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## Recent Work

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BECA, BUILDINGS ENERGY-USE COMPILATION AND ANALYSIS

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Please enclose  
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## Selected Publications of the Buildings Energy Data Group

**Supplying Energy Through Greater Efficiency: The Potential for Conservation in California's Residential Sector**, A. Meier, J. Wright and A.H. Rosenfeld. Berkeley: University of California Press, 1983.

**Infiltration and Indoor Air Quality in a Sample of Passive Solar and Super Insulated Houses**, B.S. Wagner and A.H. Rosenfeld, presented at PASSIVE '82, ASISES Conference, Knoxville TN, August 29-September 3, 1982. June 1982; LBL-14111.

**Supply Curves of Conserved Energy**, A. Meier, Ph.D. Dissertation, May 1982, LBL-14686.

**Building Energy Compilation and Analysis (BECA) Part B: Existing North American Residential Buildings**, L. Wall, C.A. Goldman, A.H. Rosenfeld, and G.S. Dutt, July 1982, LBL-13385. Published in *Energy and Buildings, Vol. 5: 3* (June 1983). Summary to be published in the proceedings of the ACEEE 1982 Summer Study in Energy Efficient Buildings, Santa Cruz, CA, August 22-28, 1982.

**Monitored Low-Energy Houses in North America and Europe: A Compilation and Economic Analysis**, J.C. Ribot, and A.H. Rosenfeld, to be published in the proceedings of the ACEEE 1982 Summer Study in Energy Efficient Buildings, Santa Cruz, CA, August 22-28, 1982. August 1982. Revised March 1983, LBL-14788.

**Building Energy Use Compilation and Analysis (BECA) Part C: Conservation Progress in Retrofitted Commercial Buildings**, H. Ross, and S. Whalen, August 1982, LBL-14827. Published in *Energy and Buildings, Vol. 5: 3* (June 1983). Summary to be published in the proceedings of the ACEEE 1982 Summer Study in Energy Efficient Buildings, Santa Cruz, CA, August 22-28, 1982.

**A Summary Report of Building Energy Compilation and Analysis (BECA) Part V: Validation of Energy Analysis Computer Programs**, B.S. Wagner, and A.H. Rosenfeld, to be published in the proceedings of the ACEEE 1982 Summer Study in Energy Efficient Buildings, Santa Cruz, CA, August 22-28, 1982. Revised January 1983, LBL-14838.

**New Utility Strategies for Saving Energy in the Commercial Sector**, S. Maves and J.P. Harris, August 1982, LBL-14818. To be published in the ACEEE 1982 Summer Study in Energy Efficient Buildings, Santa Cruz, CA, August 22-28, 1982.

**Technical Issues for Building Energy Use Ratings**, A.H. Rosenfeld and B.S. Wagner, to be published in the proceedings of the ACEEE 1982 Summer Study in Energy Efficient Buildings, Santa Cruz, CA, August 22-28, 1982. Revised March 1983, LBL-14914.

**Purchasing Patterns of Energy-Efficient Refrigerators and Implied Consumer Discount Rates**, A. Meier and J. Whittier, August 1982, LBL-14924. To be published in *Energy*. Presented at the ACEEE 1982 Summer Study in Energy Efficient Buildings, Santa Cruz, CA, August 22-28, 1982.

**Results of the Walnut Creek House Doctor Project**, B.C. O'Regan, B.S. Wagner, and J.B. Dickinson, to be published in *Energy*. November 1982, LBL-15083.

**Energy Efficiency in Commercial Food Service Refrigeration: An Assessment of Technical Potential and Data Needs** B.C. O'Regan and S. Greenberg. July 1983, LBL-16426.

**A Residential Conservation Data Base for the Pacific Northwest**, A. Usibelli, B. Gardiner, W. Luhrsens, A. Meier, prepared for the Bonneville Power Administration, Portland, OR, Draft, May 1983.

**For Reference**

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# BECA

## Buildings Energy-Use Compilation and Analysis

### Program Summary and Data Request

- New Residences ■
- Residential Retrofits ■
- New Commercial Buildings ■
- Commercial Building Retrofits ■
- Appliances ■
- Water Heating ■
- Model Validation ■

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The Buildings Energy Data Group at Lawrence Berkeley Laboratory compiles data on the energy savings and cost-effectiveness of conservation and solar measures in buildings. The data compilations cover both residential and commercial buildings, mainly in the U.S., Canada, and Western Europe. There are separate data bases for retrofit projects in existing buildings, energy-efficient new construction, and building-related equipment.

We welcome assistance in identifying additional sources of data. We have found by experience that certain information is always needed in order to perform a consistent analysis; these requirements are outlined below. Additional detail is also welcomed, and often improves our ability to generalize results to other buildings.

### The Need for Measured Data

Despite tremendous investments in measures to improve energy efficiency in buildings, there have been relatively few attempts to document successes and failures. This shortage of performance and cost-effectiveness data has handicapped innovative designers and builders, energy demand forecasters, utility and government program managers, and individual building owners seeking to reduce their energy costs.

Predicted energy savings are seldom compared with actual results, so the same computer models, calculation methods, or engineering "rules of thumb" continue to be used with little feedback on their accuracy. Without such feedback, there is no way to identify, improve, or replace inadequate methods of analysis.

Even in cases where building performance is measured, data collection is often designed for a specialized, short-term purpose. Up until now, the absence of consistent definitions, measurement procedures, data formats, and an organization responsible for maintaining and updating the data base has made it difficult to exchange and compare data.

The Buildings Energy-Use Compilation and Analysis (BECA) project attempts to address each of these constraints.

### Approach

The BECA data bases are organized by sector. BECA-A deals with new, energy-efficient homes, BECA-B with retrofits of existing homes. BECA-CN and -CR cover new and retrofitted non-residential

buildings. More recently we have begun to compile data on appliance performance (BECA-D) and water heating systems (BECA-W). BECA-V is a specialized data base that includes comparisons of predicted building performance with measured data.

Each BECA compilation is updated and published on a regular basis. The most recent printed versions are available on request from LBL. The data bases are computerized, and in the future provisions may be made for on-line remote access.

Other future plans include a "loan pool" of equipment suitable for monitoring the performance of residences or small-scale commercial buildings. The equipment will be loaned for specified periods of time, on the condition that the resulting data are made available for the BECA compilations.

### Data requirements

Following is a summary of the minimum requirements for new data that are added to the BECA data bases. We are happy to provide, on request, more detailed guidelines and data worksheets. Please contact us to obtain the appropriate data sheet, rather than using this summary to prepare data submissions.

We also welcome data that are more detailed than the minimum specified below. Examples might include sub-metering of energy by end-use; continuously monitored temperatures, occupancy, and ventilation rates; and daily or weekly (rather than monthly) energy use records. More detail is especially helpful for larger or more complex buildings, those with large internal loads, and new construction—which lacks a pre-retrofit "baseline." Wood-heated residences normally require additional monitoring; we are now testing new techniques and developing user guidelines.

**Building performance** data must include the following information:

- general building description, including location, building type, conditioned square footage, number of floors, type of heating/cooling system, levels of insulation, and glazing areas
- age of building and date of retrofit(s)
- energy-saving features and their added costs for construction, operation, and maintenance
- indoor temperatures, number of occupants, and (for non-residential buildings) operating schedules

- monthly electricity and fuel usage, based on utility bills or on-site metering, for at least one year after completion and occupancy of a new building (for retrofit projects, at last one year of monthly data before and one year after retrofit)
- (where available) sub-metered energy consumption by end-use, peak electricity demand, and on-site weather data
- copies of utility rate schedules and/or total billed charges for each fuel type and billing period

**Appliance and water heating** data must include:

- manufacturer, model and serial number, and rated loads or capacities (from nameplate)
- general description of equipment and installation
- purchase price and (where relevant) installation cost
- submetered monthly energy consumption
- other indicators of load and performance appropriate for that equipment type (e.g., for water heating systems, supply and outlet temperatures, along with volume of hot water consumed)

### Contributing data: How do you benefit?

As we acquire more data, the conclusions that can be drawn from the BECA data bases become both more reliable and more relevant to a specific region or building type. Our data sources are diverse, including architects and engineers, builders, building owners, energy managers, research organizations, and utilities or government agencies that sponsor conservation programs. Each data contributor receives a report showing how his data have been encoded, and how they compare with other results. Where requested, sensitive information (such as building ownership or construction costs) are kept confidential.

While we do not have funds to help pay for primary data collection, the Buildings Energy Data Group occasionally provides in-kind assistance in planning for data collection and analysis. We can also help you to extract and interpret the appropriate subset of BECA data, in order to compare the performance of your building(s) with others that are similar.

Please see reverse side for selected publications.

### BECA DATA BASE INFORMATION

For the BECA data bases checked below, I would like to:

Contribute data or leads	Receive published reports
BECA-A.....New Residences.....( )	.....( )
BECA-B.....Residential Retrofits.....( )	.....( )
BECA-CN.....New Commercial Buildings.....( )	.....( )
BECA-CR.....Commercial Bldg Retrofits.....( )	.....( )
BECA-D.....Appliances.....( )	.....( )
BECA-V.....Model Validation.....( )	.....( )
BECA-W.....Water Heating.....( )	.....( )

Name: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_

Organization/Title: \_\_\_\_\_

Address: \_\_\_\_\_ (Zip) \_\_\_\_\_

detach here

We welcome all inquiries from prospective users or contributors to the BECA data bases. For further information on the BECA data bases, or to suggest new sources of data, please fill out and mail the attached card, or contact:

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