

HOME ENERGY RATING SYSTEMS

this improvement advice. A second rating evaluation, to be done after the improvements are completed, can be included as part of a package. This second rating quantifies the invisible energy improvements, which may help the homeowner to sell the house at some point in the future. The homeowner is responsible for finding a contractor to complete any desired improvements. In some cases, the energy evaluator may provide renovation services, but NRCan requires all agents to advise their customers that they should obtain quotes from other sources before they use a NRCan agent as a contractor.

NRCan uses the data from both evaluations to tabulate the CO₂ reductions that can be expected to result from all of the potential improvements identified by the evaluation, and from the improvements that the homeowners actually choose to have done. The results provide important data on the program's actual and potential contributions to Canada's climate change strategy.

Costs for the home evaluation vary,




Added insulation is a commonly recommended energy efficiency improvement.

depending on the region. In the Yukon, for example, where the program is supported by provincial funding, the rating is free. Everywhere else in Canada, prices currently range from \$50 to \$175 Canadian.

By supporting the development of a ratings industry in its early years, NRCan hopes to provide high quality information to homeowners that will lead to improvements in the energy efficiency of the Canadian resale housing stock. The rating label is voluntary, and NRCan has found that in the resale market, the label

itself is of limited value—basically, it shows that the house is more energy-efficient than other, similar homes in the area.

In the new housing market, where the rating is presently being pilot-tested, NRCan thinks it may have more influence. Through the program, energy efficiency upgrades could be developed as an option that consumers could purchase from builders. NRCan says that the more labels there are out there, the more people will look for them, and slowly awareness of the value of ratings will build.

NRCan anticipates that after the first three-year commitment, energy efficiency ratings will be established in the marketplace as a Canada-wide program. EnerGuide for Houses is the fourth in a line of EnerGuide products and labels that the government has developed to influence the consumer market. The other three programs identify the energy use of household appliances, HVAC equipment, and new vehicles, respectively. 

Deborah Rider Allen is a freelance writer based in Richmond, Virginia.



European Union Not Unified on Home Ratings

by Véronique Richalet and George Henderson

Legislation requiring home energy ratings has been in force in the European Union since 1993. But the corresponding directive defines ratings loosely enough that each member country has its own version of a home energy rating system.

Since 1993, all countries in the European Union (EU) have been required by the Specific Actions for Vigorous Energy Efficiency (SAVE) directive to "certify" the energy efficiency of their homes. As the directive does not specify either the certification procedure or exactly which energy uses

should be assessed, each member country has a different interpretation of the word "certification." Some countries, such as the United Kingdom and Denmark, have already institutionalized their ratings schemes, while others, such as France and Portugal, are still working on defining certification.

Generally, the key components of a certification process are: some form of a building components inspection, either from an audit or from the design drawings, to assess energy performance; a report describing performance and sometimes recommending improvements; and, in some countries, the

assignment of a label or rating expressing performance against a scale that allows a building's performance to be compared with those of other buildings. A building's energy performance can be expressed in such units of measurement as energy cost per year or per occupant or ratio of energy use by inhabited area, by heated volume, or by heating degree-days.

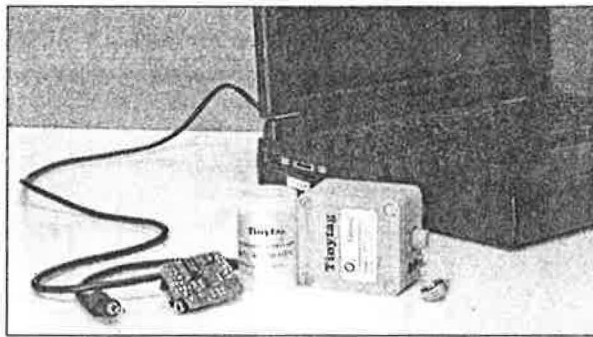
An absolute energy consumption figure is often not useful for a home's residents unless they know how it compares with buildings that perform well. But comparing the energy consumption of buildings and producing a scale of performance requires agreement on a normalization procedure that adjusts for factors such as occupancy patterns, floor area, and climate.

Another definition of certification is official acknowledgment of a building's good energy performance. Therefore, a building cannot receive such certification unless sufficient efficiency retrofits or design components have been implemented. This definition of certification resembles the Energy Star label, which the U.S. Environmental Protection Agency awards to roughly the top 25% of appliances and buildings. If the owner of a building requests such certification to verify improvements made to the building's energy performance, the certificate may increase the value of the building and could result in other financial benefits, such as low rate mortgages.

For example, the region of Upper Austria has a system for ratings in which an increased loan for building a new home depends upon the achievement of a high rating under its labeling system. This program has been estimated to result in residential energy savings of 100 million kWh annually between 1993 and 1998.

Aside from the diversity of interpretations by member states, there are also differences in how seriously each country has responded to the SAVE directive. Certification can be on a voluntary or a compulsory basis; it can be developed for information only, or it may have legal validity. At the moment, most

certification programs in Europe consider only the energy used for heating in the residential sector. However, many countries have hardly responded to the directive at all. The key factor to the actual use of energy ratings throughout Europe is the extent to which they are linked to government action, either through legislation requiring them or as a means of getting government money. Only mandatory certification programs can ensure systematic data collection on a very large scale and produce the CO₂ emission reduction benefits intended by the directive.



This autonomous data logger, which is used in home energy ratings in Denmark, simplifies the process of monitoring occupied houses. The laptop computer is used to periodically update the data.

small buildings within the last three years. The consultants learned the rating procedure in a required two-week training course. To facilitate data input and data management, a software program called EK-PRO was developed. Using this software, raters of small buildings need measure nothing except the dimensions of the house. From there on, calculations are based on the Danish standard for energy performance of buildings, with extensive use of databases to help key in building components and systems. (For larger buildings, energy use is monitored directly.) A two-page report produced by the software includes a ranking of the building's heating-energy performance on a scale from A to C; similar displays for electricity and water consumption; CO₂ emission level; and savings in heating, electricity, and water use that can be achieved by implementing conservation measures.

According to Jens Laustsen of the Danish Energy Agency, 26% of all home buyers have already carried out the recommendations identified during the labeling process. These improvements have led to energy cost savings of 2 billion Danish crowns, or nearly \$300 million.

Denmark Advances

Two countries are well advanced in implementing certification of building energy use: Denmark and the United Kingdom. In Denmark, a certification program has been in operation since 1981, when the government started offering grants to householders to make energy-saving improvements, contingent upon an energy inspection. The grants were phased out, but starting in 1985, sellers of houses were required to have an energy inspection and to make the results available to potential buyers. In the newest version of this mandatory program, which went into effect on January 1, 1997, there are two sets of regulations—one for buildings with an area of less than 1,500 square meters, and one for larger buildings. The small buildings still need to be assessed only in connection with a sale, but the large buildings now must be evaluated every three years.

About 700 energy consultants have produced 125,000 energy labels for

Surprisingly Progressive U.K.

The United Kingdom (U.K.) has a reputation for poorly heated homes, low indoor temperatures, and a general preference for sweaters over building insulation. Rapid growth in central heating has greatly improved heating standards over the last two decades, but low levels of insulation remain a problem. It is therefore surprising to find that the U.K. has one of the oldest home energy rating systems in the EU. Still, while home energy ratings have been popular in theory for many years, actual achievement has been mixed.

The U.K.'s approach to energy ratings started with government enthusiasm for something that was perceived as a market mechanism, which was seen as being preferable to a regulatory mechanism such as a building code. After a

HOME ENERGY RATING SYSTEMS

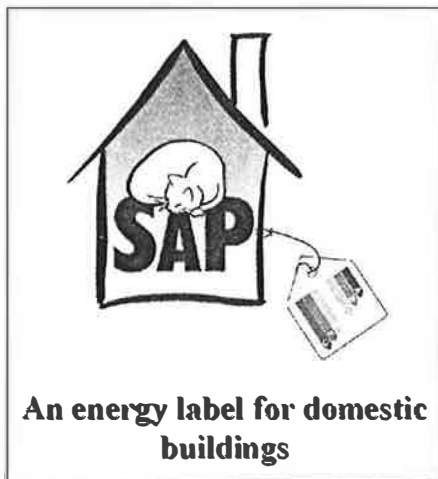
number of small-scale efforts, two separate organizations—Starpoint and NHER—started offering nationwide energy-rating services, both encouraged, but not funded by the government. Each organization aimed to tap a slightly different market. Starpoint apparently believed that organizations engaged in selling energy efficiency products would be able to absorb the cost of carrying out the rating and would offer it free to households. NHER concentrated on new houses, assuming that builders would adopt their label to advertise their houses' superior performance.

One problem that emerged early on was that the two systems gave different results. This was a source of confusion and probably an obstacle to public acceptance. The situation was aggravated by the strong adversarial relationship that developed between the two organizations. The government responded by developing its Standard Assessment Procedure (SAP), which was ultimately adopted by both organizations. Starpoint adopted SAP directly for its rating scale, and the NHER included it alongside its own scale. SAP is simply a published definition of how to calculate ratings, not a system for providing ratings administered by the government. With SAP, performance is based on annual energy cost for space and water heating per square meter of floor area, which is calculated from details of the house and its heating systems. It is expressed on an index scale of 1 (worst) to 100 (best).

With the procedural questions settled, the real problem came to the fore. In the U.K., there is no significant market for home energy ratings in the absence of government stimuli, such as legislation or funding. To address this problem, the government has helped to create a market in a number of ways. In public housing, which in the U.K. has traditionally been provided by local government, the use of ratings for assessing energy performance has been encouraged by linking it to the availability of additional funding. Housing associations, which are increasingly taking over the role of providing public housing from local government, have been offered similar incentives. The result is

that ratings are now routinely used in public housing and a large proportion of the stock of dwellings has been rated.

New housing in the U.K. is subject to building regulations, which act as mandatory building codes. These regulations include requirements for energy efficiency, which were previously set in terms of U-values for the building fabric, and requirements for the control and insulation of heating systems and hot water storage tanks. The regulations were revised in 1995 to include, among other changes, a requirement that a home energy rating (using SAP) be provided for all new houses. If the rating



A SAP home energy rating is required for all new houses built in the U.K.

falls below a certain threshold, higher insulation levels are required. It is also possible to demonstrate compliance with the regulations by achieving a high SAP rating, as an alternative, for example, to meeting the requirements for insulation.

For existing owner-occupied houses, no legislation requires that ratings be undertaken. However, the possibility of requiring ratings when houses are sold, or when home loans are made, has been the subject of much discussion, and the government has indicated its interest in some such requirement. The discussions have focused on the cost of carrying out the rating and on who would have to bear that cost. The cost is likely to be lowest if the rating can be carried out in conjunction with a broader assessment of the property, such as that which occurs when the property is sold.

In summary, the U.K. story is one of partial success. Several hundred thousand ratings are done each year, although few formal certificates are issued. However, the biggest potential application—existing owner-occupied housing—remains largely untapped, awaiting legislation that will trigger it. The key lesson may be that there is little or no self-sustaining market for home energy ratings in the U.K.—it only flies when it has the rocket booster of legislation behind it.

France Defines

In France, the idea of a performance label is quite old, but it has not been widely applied. Since 1986, QUALITEL, a nonprofit association, has been allowed to issue a label, known as "Label Qualitel," to new buildings that meet certain standards. These standards are in the areas of acoustics, energy costs for heating and hot water, maintenance costs, electrical installation, plumbing, and summer thermal comfort. A rating table expresses the level of quality on a scale from 1 (poor) to 5 (excellent). Within this program, a specific label for energy cost was created—label Qualitel HPE—and it has been delivered to 140,000 dwellings between 1991 and 1995.

The French energy agency (ADEME) also prepared a simple audit method, accessible to home residents through Minitel—a French precursor to the Internet—to calculate the energy performance of single-family houses in kWh or Francs per year. Since its creation 10 years ago, about 400 people per month have used this service. ADEME plans to offer a similar service through the Internet very soon.

There seem to be two main barriers to the wider use of certifications in France: The first one is building auditors' fears of being sued over the validity of their ratings. The second is the same gas-electricity struggle that has hobbled HERS in the United States. Namely, the French energy utilities are lobbying the government to get their definition of energy adopted. Electricite de France would like to see energy use in kWh or overall cost (including investment, maintenance,



GEORGE HENDERSON

English Victorian brick-built row houses are hard to insulate effectively.


and monthly fixed charges) while Gaz de France would prefer to only include the energy cost.

France's initial response to the SAVE directive were studies dedicated to how to certify energy use in new housing, but as of 1996, French law has established a mandatory program to determine annual energy costs in all buildings, except industrial and agricultural ones. The application of this law awaits the approval of an acceptable calculation method.

One experimental approach that one of us (Richalet) is working on couples a calculation of the building's heat loss with some direct measurements of occupancy patterns and systems' performances. The two calculations are then compared: the "Standard Energy Use" and the "Actual Energy Use" for space heating, domestic hot water, and appliances, together with a list of energy conservation opportunities. This approach recognizes the independent roles played by the building structure and by the occupants and appliances inside the building.

Convincing European Consumers

Across the EU, almost every member country has at a minimum come up with a technical definition of certification. However, exactly how a building's performance is expressed and reported varies widely from one country to another.

The larger problem now is to make the certification procedure attractive to the consumer. Only with active government intervention will home energy ratings achieve the public success needed to attain the level of energy and CO₂ emissions savings intended by the writers of the SAVE directive. 

Véronique Richalet is associate researcher at the Laboratoire des Sciences de l'Habitat of the Ecole Nationale des Travaux Publics de l'Etat in Lyon, France. George Henderson is a St Albans, U.K.-based independent energy consultant, specializing in home energy calculations and ratings.

INFILTEC

TOOLS FOR HOUSE DOCTORS

Check out our Web catalog at <http://www.infiltec.com>

Blower Doors

- Calibration certificate is standard
- Digital or mechanical gauges
- Aluminum or wood door frames

Duct Leakage Testers

- Digital or mechanical gauges
- Includes calibration tester for field check

Micromanometers

- Single or dual sensors models
- Auto zero, Multiline display
- Pushbutton selection of units, averaging, etc.

Radon Control Supplies

- Fans, gauges, kits, diagnostic tools, smoke puffer

For more information, contact:

INFILTEC

P.O. Box 8007, Falls Church, VA 22041
Phone (703) 820-7696, Fax (703) 671-9350
Email Infiltec@infiltec.com

(Circle No. 24 on Reader Request Card)

The *security* of
instant
backup power.



Shield yourself from power interruptions with a Trace electric backup system. Electronics, heating, lighting, water pumping, refrigeration and all the comforts of home are maintained silently and automatically. Instant backup power for critical home and office equipment. Trace electric backup – comfort and security no home should be without.

POWERFUL SOLUTIONS
Trace
ENGINEERING®

1-800-658-7223

www.traceengineering.com

All Trace products are V2K compliant

(Circle No. 208 on Reader Request Card)