



Hurdling Financial Barriers to Low Energy Buildings: Experiences from the USA and Europe on Financial Incentives and Monetizing Building Energy Savings in Private Investment Decisions

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ABSTRACT

There is a growing awareness by policy makers, the news media and consumers on both sides of the Atlantic that private investment decisions concerning the energy performance of the building stock do not reflect the cradle to grave value of potential building energy saving investments. Not only is a large part of the building stock leased to tenants, thereby taking away the owners direct interest in investments to lower energy bills, but the vast majority of owner-occupied buildings undergo multiple changes in ownership during their lifetimes and thus each individual owner has a limited financial interest in undertaking investments to minimize the buildings long-term energy costs.

If low or zero energy buildings are to be achieved beyond a niche market for “early adopters” and the wealthy, it is necessary to adopt market forces that will enhance the demand for such buildings. Financing practices that monetize long-term energy costs in near-term investment decisions can make a major contribution to this effort. This paper reports on a number of such initiatives that have been implemented in the European Union and the United States. It also examines complementary policies in both regions that are creating a more favorable environment for such investments. The paper will also explore new options to financing and identify areas where the European Union and the United States can cooperate.

Introduction

An important element for achieving the goal of low or zero energy buildings is to provide the financing to cover any incremental costs to achieve such performance. Building owners will be less interested in purchasing such buildings if the added costs must come directly out of their pocket books. While governmental rebates and tax incentives can help in the near term, a long-term privately financed mechanism must also be found. Governmental programs are subject to the whims of politics and agency budgets. The monetizing of energy savings will help lead to this private long-term financing. This can take place in several forms – such as including the added costs for improving the energy efficiency in a building in the mortgage financing or having the building’s energy savings credited in a certificate trading scheme.

Even with successful monetization government will need to play a central role to both, accelerate private internalization of life-cycle costs and continued internalization of other externalities (e.g., global environmental and social ones). With the growing concerns over spiraling energy costs and global climate change, the United States and the European Union have enacted initiatives to reduce energy consumption in buildings. In the United States this concern was manifested by the enactment of the Energy Policy Act of 2005. In the European Union the Directive on the Energy Performance of Buildings was enacted in 2002. Both pieces of

legislation can lay a foundation for the development of policies, standards and infrastructure for the verification of building energy savings that is important for the monetizing of building energy savings that will lead to private investment decisions.

Another significant action was the ratification of the Kyoto Accord on Carbon Reduction. A key provision of the accord is the development of a carbon savings trading mechanism that is modeled after the U.S. Clean Air Act. The climate agreement set up a trading system, to be administered by the United Nations, in which the reductions in carbon emissions can be bought and sold like stocks. This has spurred interest from entrepreneurs who are becoming interested in investing money into clean energy projects in exchange for anti-pollution credits. While the United States is not a party of the Kyoto Accord there are opportunities presented to the U.S. with the formulation of an international protocol on carbon emissions trading. Already there is a fledgling market on the monetizing of carbon emissions reduction. The value of the emissions reductions is expected to grow with the adoption of an international protocol. The *Los Angeles Times* predicted that trading in carbon emission credits could become a \$40 billion market in the U.S. by the end of the decade. (Los Angeles Times, February 12, 2006).

Another trend towards the monetizing of energy performance is the emergence of White Certificates in the European Union and Renewable Portfolio Standards (RPS) in the U.S. Under both schemes targets are set for energy companies in reducing energy consumption or putting renewable energy in the grid. These certifications can be sold or traded.

Why Monetizing Energy and Pollution Savings Is Important to the Path to Zero Energy Buildings

Addressing the First-Cost Barrier

One of the largest barriers that net zero energy buildings will face in the market place is the resistance of consumers to make the necessary up-front investments. These investments will not be insignificant. Not only is a large part of the building stock leased to tenants, thereby taking away the owner's direct interest in investing in energy bill reductions, but the vast majority of owner-occupied buildings undergo multiple changes in ownership during their lifetimes and thus each individual owner has a limited financial interest in undertaking investments to minimize the building's long-term energy costs. Clearly, access to preferred long-term financing is needed if the market for zero-energy buildings is to ever be mainstreamed and if private cost-optimization decisions are to be brought in line with societal cost optimizations.

Traditional financing and governmental incentive programs are not enough to meet the scale required. Clearly the private sector must be tapped. Monetizing the energy and pollution savings from low and zero energy buildings offers the greatest promise to achieve this. Through mechanisms like carbon and white certificate trading, tradable renewable energy credits and energy efficient mortgages, affordable financing can be presented to the consumer to make the needed improvements. The barrier to the up-front cost can be reduced if the consumer can access long-term, no-down-payment, affordable interest financing or if a third party finances the upgrades in order to have title to the monetized energy and pollution savings to trade in the open market.

What Is Necessary to Create a Tipping Point?

In order to create private sector investor confidence there is a need for an international set of standards that clearly define the technical aspects of calculating, labeling and certifying a building's energy performance. A critical aspect is the qualifications and training of the individuals that will verify the performance through inspections and testing. One key need is to develop a uniform definition of a reference building to which a building's energy performance can be compared. Any robust investment market is going to ask the question "energy savings compared to what?" If the building performance industry cannot answer that question, there is little chance that an international market will develop for building energy and pollution savings.

To develop this confidence in the market place there needs to be an international consensus on a number of technical and rater certification issues.

Technical issues include:

- A set of common definitions and rules for the configuration of reference buildings
- Standards for the computation of energy and pollution savings
- Standards for the verification of software and calculation methods
- Protocols for the identification of recommended energy improvements and for the calculation of cost-effectiveness

The training and certification of persons certifying the building's performance includes:

- Qualification of raters
- Development of code of standards for the field and performance testing verification
- Definition of quality assurance requirements
- Definition of insurance requirements

The good news is that important first steps are being made.

In the United States the technical standards for rating of homes including a well defined reference home and standards for the certification of the persons that verify a home's energy performance have been adopted by RESNET and are widely accepted. The American secondary mortgage market has accepted these standards for the capitalization of energy savings in the mortgage loan and the Internal Revenue Service has adopted the standards for verification of a new home's energy performance for the federal tax credit for energy efficient homes.

In the European Union 25 nations are striving for a uniform set of standards to implement the EU Directive on Building Performance that will result in millions of buildings being rated and ten of thousands of energy raters certified. The development of a European white certificates scheme will also hasten the development of an international market. Clearly, the groundwork is being laid for an infrastructure for verification of energy and pollution savings in buildings.

Governmental Policy Initiatives

U.S. Energy Policy Act of 2005

In August, 2005 President George W. Bush signed the Energy Policy Act of 2005. Tucked into the thousands of pages of text were provisions for tax incentives for building energy efficiency. The national energy legislation provided tax credits of \$2,000 for homebuilders to construct homes whose energy performance is verified to use 50% less heating and cooling than required by the 2004 Supplement to the International Energy Conservation Code. The legislation also provides for tax deductions of up to \$1.80 per square foot for improving the energy performance of commercial building over the provisions of ASHRAE Standard 90.1-2001.

The significance of the two tax incentives is that they are based upon the verification by a qualified third party of the predicted building's performance based upon an analysis of the building's design. This could lead to the recognition of standards and infrastructure that can be used by private investors for verification of building energy savings for the monetizing of the verification of the predicted energy and pollution savings.

The new homes energy efficient tax credit is an example of how this can happen. The legislation creates the reference for calculating the homes energy performance as the performance section of the International Energy Conservation Code. The Internal Revenue Service's (IRS) rules for the tax credit require that software programs used to calculate the home's energy performance above the reference must pass a suite of software verification tests adopted by the Residential Energy Services Network (RESNET). The IRS also requires that individuals who certify the home's energy efficient features must be certified through RESNET's procedures (Internal Revenue Service IR-2006-32). RESNET's home energy rating reference home is based upon the same reference home as called for in the tax credit. This recognition by a federal agency could lead to investors of energy savings recognizing the methods of predicting and the verification of the proper installation of the improvements for the purpose of sale or trading in pollution credits. The demand by homebuilders for access to the tax credit can lead to expansion of the infrastructure of home energy raters across the nation. It can be expected the commercial tax incentives can present the same opportunity. While Congress only authorized the tax incentives for two years already bills have been introduced to extend the credits until 2011. The most notable is a bill introduced in the Senate by the Chairman of the Senate Finance Committee Charles Grassley (R-IA) and ranking minority members Max Baucus (D-MT).

Congress unfortunately did not follow the same path for tax credits for improving the energy efficiency of existing homes. Instead it relied on a cost-based credit that was unsuccessfully tried in federal tax credits in the 1970's and 1980's. Hope exists that Congress will right this issue. Already a bill has been introduced by Senator Norman Coleman (R-MN) that would create a tax credit for existing homes whose credit would be calculated based on the predicted therms of natural gas or kilowatt hours of electricity energy saved, verified by a certified home energy rater.

European Union Directive on the Energy Performance of Buildings

In 2002 the European Union's Parliament passed the Directive on the Energy Performance of Buildings (2002/9/EC). The legislation is breathtaking in its scope but many

issues remain to be resolved regarding its implementation. It requires that member nations must enact and implement laws that would:

- Establish common methodologies for calculating building energy performance based on whole-building energy performance
- Mandate energy rating of all buildings at the time of construction, sale or change of occupancy
- Adopt new building thermal regulations for new buildings and major renovations based upon whole-building energy performance
- Require regular inspections of boilers, heating and air conditioning systems

The reasons the European Union adopted this legislation are:

- To assist member states in meeting the Kyoto Accord on carbon reduction
- Because there is a European consensus on the priority of energy efficiency (the EU Directive stated, “Energy saving is without a doubt the quickest, most effective, and most cost-effective manner for reducing greenhouse gas emissions.”)
- Buildings represent 40% of EU’s energy consumption and carbon production.

The EU Directive on the Energy Performance of Buildings (EPBD) goals are very ambitious:

- Reduce European building energy consumption by 10% by 2010 and 20% by 2020
- Complete energy ratings of 2 million existing buildings by 2010
- Cut carbon emissions by 45 million metric tons by 2010

Thus far, the EPBD is still not fully implemented in the majority of EU Member States but much progress has been made. Germany, UK, France and Denmark among others, have broadened the scope of their building codes to: apply to all building types, include major refurbishments and address all energy flow. They also have strengthened their minimum energy performance requirements, usually by about 25%. Many new EU Member States previously had no building energy performance requirements and so implementation of the Directive represents a major transition for these countries. The requirement for mandatory building energy certification is a new element for all but a handful of EU states and opens the door for many new supporting activities including those related to preferential finance for efficient buildings or refurbishments.

While the EPBD is clear in its requirements and goals, it leaves member nations a great amount of flexibility in the design and implementation of the requirements. As a primary requirement of the Directive is the adoption of building energy performance codes and certification based on a whole-building calculation method there has been a need for coordinated development of model building energy performance standards. There are also many areas where sharing experience on implementation of the Directive was deemed to be beneficial. To address these needs a set of common European building energy performance standards have been developed and the Concerted Action Group formed.

Through this body, which includes government designated participants plus the International Energy Agency in an observer capacity 24 nations are voluntarily working together to achieve the following goals:

- Develop a European philosophy concerning energy efficiency in buildings
- Create a common methodology for calculating building energy performance
- Develop common practices and strategies for implementing the Directive
- Work toward coherence of the new certification schemes in the different countries

The group's main focus is on developing coherence in the development of certification labeling of the energy performance of buildings and inspection of boilers and air conditioners in the EU. The group is also working to achieve consistency in the training and certification of inspectors. Because many EU member states did not have building energy performance requirements based on a whole building energy performance assessment approach prior to this Directive, there has been a major effort to develop model European standards to allow this to be assessed. This has involved a collaboration between the European Commission, the European standards agency, CEN, and the Member States. Some 31 standards, which collectively form a combined standard, have been developed and are at various stages of approval (EPBD BP 2006). Member States are not obliged to use these standards to comply with the Directive.

Clearly the scope and scale of the EPBD can lead to the recognition of standards and infrastructure by private investors. Currently the EU is considering marrying an operational rating, the certification of the actual performance of the building with the asset rating which compares the energy usage of a building on the basis of reference conditions is in. This confidence in the verification of building energy savings can lead to the monetizing of the documented energy and pollution savings. There will be millions of buildings rated and tens of thousands of raters trained and certified to inspect and test a building's energy performance.

Examples of National Responses

- ***New building regulations and mandatory improvements in Denmark.*** Denmark used the implementation of the EPBD in 2006 to strengthen its energy performance requirements for all new buildings by 25-30%. At the same time two low-energy building ratings, class 1 and 2, were introduced that apply to buildings consuming less than 50% and 75% of the energy respectively requirement for new buildings. The low-energy class 2 threshold has been set as the target for a new revision of the general requirements scheduled to take effect in five years time. Furthermore all existing public buildings must be certified (energy labeled) every 5 years and all savings identified as having a payback time of less than 5 years must be implemented before the next certification.
- ***Mandatory upgrade of old boilers in Germany.*** In Germany there is a new requirement to exchange old oil-fired and gas fired boilers with highly efficient new boilers when they were installed before 1978. Those required to comply with this can apply for a subsidised loan through the KfW scheme described in the section on Governmental Policy Initiatives.
- ***Mandatory installation of solar collectors in Portugal.*** In January 2006 the Portuguese Parliament approved legislation for implementation of the new European EPBD directive. This legislation includes mandatory use of solar heaters in all buildings. The

Portuguese implementation is further expected to set a requirement for mandatory improvements of existing buildings of greater than 1.000 m² if the energy certification shows they have a poor energy performance. As with the case for boilers in Germany this is a mandatory prescriptive provision, but in this case additional financial support has not yet been developed.

European White Certificates, Economic Incentives and Tax Credits

White certificates are a market-based measure that is being employed by a number of European nations to set goals for reducing energy demand to ensure that they are obtained through the most cost-effective solutions available. White Certificates are a system where producers, suppliers or distributors of electricity, gas and oil are required to undertake energy efficiency measures for the final user that are based on a pre-defined percentage of their annual energy delivery – or else to purchase certificates from other sources. Independent certifying bodies will then verify the energy savings and issue the certificates. White Certificates can be sold or traded. This creates a new trading market for energy efficiency.

The Council of the European Union set a target of an annual energy savings of one percent per year in its directive on energy end-use efficiency and energy services. The mandatory target of annual energy reductions that must be fulfilled within a scheme for White Certificates ensures the results, while the certificate trading gives the flexibility for cost-efficient compliance.

The EuroWhiteCert project supported by the EU is tasked with supporting the development of tradable white certificate systems covering energy savings and energy efficiency. This effort includes developing a uniform measurement and verification methodology and certification of projects.

Italy and the United Kingdom are already implementing white certificate programs and France, the Netherlands and Denmark are preparing to adopt them. Once a white certificate develops for the entire European Community it is expected to push the development of an international market for the trading of energy savings. The UK example is described below.

The UK Energy Efficiency Commitment scheme. Following the formation of the Energy Saving Trust (EST) in 1994 the UK has operated a number of programs for energy efficiency in buildings which have been sponsored by either the regional electricity companies or the generating utilities. The scheme operates through an energy efficiency obligation placed upon generators and energy suppliers. Under the Electricity and Gas (Energy Efficiency Obligations) Order 2001, the costs will ultimately be paid for by the end-users. Utilities are set obligatory energy savings targets for the residential sector and are given four compliance pathways to reach their targets. These address: installation of insulation, CFLs, condensing boilers and efficient appliances. In the EEC1 about 50% of the measures were required to be targeted at 'Fuel Poor' households. All energy suppliers with customer bases of 50,000 or more were obliged to meet specific targets in accordance with their customer base. The total savings required under EEC1 equated to 64 TWh of fuel-weighted benefits, but in fact 86.8 TWh were achieved despite the insolvency of one of the suppliers. The overall savings target was set in terms of fuel-standardized, lifetime discounted energy savings. All the savings that suppliers were accredited with were derived on an ex-ante basis rather than an ex-post basis i.e. that the savings are modeled and estimated savings, based on the number of installed measures, rather than actually measured. Despite this the regulator has been conducting in situ metering studies to confirm that

the estimated savings are actualized and using these to make any necessary adjustments to the certified savings. Suppliers had the option of trading their obligation or energy savings with other suppliers. It was expected that this commitment would cost the energy suppliers somewhere in the region of GB£165 million/year, which equates to a cost of GBP0.008 per kWh saved i.e. approximately a tenth of the average residential tariff. Final cost figures are not in the public domain but it is reported that the costs are appreciably lower than the cost of both marginal and existing energy supply, which is part of the justification for the schemes extension. Following the success of EEC1 the EEC2 scheme is now operating from 2005-08 with a target of roughly twice the savings of EEC1 at 130 TWh.

EEC 1 has already produced some major market transformation effects. The number of CFLs per household has risen from 0.7 to over 2 and there is a target to take it to 4 by 2008. Some 39.5 million high quality government certified CFLs were supplied in the three years from 2002-2004 to the residential market, which is three times the baseline scenario of 12.5 million lamps. In addition the UK Energy Saving Trust and the UK Lighting Association have begun to operate a Domestic Energy Efficient Luminaire Scheme to address the traditional low efficacy of domestic luminaires (i.e. table lamps, standing lamps, or other portable luminaires aimed at the domestic market). The scheme gives a GB£5.0 subsidy supplied through EEC2 to luminaire manufacturers that produce and sell CFL dedicated luminaires (i.e. ones which can only take pin-based CFLs). The luminaires have to use high efficiency 50khz ballasts with a minimum life of 25,000 hours and the CFLs are certified through the EST certification scheme. By using pin-based CFLs there can be no switching back to incandescent light sources once the first CFL tube fails. The first year target is to sell a million luminaires of which 400 thousand were sold in the first seven months (Verdun 2005). It is hoped that this will encourage the development of the residential pin-based CFL market. In addition to CFLs the subsidies provided through the EEC has helped to transform the UK market for domestic boilers to the point where high-efficiency gas condensing units now occupy the dominant share.

These incentive driven changes have in turn encouraged significant tightening of the UK domestic building energy code requirements. The UK 2006 L1 regulations require new homes and major retrofits of existing homes to be fitted with at least one fixed luminaire that may only take an efficient lamp (of $> 40 \text{ lm/W}$ efficacy) per 25m^2 of floor space, as well as at least one such fixture per four fixed fittings. They also require all new boilers to be of an efficiency equivalent to a gas condensing boiler unless it is physically impossible to use a gas condensing boiler type. A similar situation has developed in Denmark as described below.

The above examples illustrate significant market transformations being made through a combination of utility obligations linked to a monetized valuation of energy savings in a sector that is particularly subject to market barriers and imperfections.

European tax credits and incentives for efficient buildings. A number of EU countries have implemented tax credits and financial incentives for more efficient new buildings and refurbishments. The UK gives landlords tax credits for energy efficient refurbishments as assessed by their Standard Assessment Performance (SAPs) building energy rating system. France has recently introduced ambitious tax credits as outlined below:

French Tax Credit Initiative

The French “Plan Climat 2004” set a national objective of reducing CO2 emissions by a factor of four by the year 2050. The plan identifies energy efficiency as a major means of fulfilling these objectives. The Government has introduced financial incentives to promote energy efficient projects. The ‘Credit d’Impot’ (or tax credit) has emerged as the major tool for this action plan.

The French tax credit is based on the assumption that *everyone* should be given incentives to invest in energy efficiency. As such, even individuals not paying any tax, will be rewarded for implementing energy efficient refurbishment measures (i.e. will receive money in compensation).

The tax credits were formally adopted in law through the 2005 finance law. Overall, the measure involves the following credits:

- For efficient boilers, insulation and energy meters the tax credit is 25% of the investment cost;
- For efficient heat pumps or renewable energy production, there is tax relief at 40% of the amount invested (i.e. increased from a former value of 15%)

In order to benefit from the credit, the new (or renovated) installation needs to meet pre-determined energy efficiency benchmarks, defined by the government and available to customers when applying for the tax credit. Conformity with this requirement is assessed via certification based on a whole-building energy performance methodology. There is a limit to the total amount that can be considered for tax credit set at 8 000€ per person per fiscal year. Although the implementation of this measure is too recent for an evaluation of impacts, ADEME has been overwhelmed by the number of phone calls, and demand for applications received since the initiation of its marketing campaign “Faisons vite, ca chauffe!” (Act fast, its getting warm!).

Incentives for Efficient Gas Boilers And Efficient Windows in Denmark.

In Denmark, subsidies have been used to help new products penetrate the market and break through the first cost barrier. The intention is to overcome the financial barrier by removing the additional costs for energy efficient products over a certain period. In 1999 a subsidy scheme for condensing boilers was launched to improve the market share of gas-fired condensing boilers. The aim was to raise their market share from approximately 15 % to more than 33 %. In March 2001 the scheme was closed because of budgetary constraints but by that time the market share had reached more than 60 %. Happily this share has persisted since the subsidies were terminated because installers are now familiar with condensing boiler technology and are continuing to recommend them to home owners.

In February 2004 the Danish Energy Authority made an agreement with window producers and installers to phase out traditional double glazing over a 3 year period and to only use highly efficient windows with low emissivity, double glazing or better. This has changed the market for energy efficient windows and glass components into a market where energy efficient windows are standard and where windows are labelled on a scale from A to G.

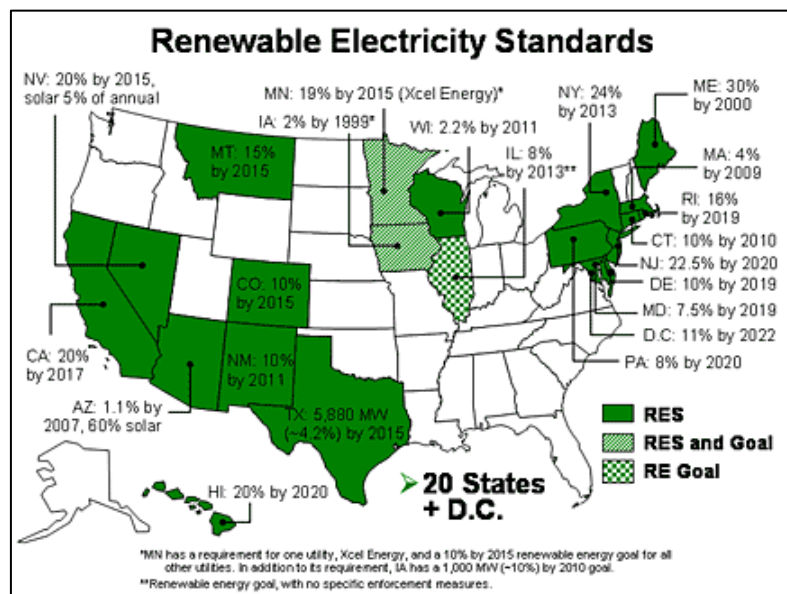
American Renewable Portfolio Standards

Renewable Portfolio Standards (RPS) are state legislatively mandated electricity generation requirements, imposed on electric utilities by state legislatures, to provide either a specific amount of electric capacity or a percentage of total capacity from renewable sources such as wind, solar, biomass and geothermal energy. These state laws create a marketplace for Tradable Renewable Energy Credits (TRECs) by allowing electric utilities to purchase their requirements from external sources. Thus, utilities may either produce the renewable electricity themselves or purchase renewable electricity “certificates” from others. In the end, the utility is required to have in its possession renewable electricity “certificates” sufficient to meet its legislatively mandated goal. Only “certified” renewable electricity counts. The various state laws specify the renewable electricity certification requirements and the marketplace determines the value of the certificates.

While the TRECs are focused on renewable energy sources they serve as an American example on how monetization of alternative energy and efficiency savings can take place.

A February 2006 survey from the Union of Concerned Scientists (http://www.ucsusa.org/clean_energy/clean_energy_policies/RES-climate-strategy.html) claims more than 20 U.S. states plus the District of Columbia have enacted some form of RPS or Renewable Electricity goals. There are many specific forms that these Standards take, some with MW capacity requirements and some with percentage of total capacity requirements. Virtually all of the requirements graduate upward over time toward the goal. Thus, a lower requirement is in place in early years and the ultimate requirement becomes effective on the legislated “by” date. It is interesting to note that Iowa’s goal of 2% by 1999 was easily met.

A report by the U.S. Energy Information Administration (EIA, 2003) analyzed the impact of a



proposed national renewable portfolio standard (RPS) with national requirements of 10% renewable electricity by 2020. The authors found that such a standard would reduce natural gas prices yet have practically no impact on electricity prices. The analysis further concluded that the proposed standards would save consumers as much as \$13 billion.

The Union of Concerned Scientists (UCS) conducted a similar analysis that considered both a 10% and a 20% standard by 2020 with similar results for the 10% standard but much improved economic development, environment benefits and diversity results for the 20% standard. The report found that increasing renewable electricity capacity from the 2002 level of 2.5% to 20% by 2020 would reduce natural gas prices by 6% while saving consumers \$27 billion (UCS, 2002). It is quite important to note that these analyses were conducted and projections

made at least two years prior to the recent steep rises in oil and natural gas prices. In 2005 there was an attempt in the U.S. Senate to incorporate a national RPS in the national energy policy legislation that failed in the last moment.

TRECs provide a model for how trading of energy efficiency credits could work in the U.S. This is demonstrated by the recent announcement by Sterling Planet the launching of a “White Tag” energy efficiency trading program. Sterling Planet is a leading US retailer renewable energy trader. White Tags are the latest energy trading certificates to hit the market and trade much like renewable energy credits (RECs). But unlike RECs, which are tied to creating renewable power and measured by meter reading, White Tags are determined through calculations of energy savings derived from energy efficiency measures.

Three states have adopted legislation requiring energy efficiency credits as part of mandated portfolio standard. Connecticut will be the first state to implement such a standard in 2007, with Nevada and Pennsylvania next in line. Energy efficiency credits are better recognized in Europe where “White Certificates” markets originated in the United Kingdom, France and Italy.

The White Tag program already has the commitment and interest in a number of Fortune 500 companies from a range of industries, including pharmaceutical products and office furniture, as well as leading retailers, universities and municipalities. Sterling Planet will bring together White Tag buyers and sellers. Buyers include electric utilities in mandated markets with portfolio standards and corporations or institutions in voluntary markets that are looking to meet greenhouse gas emission goals. Sellers include those who have taken concrete, effective measures to reduce their energy use and are able to measure, monetize and certify White Tags that result. (Sterling Planet, May 1, 2006)

G8 Gleneagles Climate Change Policy

During the United Kingdom’s presidency of the G8 throughout 2005, Prime Minister Tony Blair made shaping the industrial nations’ response to climate change the priority of the UK’s presidency. The UK Prime Minister has stated that climate change is, “probably, long-term the single most important issue we face as a global community.” At the 2005 G8 summit meeting in Gleneagles, Scotland, the G8 leaders, including President Bush, signed a communiqué that included a policy statement and an action plan covering climate change, clean energy and sustainable development. The policy statement recognized the importance of the climate change issue and highlighted the agreement to “act with resolve and urgency now” and that G8 nations need to make “substantial cuts” in emissions. This was the first time that the G8 leaders reached an agreement on the role of human activity on climate change and the need for action.

In Scotland, the G8 leaders also asked the International Energy Agency to undertake work on actions to reduce greenhouse gas emissions. The G8’s Gleneagles Plan of Action for Climate Change, Clean Energy and Sustainable Development called for the International Energy Agency to “review existing building standards and codes in developed and developing countries, develop energy indicators to assess energy efficiency, and identify policy best practices (G8 Gleneagles 2005). As part of fulfilling this mandate the International Energy Agency will be examining all policies and practices that can be applied to raise the efficiency of buildings and will conduct specific analysis of the impact of financing and the role of measures to encourage the monetizing of energy savings as part of this work.

Energy Efficient Mortgages

Energy efficient mortgages monetize the energy savings of an energy efficient home through the mortgage loan. The concept is based on the recognition that energy is part of the cost of housing. Fannie Mae has reported that the cost of heating, cooling and providing hot water is the highest cost of homeownership outside of the payment of principle and interest on the mortgage loan (Fannie Mae, 2004). An energy efficient mortgage capitalizes the monthly energy savings of an energy efficient home into the mortgage loan. Fannie Mae, Freddie Max, FHA and the Veterans Administration all have adopted energy efficient mortgage products.

Energy efficient mortgages work in two ways:

For existing homes the product finances the upgrade of the home being purchased or refinanced using the monthly energy savings. The energy upgrades are financed through the mortgage loan with no additional down payment and no additional income requirements. The amount of improvements that can be financed can go as high as 15% of the home's appraised value through a Fannie Mae energy efficient mortgage.

For homes that are energy efficient, the product capitalizes the energy savings in the home's appraised value and treats the monthly energy savings as additional income for qualifying for the mortgage loan. These two features allow a borrower to have a higher loan-to-value ratio and be able to finance other upgrades to the home.

By far the most aggressive energy efficient mortgage product is offered by the mortgage finance giant, Fannie Mae. Fannie Mae has gone so far as to "mainstream" energy savings into the mortgage loan process. Through its automated underwriting process, "Desk Top Underwriter", Fannie Mae includes the energy savings reported by a home energy rating into both the borrower's income calculations and the home's valuation.

All of the American secondary mortgage programs for underwriting energy efficient mortgages require that energy use information be provided through a home energy rating following the RESNET standards. These procedures were also adopted by the IRS for verification of a home's energy performance for the federal tax credit for new energy efficient homes.

In the past, the use of energy efficient mortgages has been limited due to low consumer awareness of the products, relatively low energy costs, and a booming housing market in the U.S. Nonetheless, they provide a real world example of how monetizing energy savings can take place through the private sector.

Energy efficient mortgages also demonstrate that a \$2 trillion industry can be comfortable with the risk of the capitalizing of the energy savings if verified through a credible standard and third party performance verification. This should serve as a model for protocols that are developed for the verification of building energy savings for a carbon emissions reduction trading regime.

The private sector has also been involved in supporting reduced rate mortgages and loans for energy efficient buildings in Europe. In France the Banque Populaire d'Alsace Lorraine initiated a preferential loan scheme in 1992 called PREVair Eco-Habitat. Through these loans, the bank voluntarily reduced its margins in an effort to promote the construction of eco-friendly homes and eco-friendly refurbishment of existing homes. Although it was initially established as a purely private sector mechanism, it evolved into a Public-Private Partnership for certain projects, when the French energy efficiency and environment agency, ADEME, signed an

agreement in 2003, to subsidize part of the loans. Up until 1999 the PREVair used a double financing mechanism:

- Loans were financed via an “ethical savings account” called CODEVAIR, which enabled small investors to invest in environmentally friendly projects on the understanding that rates of return would be slightly lower than for ethically unconstrained investments;
- The bank made an additional contribution by reducing its margin to 2.75% (instead of 4% for regular 15 years loans granted by the banks; an interest rate reduction of 1.25%)
- The money received from CODEVAIR allowed that interest rate to drop to **1.75%** which compared very favorably with the typical mortgage rate of 4.75%

In 2003, ADEME offered further support that allowed the rate of interest to drop to 0% (but only for projects meeting a certain criteria).

Despite these attractive terms the project was not an initial success as in total the bank financed a mere 200 loans; however, it remained a pioneer in the field and today new players are coming into the market (e.g. Credit Agricole; or LCL), and the PREVair are in the process of becoming national (i.e. should be made effective by the end of the month).

With the recent implementation of the EU’s EPBD, it is probable there will be an important increase in such initiatives. Not least because from July 2006 it will be mandatory to provide an energy rating certificate to prospective property purchasers while from July 2007 they will become mandatory in the rental market too. It is reported that banks increasingly anticipate a huge increase in the market for energy-efficient refurbishment finance.

Yet another financial mechanism was initiated in Germany in 1996 with the introduction of the Kreditanstalt für Wiederaufbau (“KfW”) preferential loans using money from the former German Marshall Fund.

- KfW is a public bank owned jointly by the Federal Government and the Lander (the German states).
- In 1996, KfW launched a set of preferential loans to finance energy efficiency projects through a double-edged mechanism:
 - Public tax exemption for all money invested in efficiency projects;
 - Coupled with direct public incentives;
 - The maximum amount of money distributed by loan is: 35,000€ (new buildings) and 80 to 250K€/m² (refurbishment)
 - Repayment period from 20 to 30 years;

Overall KfW loans have been a big success: from 1996 to December 2004 they provided over 330,000 loans spread over 850,000 buildings. Some 95% of those loans were for refurbishment and have had an especially important role in upgrading the energy performance of the building stock of the former East Germany. For the year 2004 alone these loans amounted to a total of 4.42billion€.

The German experience presents an interesting contrast to the America experience. Possible reasons for this are the tax exemption to the investors and the direct governmental incentives. It is possible the incorporation of these mechanisms into the American energy efficient mortgages could spur demand for the products in the US.

Conclusions

Monetization of energy and pollution savings can accelerate adoption of more energy efficient buildings. There have been a variety of public and private endeavors to foster energy efficient buildings construction and retrofits in Europe and the USA. Lessons learned need to be shared to help improve future endeavors.

There is a benefit for the exchange of information on program and policy initiatives and their implementation issues on the efforts that are taking place in the European Union and the United States. There is much each can learn from the other. The USA has decades of experience in developing standards for measuring the energy performance of buildings and, for homes, has adopted a mature set of standards that is accepted by both policy makers and the market place. The EU will have the experience of an unprecedented scale of implementation due to the Energy Performance in Building's Directives mandatory building energy certification requirements. Both the EU and the US have energy efficient mortgage schemes that can provide lessons for future improvements. The setting of the international protocols necessary to ensure international investor confidence will be moved forward if the EU and the USA can adopt complementary standards. If this coordination takes place the potential for international monetization of energy performance in buildings will be hastened.

The International Energy Agency can play an important role in this task. With its mandate from the G8 Gleneagles Summit to develop energy indicators to assess energy efficiency and identify policy best practices, the Agency can set the goal and the metrics for this coordination to take place. An important first step has already taken place. In September 2005 at the invitation of the chairman of the EU's Directory on Building Performance Concerted Action Group, the U.S. standards were presented at the EU Conference on the Energy Performance of Buildings Directive. From this presentation, it was agreed that a formal dialog will be developed between RESNET and the EU Concerted Action Group. The benefits of this dialog will include:

- The potential of reaching a common methodology for calculating building energy performance
- Establishment of a framework for an international protocol for verification of building energy and pollution savings for trading
- The attainment of first-hand knowledge on rolling out a comprehensive building performance initiative

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