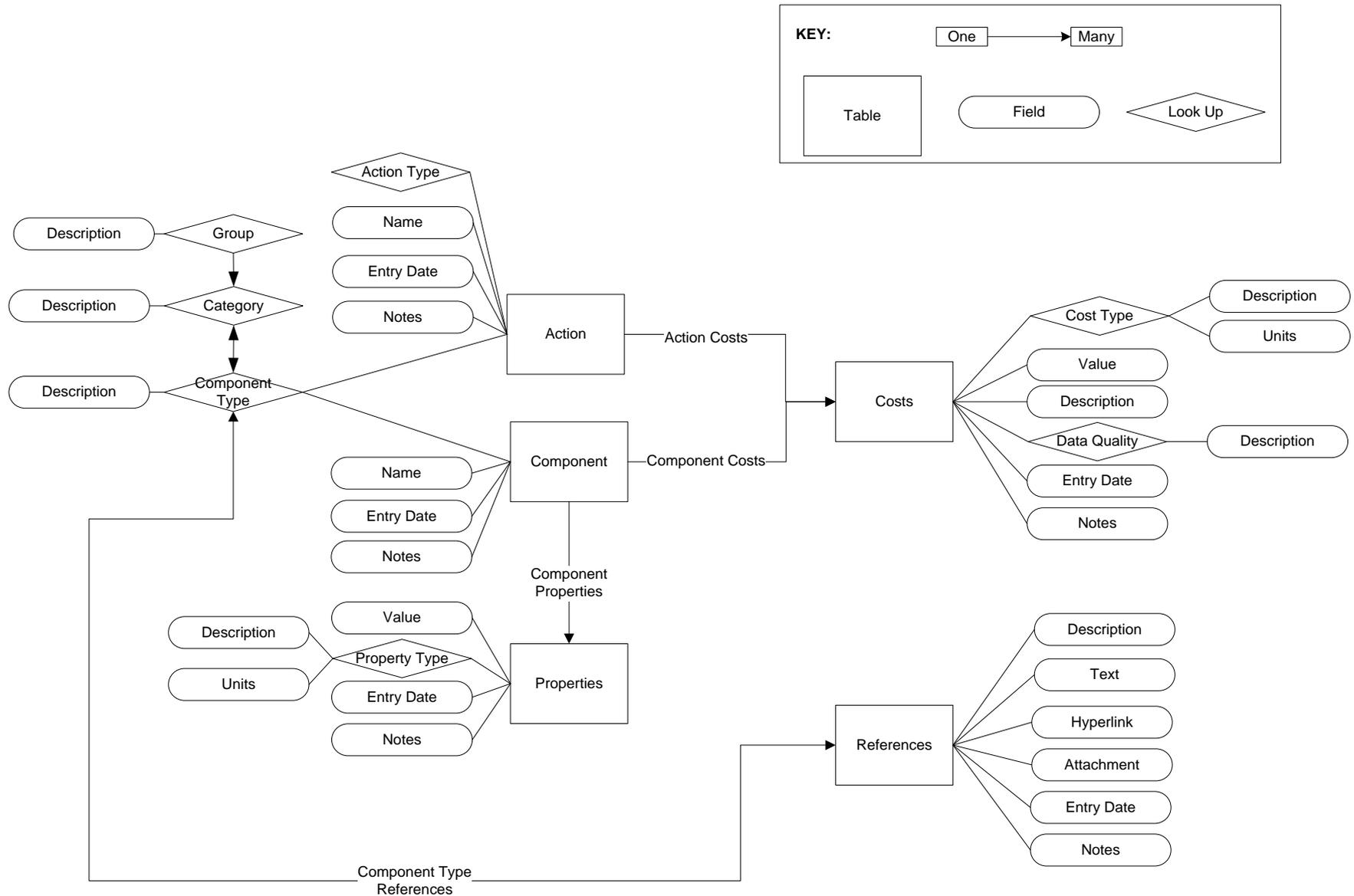


# Current Status

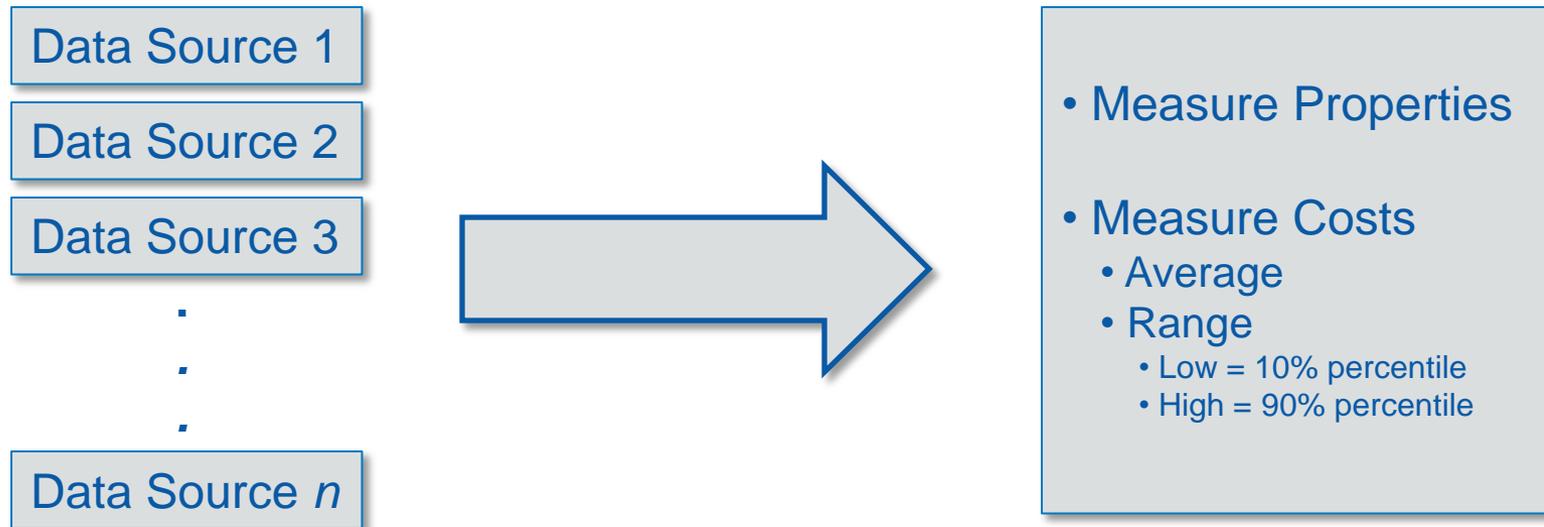
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- Database built and hosted at NREL
- v2.0 released 11/2010
  - Web UI available
  - XML data export capability
  - ~2800 measures
- LBNL has aligned HESPro v2.0 (Home Energy Score tool) measures with a subset of measures in database
- NREL has aligned BEopt v1.0 measures with a subset of measures in database

# v2.0 Database Schema



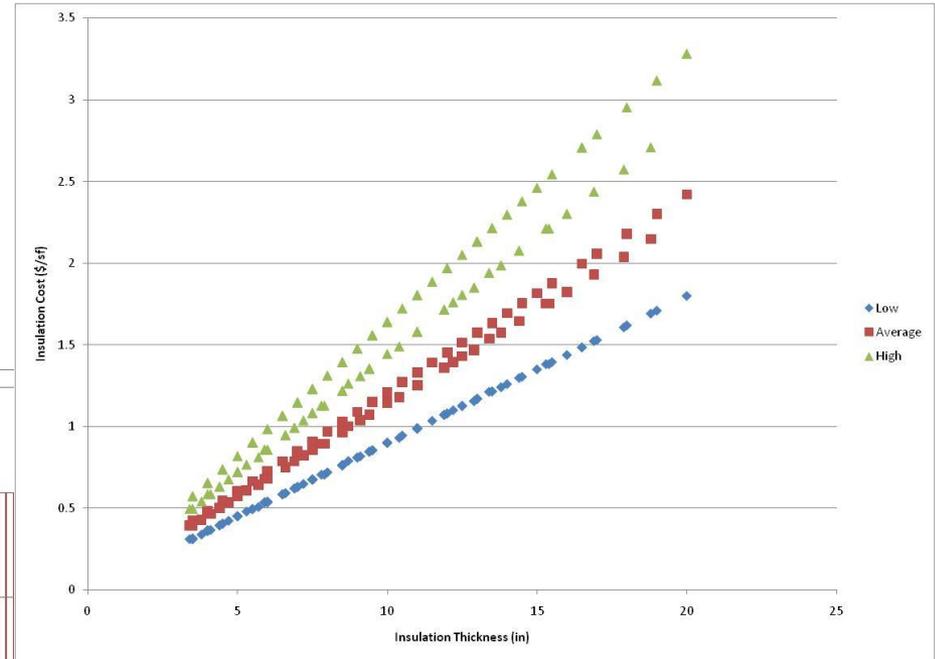
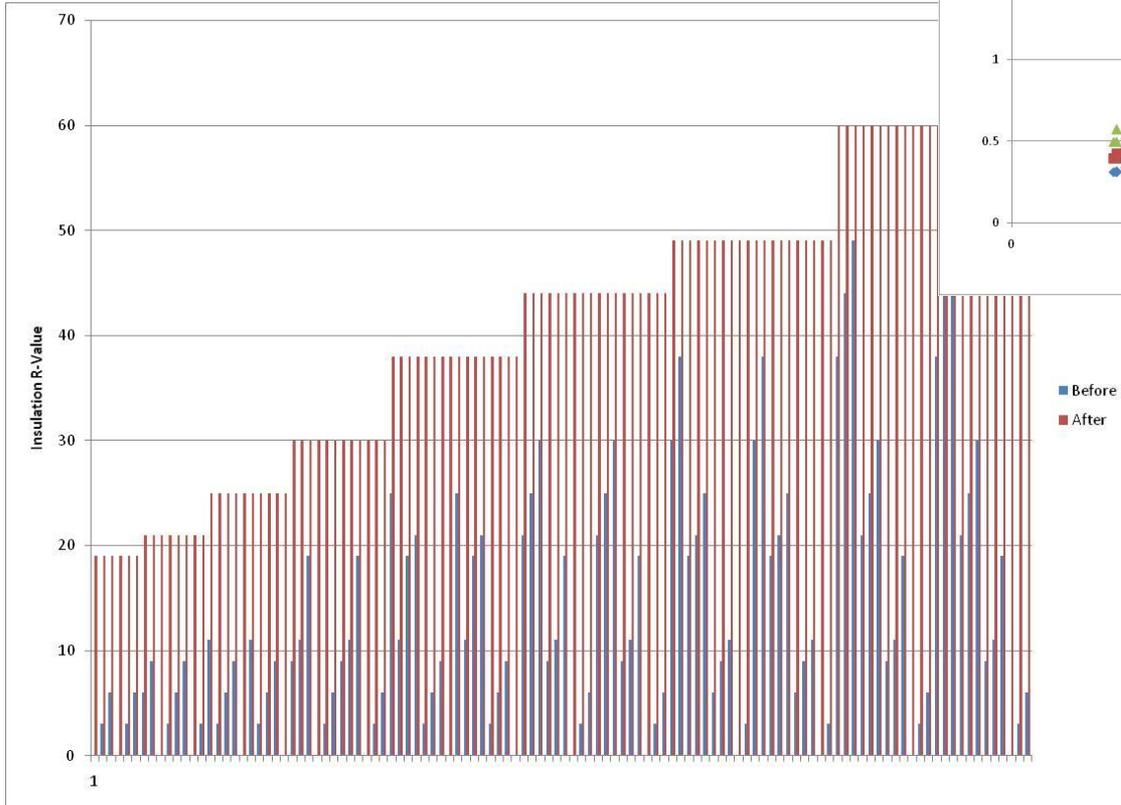
# Data Processing



- Costs are aggregated, analyzed statistically
  - No individual data sources are included in public database
- Measure costs developed using data from performance home contractors, DEER, RS Means, retailers etc.
- Costs are generally normalized
  - \$/sf treated surface area
  - \$/kBtuh heating/cooling capacity

# Testing and Quality Assurance

- Quality Assurance
  - Using data visualization



# Public Web Interface

- Review Data
- Download XML Feeds
- Review Documentation
- Submit Comments
- Submit Data

## National Residential Efficiency Measures Database



**About the Database**

**All Measures**

- Appliances
- Domestic Hot Water
- Enclosure
- HVAC
- Lighting
- Miscellaneous

**Application Developer Tools**

- Change Log
- Data Dictionary
- XML File Download
- Glossary
- Help
- Submit Comments
- Submit Data

The National Residential Efficiency Measures Database is a publicly available, centralized resource of residential building retrofit measures and costs for the U.S. building industry.

With support from the U.S. Department of Energy, NREL developed this tool to help users determine the most cost-effective retrofit measures for improving energy efficiency of existing homes. Learn more [about the database](#).

By accessing the database, the user agrees to the [terms and conditions of use](#).

[View Data Now](#)

**Supporting Resources**

The following resources provide more information about the data and allow you to download the data.

- [Data dictionary](#)
- [XML file download](#)
- [Glossary](#)
- Guide for Application Developers ([PDF 438 KB](#)) [Download Adobe Reader](#)
- Development Document ([PDF 859 KB](#))

Version: [v2.0.0](#)

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# XML Feeds

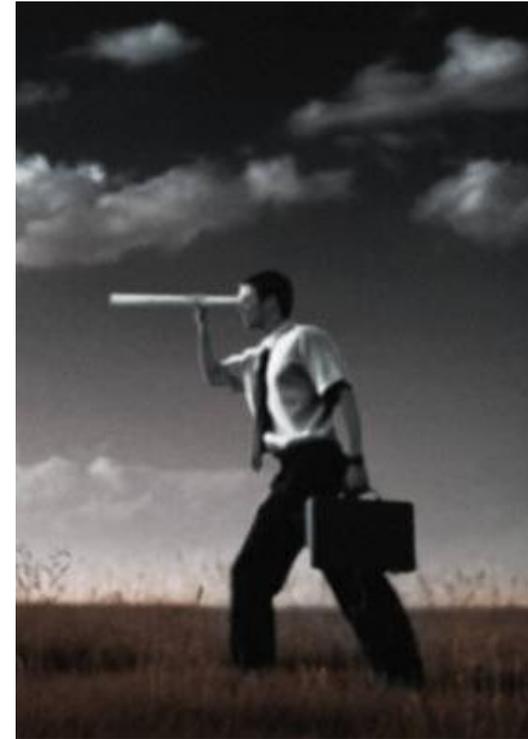
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- Available via web UI
- Two feeds
  - Measure-centric
    - Reflecting web UI content
  - Raw data
    - Reflecting underlying database schema
    - Loose collection of components and actions
    - Provides additional flexibility to define measures
- XML and XSD files provided
  - XML contains data
  - XSD documents schema

# Looking Ahead... Near-Term

## – v2.1

- Expected release Spring 2011
- Additional measures
  - Spray foam insulation
  - Radiant barrier
  - Storm windows
  - Etc.
- UI improvements
  - List measure-specific factors driving cost ranges
- Start expanding measure properties
  - e.g., A/C performance curves



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*It is always wise to look ahead, but difficult to look further than you can see.* **Winston Churchill**

# Looking Ahead... Longer-Term

## Overarching Goal: Consistent/robust measure definitions for industry-wide use

- Best practices documents
  - Measure-specific
  - Links from measures in database
- Expanded component performance data
  - Equipment performance curves
  - Material/assembly thermal characteristics
- Add operational data
  - Provide standardized modeling assumptions regarding occupant operation
- Update and expand cost data
  - More detail
    - Identify and cost drivers (e.g., crawlspace height)
    - Identify and cost regional differences
    - Labor/material split
- Field data repository
  - Retrofit project data
    - Characteristics
    - Use
    - Costs
  - Develop standardized format

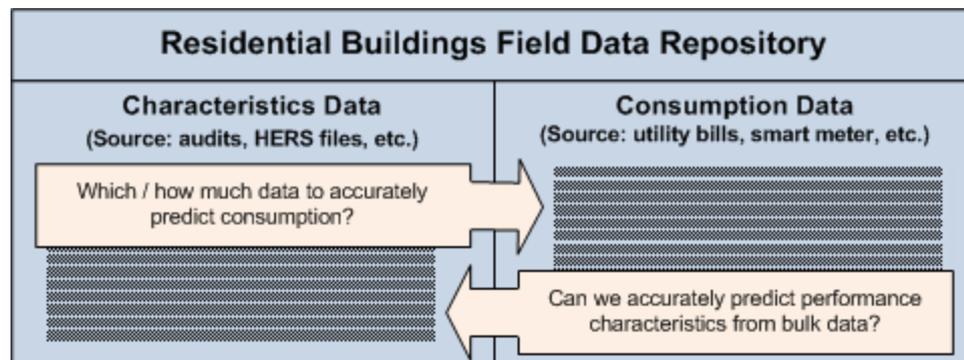


# Looking Ahead... Field Data

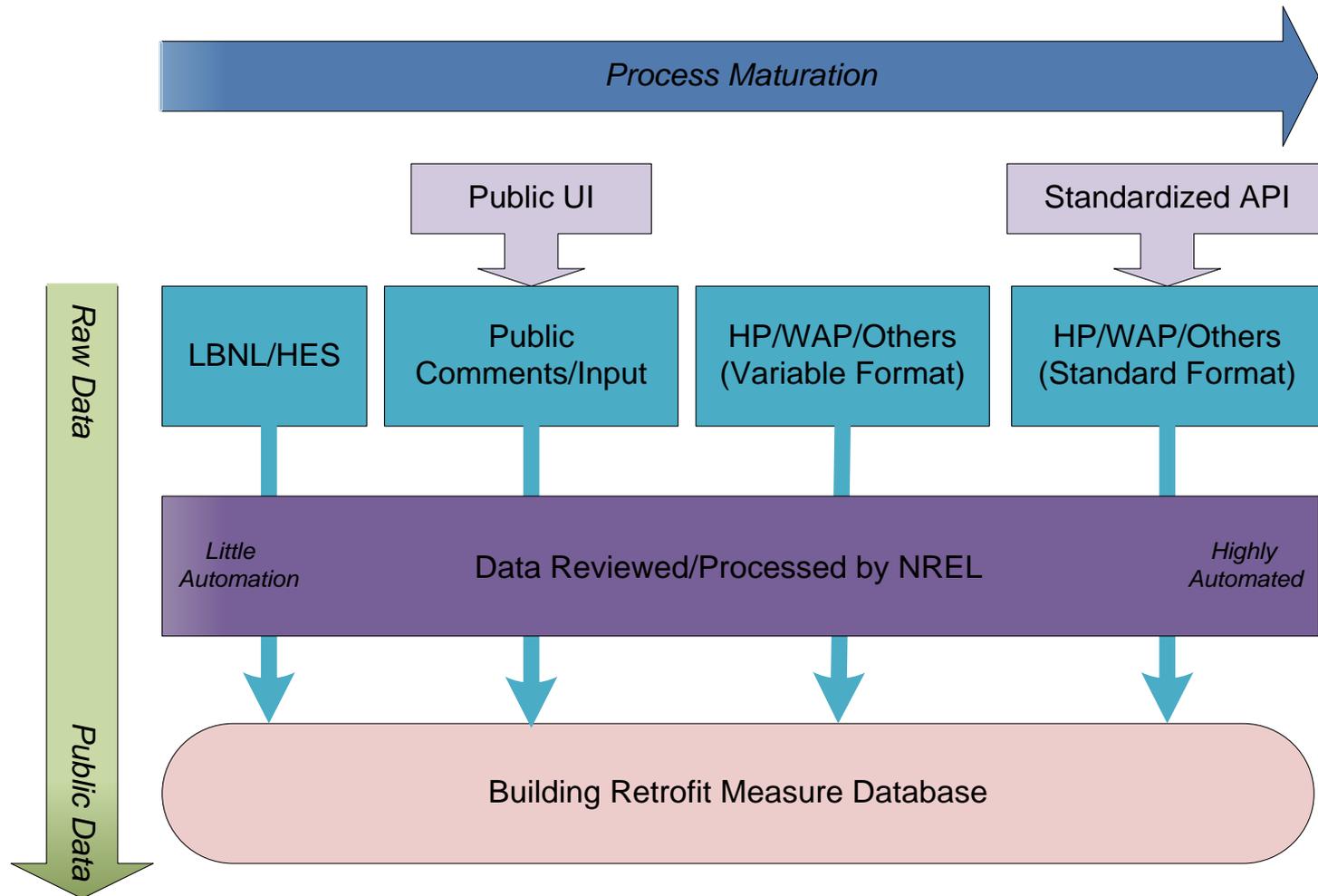
- Retrofit project data

- Characteristics
- Consumption
- Costs

- Datasets that include both energy-related performance characteristics (i.e., energy audit data) and associated energy use (i.e., utility bill data) are useful in researching home energy efficiency, helping to answer questions such as:
  - On average, how well do simulation tools predict energy use?
  - How much audit data are needed to accurately estimate energy savings from retrofit measures?
  - Can we successfully identify retrofit-candidate homes from bulk utility billing data?
- Cost data from actual projects can help improve estimates in published database



# Evolution of Data Intake Process



UI = User Interface, API = Application Programming Interface, HP = Home Performance, WAP = Weatherization Assistance Program

# Call for Data

- Datasets needed for research
  - Audit data coupled w/ utility bill data
    - Comprehensive audit data are preferable
    - Utility bill data for past year or two
  - Retrofit measure cost data
    - Actual project data preferable
- NREL will accept data in any format
- Sources can be treated confidentially
- NREL will remove any personally identifiable information from the data and follow laboratory procedures protecting these data
- To submit data
  - Contact Dave Roberts at NREL
  - Utilize upload page on website

## National Residential Efficiency Measures Database



[Retrofits Home](#)

**About the Database**

**All Measures**

- Appliances
- Domestic Hot Water
- Enclosure
- HVAC
- Lighting
- Miscellaneous

**Application Developer Tools**

- Change Log
- Data Dictionary
- XML File Download
- Glossary
- Help
- Submit Comments
- Submit Data

**Submit Data**

To improve the effectiveness of existing home energy retrofits, the National Renewable Energy Laboratory (NREL) is working to make accurate efficiency and cost measures information available to the public. In addition, NREL is developing a repository of field data for residential buildings. This page provides information about how you can participate in this research by providing data for both of these efforts.

**Measures Data**

The [National Residential Efficiency Measures Database](#) is a publicly-available, centralized resource of residential building retrofit measures and costs for the U.S. building industry. The database is routinely updated to include new measures, add measure properties, and update or expand measure cost data. NREL encourages industry participation and contribution to the database.

If you have measure performance property data or measure cost data to contribute to the project, you can register on this Web page and upload data for consideration in future versions of the database.

**Field Data**

Datasets that include both the characteristics of residential buildings and associated energy use are extremely useful in residential energy efficiency research. Using primarily statistical methods, these data can help answer key questions:

- How much audit data are needed to accurately estimate energy savings from retrofit measures?
- On average, how well do simulation tools predict energy use?
- Can we successfully identify retrofit-candidate homes from bulk utility billing data?

NREL is currently developing a database to host this information. The repository is being built with voluntary input from Home Energy Rating System providers, home performance contractors, utility program managers, and others. If you would like to contribute data to this project, you can register on this Web page and upload data.

**How to Submit Data**

You can submit data relating to specific retrofit measures (such as the cost to upgrade an air conditioner) or overall home characteristics and energy use. NREL researchers will be examining this data to provide input into the databases and inform future research activities. To submit data, you must first register using the form to the right.

**All data will be treated confidentially.** All data will be combined and processed with other data. No single-source data will be made publicly available.

**Personal Information**

If possible, remove personal information such as names and home addresses. Please include zip codes, if available, as that helps identify climate zones.

If it is not possible to remove personal information, please indicate that personal information is included in the data being uploaded in the Description of Data field. NREL will remove these data and follow laboratory procedures protecting personal information.

\* indicates required fields.

\*First name:

\*Last name:

\*Company:

\*E-mail address:

\*Phone number:

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## **Measures Database Website**

**<http://www.nrel.gov/ap/retrofits/index.cfm>**

## **Contact Info**

Dave Roberts

david.roberts@nrel.gov

303.384.7496



## ***Question and Answer Session***

Questions will be submitted electronically and answers will be provided verbally

To submit a question, select Q&A on the top bar, click in the top box, type your question, click Ask

Today's slides are available at [www.buildings.energy.gov/webinars.html](http://www.buildings.energy.gov/webinars.html).  
A video of the presentation will be posted in the next week.



## Thank you for attending the Webinar

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[webmasterbtp@nrel.gov](mailto:webmasterbtp@nrel.gov)

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