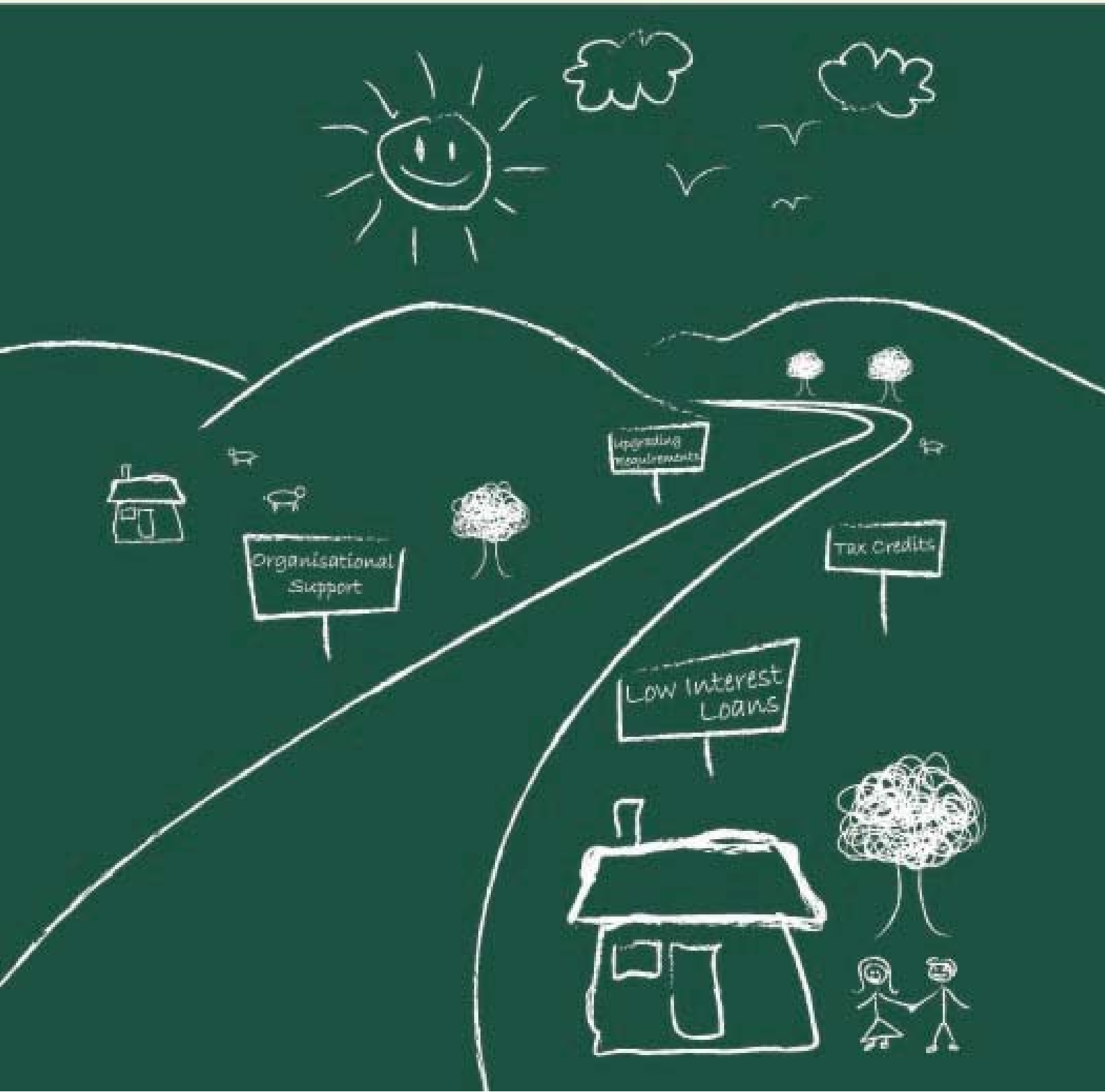
## ANNEX A - Programme Fact Sheets

# BETTER BUILDINGS THROUGH ENERGY EFFICIENCY

## A Roadmap for Europe



*Colophon*

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   Arlington County has adopted the US Green Building Council's LEED (Leadership in Energy and Environmental Design) Green Building Rating System as a method to measure the energy and environmental performance of buildings in the county. Adopted in 1999, the Arlington Green Building Incentive Program was revised and enhanced in 2003. The programme allows private developers to apply for additional density if the project achieves a LEED award (certified, silver, gold, platinum).

2. Lebanon: Voluntary building code, with added density allowance

   In 2005, Lebanon adopted a thermal code for buildings, requiring new constructions to comply with minimum insulation standards. This concept was new to Lebanon, and awareness of building energy efficiency very low, even among professional parties. Since Lebanon lacked a good compliance checking regime with this new policy, it was decided to implement the thermal code on a voluntary basis for a transitional period. To stimulate voluntary adoption, the government allowed for larger floor area in buildings complying with the standard.

3. Finland: PIMWAG evaluation as a prerequisite for a building permit

   The city of Helsinki requires construction processes in Viikki to follow principles of sustainable development. PIMWAG assessment criteria were chosen by the city of Helsinki through competitive bidding. The scheme was developed essentially for Viikki but is planned to be extended to other public building projects across Finland. In Viikki, all projects must meet the basic requirement level of assessment criteria in order to be granted a site and building permit.

4. Australia: Five Star Standard

   Despite new building regulations and growing awareness of the contribution that buildings make to greenhouse emissions, there has been little improvement in the energy performance of housing in the state of Victoria, partly due to increasing new house sizes, coupled with growth in the use of central heating and air conditioning. As a key element of Victoria's 'Greenhouse Strategy', the state government has developed a sustainability standard for residential buildings, which requires a five star energy efficiency rating for new homes constructed in Victoria after 1 July 2004.

5. Unites States: Increased requirements for federal buildings (all states)

   The Energy Policy Act of 1992 mandates a 35% drop in energy use by 2010 for all federal buildings. Section 109 of the new law requires that 'sustainable design principles are applied to the site planning, design, and construction of all new and replacement [federal] buildings'. In addition to the requirement for sustainable design, Section 109 requires that new federal buildings consume 30% less energy than that allowed under the standard for commercial buildings or the International Energy Conservation Code for residential building.

6. Germany: Energy regulations for the existing stock

   According the new German building regulations, when more than 20% of the area of a component needs to be changed, it has to be done in line with requirements for new construction. For example, owners of existing buildings are required to replace windows in line with the regulations on new construction if more than 20% of the window area needs to be changed.

7. Germany: KfW $CO_2$ reduction programme and loans

The National Climate Protection Programme (NCPP) of 2000 identified renovation of existing buildings as a priority task. By implementing the climate protection programme for existing buildings, providing grants at reduced interest rate, investments of €1 billion per year were envisaged. For this purpose, €200 million per year in subsidies was earmarked by the government to reduce interest. Under this climate protection programme for existing buildings, the Federal Investment Bank (Kreditanstalt für Wiederaufbau - KfW) offered loans at 3% below market interest rates for measures undertaken to reduce emissions, with a minimum CO2 reduction of 40kg per m² per year.

8. United States: Energy Rated Homes of Vermont (State of Vermont)

In Vermont and several other US states, a uniform, national Energy Star rating system, known as the Home Energy Rating System (HERS), has been adopted. The Energy-Rated Homes of Vermont (ERH-VT) programme provides a one-stop service to obtain energy improvement mortgages (EIM). In order to qualify for an EIM, an energy rating must be performed. ERHVT provides the energy assessment, obtains contractor bids for the planned measures, oversees the contractor's work, conducts a post-construction energy rating and prepares documents to secure the energy efficiency mortgage..

9. United States: LEED Incentive Program (City of Seattle)

Funded by Seattle City Light and Seattle Public Utilities, the LEED Incentive Program provides financial assistance to building owners and developers, who incorporate cost-effective sustainable building measures early in the building process. Incentives are individually negotiated. The minimum is €12,100 for projects that commit to achieving a LEED-certified rating and €16,100 for those committing to a LEED silver rating.

10. United States: Energy Star rating in combination with tax credits

The Energy Policy Act of 2005 (also see fact sheet no 8) includes tax credits for energy-efficient buildings and products. The US Environmental Protection Agency (EPA) has introduced a voluntary labelling programme, Energy Star, aiming to identify and promote energy-efficient products to reduce CO2 emissions. The programme includes measures for home improvements, with tax credits available for a number of products reaching optimal efficiency levels, which typically cost much more than standard products.

11. United Kingdom: Reduced value added tax (VAT) for energy-saving products

A lot of effort has gone into improving energy efficiency in UK housing. To encourage investment in domestic energy efficiency, the UK government has introduced reduced VAT rates for energy-saving materials and micro-renewable energy: micro-CHP and air source heat pump systems. VAT has been cut from 17.5 % to 5 %. Five per cent is the lowest VAT rate allowed under EU agreements.

12. The Netherlands: Regulatory Energy Tax (REB)

Regulatory Energy Tax (REB) was introduced in 1996 when it became clear that a European-wide CO2 tax would not materialise. This was the first tax introduced, not primarily for funding collective expenses, but for environmental reasons. As the tax was not intended to supplement overall government income, revenues were integrally recycled by lowering other taxes. Furthermore, from 2000 to 2004, so-called energy premiums on the purchase of energy-efficient appliances and other energy-saving measures by households were made available.

13. Bulgaria: Residential Energy Efficiency Credit Line (REECL)

The European Bank for Reconstruction and Development and the Energy Efficiency Agency of the Republic of Bulgaria have developed a crediting mechanism to the sum of €50 million to finance energy efficiency in the residential sector – the Residential Energy Efficiency Credit Line (REECL). The range of EE measures includes energy efficient windows, insulation of walls, floors and roofs, efficient biomass-fired stoves and boilers, solar water heaters, efficient gas-fired boilers, and heat pump systems for heating and cooling.

14. United Kingdom: Landlord's Energy Saving Allowance (LESA) / Green Landlord Scheme

In 2004, the UK government introduced the Landlord's Energy-Saving Allowance (LESA). The scheme provides private landlords who pay income tax with upfront relief of up to €2,150 on capital expenditure for installations of loft insulation, cavity wall insulation and now solid wall insulation in residential properties which they let. The 2005 budget stated that, in the context of its Green Landlord Scheme, the government would explore how other tax deductions and reliefs could be developed to reward landlords who improve the energy efficiency of their properties.

15. United Kingdom: Sustainable Communities Plan

The UK government launched its Sustainable Communities Plan (Sustainable Communities: Building for the Future) in 2003. The plan sets out a long-term programme of action to develop sustainable communities in both urban and rural areas. It aims to tackle housing supply issues in the South East, low demand in other parts of the country, and the quality of public spaces. The plan includes not only a significant increase in resources and major reforms of housing and planning, but a new approach to how we build and what we build.

16. United Kingdom: Energy Efficiency Commitment

Under the Energy Efficiency Commitment (EEC), electricity and gas suppliers are required to achieve targets for the promotion of improvements in domestic energy efficiency. These suppliers provide subsidies to promote the installation of energy-saving measures by residential customers, and are rewarded with defined energy-saving benefits for each measure subsidised.

17. Canada: Energy Innovators Initiative (EII)

The Energy Innovators Initiative (EII) helps commercial and institutional organisations overcome barriers to pursuing improved energy efficiency through renovation, equipment upgrades and other energy-saving measures. The EII offers its members financial incentives of up to 50% of the cost of planning a renovation, such as energy management plans, audits and feasibility studies. Funding (up to 25% of costs) is also available for implementation of energy retrofit projects (based on actual energy savings).

18. Finland: Energy audits

Even if the energy performance of housing is relatively good in Finland compared to European average, according to energy audits of buildings and processes backed by the Ministry of Trade and Industry, Finnish buildings still have remaining energy-saving potential of up to 20.5% in heating, 7.6% in electricity and 13% in water consumption. Energy audits assess project-specific primary energy use, energy-saving potential and use of renewable energy sources, and offer improvement suggestions (with their CO2 reduction impact) and cost calculations.

19. Czech Republic: Demonstrating Low-cost, Low-energy Residential Buildings and Sustainable Urban Development

High energy consumption in residential buildings incurs unnecessary energy costs and results in damage to the environment. This project supports the idea of avoiding such wasteful expenditures by designing and developing better housing in a cost-effective manner. Concepts are implemented through actual projects to persuade architects, developers and investors, through practical examples, that the concept of energy efficiency in new housing developments is attainable at a reasonable cost.

20. Finland: Voluntary energy conservation agreements

In the context of its National Climate Strategy and associated Energy Conservation Programme, voluntary energy conservation agreements play a central role in the implementation of energy efficiency in Finland. Energy Conservation agreements are framework agreements between the Ministry of Trade and Industry (KTM) and various sector organisations. The voluntary energy conservation agreement programme was launched in Finland in November 1997, not just for industry concerns, but also for building, energy, transport and public sectors.

21. Netherlands, UK: Sustainable real estate investment trusts

These trusts, a form of investment funds, aim to link building sustainability to added value, economic returns and reduced investment risks. These are private sector initiatives, supported by government funds to facilitate the development of methodologies.

22. Switzerland: MINERGIE

MINERGIE is a quality label for new and refurbished buildings. Comfort is the central theme – the comfort of the users living or working in the building. This level of comfort is achieved by high-grade building envelopes and the systematic renewal of air. Specific energy consumption is used as the main indicator to quantify the required building quality.

23. Japan: CASBEE assessment Tool

A CASBEE assessment provides a rating of the environmental quality of a building (indoor environment, quality of service, outdoor environment on site) versus the environmental load (energy, resources, materials, off-site environment). The programme operates by providing all involved parties with a common language and target, to facilitate communication among stakeholders. A CASBEE assessment is now a mandatory requirement for a building permit in five municipalities, some of these also requiring a minimum performance level.

24. Germany: Chance Energiepass Partner Programme

A German public-private partnership, involving the German Energy Agency and various professional parties, initiated the Chance Energiepass (Opportunity Energy Certificate) Partner Programme. It consists of an Internet tool that can be used by professional home owners (housing corporations, professional managers) for their own use, and DIY stores for advice to customers. The tool provides energy ratings of homes, and advice on how to improve energy performance. The system is characterised by several degrees of advice, from basic to more advanced, with increasing involvement of experts at increasing prices.

25. The Netherlands: Energy Performance Advice

To stimulate investments by home owners in the energy performance of existing houses, the Dutch government initiated a programme of subsidised energy performance advice. This was coupled with a subsidy programme for energy measures, and subsidies were higher if the investments had been recommended in an energy performance advice. Almost three-quarters of home owners indicated that the advice had not changed their planned investments in the

energy performance of their homes. This subsidised advice has proved particularly popular with housing corporations.

26. Bulgaria: Sustainable Homeowner's Associations of Multi-family Apartment Buildings

While multi-apartment residential buildings represent a large share of the total building stock in Bulgaria, many shortcomings can be observed in the management of such buildings, which impedes the implementation of energy efficiency measures. The promotion of housing associations to improve sustainable housing management of multi-family buildings, combined with recommendations for energy efficiency measures and appropriate financing mechanisms, facilitates the process of improving energy efficiency in existing apartment buildings.

27. Czech Republic: ESCO Contracts for Municipal Buildings

The municipality of Jablonec nad Nisou conducted a review of the energy bills of municipally owned buildings and identified buildings with higher than average energy consumption. They proposed a series of improvements to a group of municipal buildings – three elementary schools, eight infant schools, a former infant school now divided into a multi-use unit (private school, children's day centre and health centre), and a swimming pool. Energy efficiency measures were adopted in all the buildings, except five schools, where only energy management measures were proposed and implemented by the ESCO.

28. Denmark: Electricity Saving Trust

The Danish Electricity Saving Trust (Elsparefonden) has developed a push/pull mechanism to promote the adoption of energy-efficient products. The trust urges manufacturers and retailers to put more efficient products on the market by providing information about upcoming programme activities, creates consumer awareness of new products and provides subsidies for qualifying products. The trust's mechanisms are tailored towards end-use products.

29. Spain: New building regulations, including minimum requirements for solar energy use

New Spanish building regulations require, amongst other things, that all new domestic buildings cover 30 - 70 per cent of hot water needs using solar thermal energy, depending on location and quantity of hot water used. The obligation also applies to buildings undergoing substantial renovation. In addition, new building codes will oblige all commercial buildings over 4000 m2 to be equipped with photovoltaic panels to generate electricity.

## 1. United States: Added density allocations for LEED-certified buildings (Arlington County, Virginia)

*Arlington County has adopted the US Green Building Council's LEED (Leadership in Energy and Environmental Design) Green Building Rating System as a method to measure the energy and environmental performance of buildings in the county. Adopted in 1999, the Arlington Green Building Incentive Program was revised and enhanced in 2003. The programme allows private developers to apply for additional density if the project achieves a LEED award (certified, silver, gold, platinum).*

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| Target area | new residential / new commercial |
| Energy theme | The LEED rating system allots points within seven categories for environmentally beneficial building materials and design, in categories such as site location, water efficiency, energy and the atmosphere, materials and resources and indoor environmental quality. |
| Type of policy | legal / communicative |
| Level of policy | Local:<br>County of Arlington in the suburb of Washington, a similar programs are considered in Seattle and Santa Monica<br>(A similar initiative) In Switzerland, density bonus is applied in Lausanne and discussed in Geneva |
| Targeted key barriers | The program promotes the use of an environmental assessment method (educating parties in the construction practice) and offers an incentive to improve the environmental performance of a building. Buildings are not always constructed like they are designed, making an environmental assessment conducted in the beginning of the project invalid regarding the end product. In the LEED program, the project team must document the specific environmental credits that are to be achieved. Once the project is complete, documentation is submitted to the US Green Building Council for review. This third-party certification ensures that all assessment components are appropriately incorporated into the project. |
| Programme operation | The procedure consists of 10 stages. At the time of site plan submission, the developer will be required to submit the LEED scorecard along with the site plan application, which is the documentation supporting the developer's request for bonus density and/or height. The scorecard is used to select which credits the developer intends to pursue and the number of points determines the award level. Once the site plan together with changes is approved, permit drawings will be reviewed to ensure the green building components from the scorecard. The County will use LEED-certified inspectors/architects hired by the developer during review of the permit drawings and construction of the building. Permits will not be issued unless approved LEED components are included in the plan drawings. During plan review and construction, the LEED-certified inspector/architect will submit regular reports to the County ensuring compliance with the LEED standards and scorecard and the approved site plan. If during construction, the developer is unable to include required green building components, or if the inspector/architect finds that the developer failed to include these components, then the County will pursue enforcement. |
| Results achieved | The reduction of environmental load from the program has not been monitored. |
| Lessons learnt - strengths | The program has similarities with the Finnish PIMWAG method applied in Viikki (see Fact Sheet no 4) and similar strengths apply, but compared to the Finnish example, it includes a density bonus in addition to the site. Density bonus can be a very effective measure in high-demand locations. In the City of Seattle, |

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| | LEED certified buildings are entitled to a subsidy (see Fact Sheet no 10). If planning objectives are not compromised, a density bonus can be a longer term and more cost-effective solution than direct subsidies. |
| Lessons learnt - weaknesses | This kind of program, like implemented in the Arlington county, is labour intensive for the local authority because site plan requests for bonus density and/or height will be analysed separately in each case based on the characteristics of individual sites. In order to ensure planning objectives, it cannot be the practice that the provision of LEED-certified green building components would automatically guarantee additional density and/or height. On the other hand, if a building density is increased in the site, it should be taken into consideration that the new building mass and its operation have also environmental impacts. |
| Other relevant info | |
| References | http://www.arlingtonva.us/<br>Drouet, D., 2003, Instruments economiques et construction durable, Arene, Paris. |

## 2. Lebanon: Voluntary building code, with added density allowance

*In 2005, Lebanon adopted a thermal code for buildings, requiring new constructions to comply with minimum insulation standards. This concept was new to Lebanon, and awareness of building energy efficiency very low, even among professional parties. Since Lebanon lacked a good compliance checking regime with this new policy, it was decided to implement the thermal code on a voluntary basis for a transitional period. To stimulate voluntary adoption, the government allowed for larger floor area in buildings complying with the standard.*

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| Target area | New residential / new commercial / new public buildings |
| Energy theme | Energy efficiency |
| Type of policy | Legislative: a voluntary building energy code with a regulatory incentive |
| Level of policy | National |
| Targeted key barriers | Low public and professional awareness of building energy efficiency, and insufficient enforcement capacities with the government institutions. |
| Programme operation | With the voluntary introduction of the code, it was expected that compliance would be low, unless measures were taken. By using a Lebanese rule setting a maximum on the share of a land plot that can be covered by a building, the government created a highly desired non-financial benefit for voluntary compliance by stating that - when complying – the building size could be calculated with interior dimension instead of the exterior dimensions of the building (thus excluding the thickness of the walls). On average, this allowed for a 10% larger floor area.<br>The regulation targets the awareness of building developers of building energy efficiency, and of the new building thermal standard. At the same time, it allows for a gradual development of the compliance checking capacities that are also needed for the planned change to a mandatory energy code. |
| Results achieved | Although the programme is fairly new, indicative results are that in the first year approx. 200 out of approx. 3000 new constructions per year voluntarily comply with the building energy code. |
| Lessons learnt - strengths | The programme creates an incentive for forward-thinking building developers, thus helping to raise awareness for building energy efficiency and preparing the ground for full adoption in later years.<br>Since the benefit is purely regulatory, it comes at no cost to the government. The expected gradual increase in complying buildings would allow the government to develop its compliance checking capacity gradually as well. |
| Lessons learnt - weaknesses | If successful, the benefit introduced by the programme might be difficult to abandon once the reason for its introduction is over (i.e., when the code is implemented mandatory), as building developers get used to designing larger buildings.<br>The programme requires government compliance checking, and a (small-scale) infrastructure for this should be in place when the programme starts. |
| Other relevant info | |
| References | Thermal Standard for Buildings in Lebanon, Republic of Lebanon, Ministry of Public Works and Transport, General Directorate of Urban Planning, 2005<br>Capacity Building for the Adoption and Application of Thermal Standards for Buildings, Final Evaluation Report, November 2005 |

## 3. Finland: PIMWAG evaluation as a prerequisite for a building permit

*The city of Helsinki requires construction processes in Viikki to follow principles of sustainable development. PIMWAG assessment criteria were chosen by the city of Helsinki through competitive bidding. The scheme was developed essentially for Viikki but is planned to be extended to other public building projects across Finland. In Viikki, all projects must meet the basic requirement level of assessment criteria in order to be granted a site and building permit.*

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| Target area | new residential |
| Energy theme | PIMWAG method defines minimum ecological levels from five points of view: pollution, natural resources, health, natural biodiversity and food production |
| Type of policy | legal / communicative |
| Level of policy | local: the City of Helsinki controls the building permits |
| Targeted key barriers | As there is no market demand for sustainable building, owners are unlikely to make use of voluntary environmental assessment methods. When it is required for a building permit, they have to use it. Moreover, a minimum requirement level forces them to consider environmental improvements where they are most cost-effective. This is very educative for owners and inhabitants. |
| Programme operation | Developers of PIMWAG, consisting of architect, engineers and consults, evaluate the designs of building projects in two meetings where implementation teams can present their projects. First, the PIMWAG points are calculated from the plans by the implementation team and commented by the assessment group. After the first meeting the implementation team has opportunity for re-design and improvement of PIMWAG points in the second evaluation. Implementation teams that satisfy the requirements satisfactorily get a building permit and a site to rent. A developer must sign a contract assuring that project will be implemented according to the PIMWAG design evaluation. The City of Helsinki controls the evaluation process as a client and supervisor. |
| Results achieved | The surveillance report (Helsingin kaupunkisuunnitteluvirasto Julkaisuja 2004:10) concludes that despite them being ambitious, the objectives for the reduction of environmental load and new construction solutions were reached in Viikki. However, integrated design process did not always carry until the end in the individual projects and in some cases, conservative solutions were adopted. There were also technical problems for example with solar energy solutions. In the construction phase there was not always information about the environmental targets of the project in the construction site and the inhabitants that moved in the housing were often not aware of the environmental performance of their dwelling and how to use it in a sustainable way. Therefore, the process was successful but the end product (=building) could be improved. |
| Lessons learnt - strengths | The City of Helsinki took a strong role in the development of the area and this contributed to the success of the project. Integration of environmental requirements as a prerequisite for a building permission ensures full compliance, and is especially effective if combined with a minimum requirement level. Energy certificates of the EPBD (or environmental assessment methods) could be used as a precondition for a building permit (with a minimum requirement level) to ensure better compliance and adoption of measures. |
| Lessons learnt - weaknesses | Despite the high requirement level contractors and developers were very enthusiastic to join the project as good construction sites are few in Helsinki but this does not apply in a low-demand area.<br>In this case the PIMWAG system was tailored to Viikki in particular but it may be difficult to develop one applicable method that could be applied in all |

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| | construction projects in the country, without it becoming too extensive for practical actors.<br>Environmental assessment, especially like carried out in this program, requires a lot of capacity and knowledge at the building permit authority and needs to be lighter if the system is to be applied more widely. |
| Other relevant info | |
| References | Ecological Building Criteria for Viikki, Aaltonen-Gabrielsson-Inkinen-Majurinen-Pennane-Wartiainen, Helsinki City Planning Department Publication 1998:6<br>http://www.safa.fi/archive/208_Eko_Viikki_loppuraportti.pdf<br>http://cic.vtt.fi/eco/viikki/<br>http://www.kolumbus.fi/solpros/ekoviikki.htm<br>http://www.pvnord.org/buildings/ekoviikki/<br>http://www.iris.ba.cnr.it/Sustain/sbr_pdf/VIIKKI%20matrix.pdf |

## 4. Australia: Five Star Standard

*Despite new building regulations and growing awareness of the contribution that buildings make to greenhouse emissions, there has been little improvement in the energy performance of housing in the state of Victoria, partly due to increasing new house sizes, coupled with growth in the use of central heating and air conditioning. As a key element of Victoria's 'Greenhouse Strategy', the state government has developed a sustainability standard for residential buildings, which requires a five star energy efficiency rating for new homes constructed in Victoria after 1 July 2004.*

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| Target area | new residential |
| Energy theme | $CO_2$-reduction; U-value improvement |
| Type of policy | legal |
| Level of policy | Regional: State of Victoria |
| Targeted key barriers | New building regulation in this program is aimed at changing the behaviour of not only building industry professionals, but also home buyers. 5 Star Standard aims to establish energy efficiency as a purchasing factor and increase the market share of energy efficient housing. |
| Programme operation | To demonstrate compliance with the *5 Star Standard*, designs must be assessed using specialized energy-rating software at the building permit stage. Average increase in new home costs as a result of this regulation are estimated to be around €1,800, which is expected to fall rapidly when the building industry gains experience in delivering energy efficiency. Building designs are assessed trained house energy raters, accredited under a scheme administered by the Victorian Government. The accreditation system provides a level of quality control that permits self-assessment. Introduction of the *new regulation* has been accompanied by a comprehensive communications campaign aimed at architects and engineers, building designers, house builders and consumers. |
| Results achieved | Economic studies on the impact of the program predict that overall benefits for the Victorian economy during the 20-year study period include: creation of up to 1,800 new jobs and €434 million added to Gross State Product. Forecast loads on the power grid from 5 Star houses during periods of peak demand from domestic air conditioning units show a reduction of up to 45% in peak demand. This reduction in demand lowers the risk of power supply shortages in summer. Over 40,000 new 5 Star energy efficient houses and apartments are expected to come into operation every year. Over the 20-year study period this is expected to amount to aggregate greenhouse abatement of total 8 million tonnes of $CO_2$. |
| Lessons learnt - strengths | As it is incorporated in the building regulations, the rating applies for all new buildings and therefore, due to this large volume, the cost of energy efficient building products such as double-glazing has already begun to fall as market demand increases. A comprehensive communications strategy (technical training sessions run by peak building industry bodies, consumer information sessions linked to a major TV advertising campaign and information sessions for designers, builders and other industry professionals) about the introduction of a new standard was performed -and is necessary. |
| Lessons learnt - weaknesses | Currently Victoria's 5 Star standard applies only to *new* residential stock but the number of building permits issued each year for major home renovations and alterations in Victoria each year significantly exceeds the number of permits for new dwellings - in excess of 50,000 renovations compared with 40,000 for new dwellings. |
| Other relevant info | |
| References | Enker, R., 2005, 5 star energy efficient housing: performance based building regulation delivers major sustainability outcomes, The 2005 World Sustainable |

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| | Building Conference, Tokyo, 27-29 September 2005 (SB05Tokyo)<br>Australian Greenhouse Office (AGO) and Sustainable Energy Authority, 2000, Victoria *Impact of Minimum Performance Requirements for Class 1 Buildings in Victoria*<br>Allen Consulting Group, 2002, *Cost Benefit Analysis of New Housing Energy Regulations*<br>http://www.buildingcommission.com.au/www/default.asp?casid=3559<br>http://www.seav.sustainability.vic.gov.au/buildings/5starhousing/index.asp |

## 5. Unites States: Increased requirements for federal buildings (all states)

*The Energy Policy Act of 1992 mandates a 35% drop in energy use by 2010 for all federal buildings. Section 109 of the new law requires that 'sustainable design principles are applied to the site planning, design, and construction of all new and replacement [federal] buildings'. In addition to the requirement for sustainable design, Section 109 requires that new federal buildings consume 30% less energy than that allowed under the standard for commercial buildings or the International Energy Conservation Code for residential building.*

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| Target area | new commercial / existing commercial: federal buildings |
| Energy theme | $CO_2$-reduction |
| Type of policy | legal |
| Level of policy | national |
| Targeted key barriers | In most countries governments are, in principle, committed to designing, constructing, maintaining, and operating its facilities in an energy efficient manner but there exists a wide gap between policy and practice because it is mandatory. Federal agency policies and activities also have an indirect impact on the broader market for sustainable construction. |
| Programme operation | The energy bill requires that new buildings consume 30 percent less energy than existing codes stipulate, but only if the changes are deemed 'life-cycle cost-effective' over a building's lifetime. As a supporting measure, the Federal Energy Management Program (FEMP) provides guidelines and tools to help federal facilities save energy and money. The National Association of State Energy Officials (NASEO) provides a forum for the exchange of information and ideas. The National Association of Counties (NACo) has initiated a County Energy Efficiency Network, designed to leverage resources and provide technical assistance, local training, staff support and financial assistance to counties implementing energy management strategies. NACo also supports Public Technology, an organization that helps city and county governments implement new and emerging technologies. |
| Results achieved | The Energy Department's Federal Energy Management Program reports that government initiatives are having a positive effect. According to its 2004 report, federal buildings have reduced energy consumption by 25 percent per square foot since 1985.<br>A recent review showed that federal projects accounted for roughly 11% of total LEED-certified buildings.<br>Preliminary calculations indicate that one-quarter of the 20% reduction required for the total building stock in 2015 could be met by the requirement for energy efficiency in new construction. |
| Lessons learnt - strengths | Energy efficiency in government buildings can set a very powerful and very public example of energy efficiency. Capital to invest and professional building management that the public sector has available (compared to the residential sector for example) enable adopting life cycle approach and accepting longer payback times; there is no similar conflict between environmental and social values like in the residential sector.<br>The organisational structures and the implementation relations between federal, state and local levels (as reported in programme operation) with different organisations could be discussed -and applied- in the context of the European Union, the Member States and local authorities. |
| Lessons learnt - weaknesses | The energy bill requires that new buildings consume 30 percent less energy than existing codes stipulate, but only if the changes are deemed 'life-cycle cost-effective' over a building's lifetime. Most of the energy efficient measures |

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| | are not.<br>There has been concern that saving energy is not a top priority for voters, who may not like their tax dollars spent on improving government buildings.<br>Buildings can be certified as environmentally friendly when they are under construction and might not be as energy efficient as predicted after they are completed. Monitoring will be required to assure that the projected savings are actually achieved. |
| Other relevant info | The federal government is the single largest consumer of energy in the US. After the hurricanes in 2005, federal agencies were issued a mandate to save gas and electricity. While previous Presidential Executive Orders have directed agencies to use sustainable design principles, this is the first time that a legislative mandate requires it.<br>The Energy Act also encourages additional measures in federal buildings, including the increased use of solar energy, better measurement of energy expenditures, and a reduction in energy consumption per square foot. Furthermore, federal, state and local agencies should actively participate in the LEED (Leadership in Energy and Environmental design) environmental assessment rating system. Section 102 requires federal agencies to reduce the energy consumption per gross square foot in all existing buildings by 2% per year beginning in 2006, relative to a 2003 baseline. This leads to a 20% reduction required by 2015. |
| References | US Congress, 2005, Energy policy Act of 2005 (Public Law 109-58), Washington DC<br>Payne, C., Dyer, B., 2004, Federal participation in LEED, Proceedings of Greenbuild 2004 annual conference of the US Green Building Council, Portland, OR.<br>www.eere.energy.gov/buildings/<br>http://www.eere.energy.gov/femp/ |

## 6. Germany: Energy regulations for the existing stock

*According the new German building regulations, when more than 20% of the area of a component needs to be changed, it has to be done in line with requirements for new construction. For example, owners of existing buildings are required to replace windows in line with the regulations on new construction if more than 20% of the window area needs to be changed.*

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|---|---|
| Target area | existing residential |
| Energy theme | $CO_2$-reduction |
| Type of policy | legal |
| Level of policy | national |
| Targeted key barriers | In the current situation, in which housing demand exceeds supply, it is difficult to introduce new purchasing criteria like energy efficiency on the consumer side without government support. The business-as-usual scenario in additional insulation and replacement of windows is established but this autonomous development is not sufficient to achieve the 30-40% energy saving potential identified in the existing building stock.<br>When the construction industry is expected to take the lead in improving energy efficiency, it should be considered that new construction is nearly always more profitable and less risky than renovation is; many renovations are very small. |
| Programme operation | The same procedure applies as in building regulation process in general. |
| Results achieved | As this is a new regulation since few years, no monitoring results on its impact on the existing stock exist yet, and their implementation partly depends on the state. However, implying energy regulations on existing housing have been criticised for costs, especially in the social rental sector (for general results of the German $CO_2$-reduction policy measures, see Fact Sheet no 1). |
| Lessons learnt - strengths | Legislation could produce particular policy outcomes if compliance and legitimacy are ensured, if the behaviour of occupants does not create rebound effects and if the dilemma of low-income households is addressed. If the energy saving potential identified in the existing stock is to be materialised, extending regulations towards the existing stock may even be a necessity.<br>The combination of building-regulation standards with the energy-certificate levels of the EC Energy Performance of Buildings Directive (EPBD) is an interesting approach that merits further research. |
| Lessons learnt - weaknesses | Energy regulations cannot be imposed on the existing housing stock overnight, as most energy measures are not yet cost-efficient and not all households are in a position to comply with mandatory standards.<br>Compliance with building regulations remains a key issue in the EU countries, where the energy performance of new buildings regularly fails to meet the standards that are specified in the regulations, partly because authorities are reluctant to force them on private owners. Compliance -and sanctions- with the introduction of thermal regulations for the existing housing stock is especially problematic, as not all renovation work requires notifying the building authorities. Public information campaigns may increase compliance, as could efforts to keep the regulations and the number of exemptions simple.<br>Building regulations do not address all the technical -or economic- potential. In Germany, it has been discussed that the standards prescribed for new buildings do not correspond to what is technically possible. |
| Other relevant info | |
| References | http://www.baunet.de/baurecht/htm/eneg/index.html<br>http://www.baunet.de/baurecht/htm/waermes/index.html |

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| | http://www2.din.de/ |

## 7. Germany: KfW $CO_2$ reduction programme and loans

*The National Climate Protection Programme (NCPP) of 2000 identified renovation of existing buildings as a priority task. By implementing the climate protection programme for existing buildings, providing grants at reduced interest rate, investments of €1 billion per year were envisaged. For this purpose, €200 million per year in subsidies was earmarked by the government to reduce interest. Under this climate protection programme for existing buildings, the Federal Investment Bank (Kreditanstalt für Wiederaufbau - KfW) offered loans at 3% below market interest rates for measures undertaken to reduce emissions, with a minimum CO2 reduction of 40kg per m² per year.*

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| Target area | existing residential |
| Energy theme | $CO_2$-reduction per $m^2$ floor area |
| Type of policy | economic |
| Level of policy | national |
| Targeted key barriers | Although efforts to promote sustainable building through market-led measures and price signals may affect energy-consuming behaviour, they are not adequate to attract investments and improve the energy efficiency of the existing housing stock. In the NCPP, it was concluded from the most recent energy projection (Prognos / EWI 1999) and the policies and measures implemented in 1998-2000 that under business as usual conditions the national target of a reduction of CO2-emissions by 25% until 2005 would be missed by about 5 to 7% (or 50 to 70 Mt of CO2). Consequently, additional policies and were identified in order to fill the gap to the target, among which private households and buildings should be responsible for additional emission reductions of 18 to 25 Mt. |
| Programme operation | The climate protection programme for existing buildings started in January 2001 offering loans at 3% points below market interest rates for initially four different combination packages of emission reduction measures with a minimum $CO_2$-reduction of 40 kg per $m^2$ and year. Eligible for the loan are 100% of the costs up to 250 Euro per $m^2$. Later the program was expanded to a fifth package allowing for the exchange of heating systems alone and a support for low energy renovations with improved conditions. |
| Results achieved | The $CO_2$ reduction programme of the German Kreditanstalt für Wiederaufbau (KfW), combined with the climate protection programme for existing buildings, is expected to contribute a total 5-7 Mt $CO_2$ reduction per year in 2005. An allocation of around 3.2 billion euros has thus enabled 166,600 dwellings to be renovated. These subsidies are likely to yield a $CO_2$ reduction of 2-2.5 Mt by 2005, less than half the $CO_2$ reduction anticipated in the National Climate Protection Programme. Four measures under this programme, with concrete $CO_2$ reduction targets totalling 17-19 Mt, will deliver roughly a third.<br>The programme has had a major impact on jobs in the construction sector, with 13,000 to 23,000 full-time jobs generated for energy renovation, and a further 12,300 jobs for new building improvements each year, based on the budgets available for 2001. The economic impact of the programme is especially relevant for SMEs, and the majority of jobs are created for labour-intensive work in small and medium-size construction firms.<br>Since building owners are required to prepare a fairly precise assessment of the energy performance of a building for a loan application. This has a noticeable impact on the awareness of building owners of the energy quality of their property. |
| Lessons learnt - strengths | A concrete requirement of $CO_2$ reduction per floor area is required in the program. This is clear for the applicants (instead of an open requirement of |

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| | 'improving thermal performance' as in some other subsidy programs) and a concrete target enables quantitative projections and monitoring on the impact of the program.<br>Similar preferential loans could be combined the energy certificates of the EPBD. For example, that the certificate levels A/B/C/D/E/F (as in household appliances) would be a prerequisite for the preferential loan, specifying that the improvements should improve the label with at least one level (e.g., from C to D): label is used as an indicator instead of $CO_2$ reduction per floor surface.<br>The program could also be structured in a way that energy cost savings could be directly used to repay the loan. |
| Lessons learnt - weaknesses | Preferential loan can be regarded as a hidden subsidy. There is a risk of a free-rider effect where a loan is used by parties who would implement energy efficient measures anyway. Handling the applications is labour-intensive and in order to achieve adequate savings the $CO_2$ reduction target needs to be set high enough (yet it should be in proportion to the costs of the improvements required to achieve it).<br>The results expected from the program would appear to be overestimated, given delays in implementation, watering-down of policies when they are implemented and the inclusion of policies beyond the national scope. Some of the expectations have been overoptimistic, with policy-makers tending to overestimate outcomes when under pressure to deliver overall targets (Wagner et al., 2005). |
| Other relevant info | The total budget was recently increased to € 1,4 billion per year, of which € 800 million for preferential loans. |
| References | Wagner, O., Lechtenböhmer, S., Thomas, S., 2005. Energy efficiency – Political targets and reality, Case study on EE in the residential sector in the German Climate Change Programme. In Proceedings of the ECEEE 2005 Summer Study. ECEEE, Stockholm. http://www.kfw.de/EN_Home/index.jsp<br>M. Kleemann, W. Kuckshinrichs, R. Heckler: CO2-Reduktion und Beschäftigungseffekte im Wohnungssektor durch das CO2-Minderungsprogramm der KfW, Eine Modellgestützte Wirkungsanalyse, Schriften des Forschungszentrums Jülich, Reihe Umwelt Band 17, Jülich 1999. Kurzfassung in KfW-Beiträge zur Mittelstands-und Strukturpolitik Nr. 11, Frankfurt a.M. 1999. Summarised in 'Klimaschutz und Beschäftigung, Studie zur Evaluierung des KFW-Programms zur $CO_2$-Minderung und des KFW-$CO_2$-Gebäudesanierungsprogramms', Forschungszentrum Jülich. |

## 8. United States: Energy Rated Homes of Vermont (State of Vermont)

*In Vermont and several other US states, a uniform, national Energy Star rating system, known as the Home Energy Rating System (HERS), has been adopted. The Energy-Rated Homes of Vermont (ERH-VT) programme provides a one-stop service to obtain energy improvement mortgages (EIM). In order to qualify for an EIM, an energy rating must be performed. ERHVT provides the energy assessment, obtains contractor bids for the planned measures, oversees the contractor's work, conducts a post-construction energy rating and prepares documents to secure the energy efficiency mortgage..*

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| Target area | new residential / existing residential |
| Energy theme | $CO_2$-reduction |
| Type of policy | economic / organisational |
| Level of policy | regional |
| Targeted key barriers | In the owner-occupied and private rental sector, the occupants may not have any experience of procurement or getting a contractor. Renovation is sometimes considered as providing opportunities for the construction industry, but owing to the high labour cost, small scale and labour-intensive nature of renovation it is bound to become more expensive and it actually increases the DIY (Do-It-Yourself) market. Therefore, in addition to policies, practical assistance and information about loans are necessary. |
| Programme operation | Energy ratings are issued by Vermont Energy Investment Corporation (VEIC), a non-profit organisation. Vermont Energy Star Homes require energy rating of 5 Stars, or higher, along with specific lighting, ventilation and combustion safety installations in order to qualify for financial incentives (homes are rated from 1 Star to 5 Stars, a building with 4 Stars or higher is usually considered energy efficient). The first step involves a visit to the property (or a review of building plans) by the certified HERS energy specialist, who completes the Vermont Energy Checklist. Next, the computer program analyses information and assigns points considering Vermont's climate conditions, then adds them together to determine the final score and Energy Star rating, resulting in Home Energy Rating Certificate (HERC). If the rating is based on building plans, it will be stamped as proposed and a final rating will be issued after construction is completed and the building is inspected again. The energy rating qualifies home owners and builders for financial incentives, namely energy improvement mortgages (EIM). |
| Results achieved | No data has been collected about the impact of the Energy Star ratings in the state of Vermont. It is difficult to separate the specific impact of this program in particular because the program is based on providing one-stop services to energy efficiency rather than new policy measures and it is likely that most clients have already considered of implementing the measures anyway. |
| Lessons learnt - strengths | If assistance, access to loans and the facilitation of implementation aspects are ignored in policies, many households are unable to comply. In this program, in addition to issuing home energy ratings, the same party can provide one service including access to energy improvement loans, technical assistance and advice about home energy improvements and equipment (energy audits, computer modelling of energy use and saving options, cost-benefit analysis of energy improvement options and financial analysis of energy investments).<br>Vermont and other states also accept the Home Energy Rating as a way to meet Energy Codes.<br>Programs where one party could provide a full service of energy rating, improvement suggestions and access to (preferential) loans for energy efficient |

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| | improvements could facilitate the implementation of the energy certificates EPBD. |
| Lessons learnt - weaknesses | Participation in the program is voluntary so it is still likely to reach forerunners that already consider energy efficient improvements rather than the large mass of the building projects. The program would be very effective if energy measures were already cost-effective but many of them, despite great energy saving potential, are not. Consultation fees are around 60 Euros per hour for homeowners and 72 per hour for businesses, which is reasonable but any extra consulting costs can still be a barrier for a homeowner unless they are at least partly subsidised. |
| Other relevant info | |
| References | http://www.erhvt.org/<br>http://publicservice.vermont.gov/ |

## 9. United States: LEED Incentive Program (City of Seattle)

*Funded by Seattle City Light and Seattle Public Utilities, the LEED Incentive Program provides financial assistance to building owners and developers, who incorporate cost-effective sustainable building measures early in the building process. Incentives are individually negotiated. The minimum is €12,100 for projects that commit to achieving a LEED-certified rating and €16,100 for those committing to a LEED silver rating.*

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| Target area | new residential / new commercial |
| Energy theme | The LEED rating system allots points within seven categories for environmentally beneficial building materials and design, in categories such as site location, water efficiency, energy and the atmosphere, materials and resources, and indoor environmental quality. |
| Type of policy | economic / communicative |
| Level of policy | regional<br>A similar program is used in the State of Massachusetts and in the Urban Heat Island Reduction Initiative in the City of Chicago |
| Targeted key barriers | Projects incorporating sustainable building objectives early in the design process can achieve higher levels of performance with less cost than projects which consider sustainable building strategies late in design. The program aims to include environmental aspects already in the beginning of the process, with standardised LEED measures. The purpose of the program was to find out 'what it takes to get a private sector project certified under the LEED Rating System'. |
| Programme operation | Projects eligible for the program are new construction or major renovations that meet the criteria described in LEED 2.1 or LEED Pilot programs. Applicants are building owners or developers. In order to verify that all agreed green measures are installed, and to disseminate project experience, the applicant has to document installation of environmental measures, complete a LEED evaluation form, provide two years utility costs and operations data and provide photos and data about the project, including utility bills, for publication of a case study by the City's Green Building Team. If the project fails to meet US Green Building Council certification, the applicant has to reimburse the incentive funding received. |
| Results achieved | No data has been collected on the energy saving effect of the program. |
| Lessons learnt - strengths | There are similarities for using the LEED assessment as a precondition for an added density bonus (see Fact Sheet no 1). In this program, the incentive does not take the form in a building permit process but in a form of a direct subsidy. This causes less administrative work and costs.<br>The program could be an interesting example of connecting subsidies to the energy certificates of the EPBD so that best labelled buildings could get a financial bonus –so that the implementation of these measures is documented and controlled like in this program. |
| Lessons learnt - weaknesses | Subsidies include a free-rider effect, are not enough alone to make a project cost-effective, can be considered as a temporary solution (also in this program) and require willingness-to-pay from the government. |
| Other relevant info | |
| References | Drouet, D., 2003, Instruments economiques et construction durable, Arene, Paris.<br>http://www.ci.seattle.wa.us/light/conserve/sustainability/leed/ |

## 10. United States: Energy Star rating in combination with tax credits

*The Energy Policy Act of 2005 (also see fact sheet no 8) includes tax credits for energy-efficient buildings and products. The US Environmental Protection Agency (EPA) has introduced a voluntary labelling programme, Energy Star, aiming to identify and promote energy-efficient products to reduce CO2 emissions. The programme includes measures for home improvements, with tax credits available for a number of products reaching optimal efficiency levels, which typically cost much more than standard products.*

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| Target area | new residential / existing residential / new commercial / existing commercial |
| Energy theme | $CO_2$-reduction |
| Type of policy | economic / communicative |
| Level of policy | national |
| Targeted key barriers | Despite energy saving potential in buildings, energy efficient improvements are not implemented in a large scale. Costs remain the main barrier. Despite the increased awareness, most consumers are also unable to make links between their dwelling, products and their energy use behaviour, and the related $CO_2$-emissions. |
| Programme operation | Home builders (and contractors of manufactured homes conforming to Federal Manufactured Home Construction/Safety Standards) are eligible for a 1,600 Euros tax credit for a new energy efficient home that achieves 50% energy savings for heating and cooling over the 2004 International Energy Conservation Code (IECC). At least a fifth of the energy savings must come from improvements in the thermal envelope. Tax credits are available for many types of energy improvements including extra insulation, replacement of windows, and certain high efficiency heating and cooling equipment. The maximum amount of the credit allowable to a taxpayer for all taxable years is 400 Euros.<br>A tax deduction of up to 1.40 Euros per square foot is available to owners or designers of new or existing commercial buildings that save at least 50% of the heating and cooling energy of a building that meets the standard (ASHRAE 90.1-2001). Partial deductions of up to 0.50 Euros per square foot can be taken for measures affecting any one of three building systems: building envelope, lighting, or heating and cooling systems.<br>Not all Energy Star qualified homes and products qualify for a tax credit. The tax credits are available for a number of products at the highest efficiency levels, which typically cost much more than standard products. |
| Results achieved | As this is a relatively new practice relating from the Energy Policy Act of 2005 (see also Fact Sheet no 8 on the sharpened requirements for federal buildings) no monitoring data about the adoption of the program exists. |
| Lessons learnt - strengths | Consumers can recognise the Energy Star as the government's label for energy-efficient products, and this should make it easy for them to choose fro example windows that qualify for the tax credit.<br>The tax credits in this program do not phase out as the income rises, which makes them especially attractive to higher income taxpayers.<br>As a supporting measure, Tax Incentives Assistance Project (TIAP) is a non-profit effort by a coalition of more than a 12 organisations, led by the American Council for an Energy-Efficiency Economy (ACEEE) and the Alliance to Save Energy, to inform consumers and businesses about federal tax incentives enacted in the Energy Policy Act of 2005. This guidance clarifies what measures are eligible for tax incentives and provides direction to taxpayers on what they need to do to qualify for the tax incentives |

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| | Tax credits could be also adopted with the energy certificates of the EPBD. |
| Lessons learnt - weaknesses | The incentive of 400 Euros is not yet enough to make all energy efficient measures cost-effective.<br>There are very specific guidelines as to what is eligible for the credits so before buying the consumer has to be aware that the house/product is qualified in the Energy Star rating in particular.<br>More assistance may be needed regarding implementation barriers, in the state of Vermont one-party carries out energy rating and provides access to energy improvement mortages (see Fact Sheet no 15). |
| Other relevant info | |
| References | http://www.energytaxincentives.org/<br>http://www.energystar.gov/index.cfm?c=products.pr_tax_credits<br>http://www.naima.org/pages/about/releases/2006/060116-tax-credits.html |

## 11. United Kingdom: Reduced value added tax (VAT) for energy-saving products

*A lot of effort has gone into improving energy efficiency in UK housing. To encourage investment in domestic energy efficiency, the UK government has introduced reduced VAT rates for energy-saving materials and micro-renewable energy: micro-CHP and air source heat pump systems. VAT has been cut from 17.5 % to 5 %. Five per cent is the lowest VAT rate allowed under EU agreements.*

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| Target area | new residential / existing residential / new commercial / existing commercial |
| Energy theme | $CO_2$-reduction |
| Type of policy | economic |
| Level of policy | national<br>Similar programmes exist also in other countries: in France, a reduced VAT rate of 5.5% applies to renovation and conversion work on social rented housing, which has been reported to enable investments in energy efficiency |
| Targeted key barriers | The quality of existing housing in the UK is poor compared to most European countries. The government recognises that around 4.3 million households in England are officially designated as 'fuel poor', i.e. unable to obtain adequate energy services for 10% of their income. The technical potential of the UK stock to deliver energy savings, irrespective of cost, is estimated at 40-42%. The economic potential is lower, estimated at 17-21% for 2010 and 28-32% for 2020. A cut in the rate of VAT on energy saving materials will make it cheaper for all people to insulate their homes. The cut is a part of a social policy aimed at reducing fuel poverty (winter deaths and ill health caused by cold homes). |
| Programme operation | A 5% VAT rate applies to the supply of services of installing energy saving materials in all homes, installing, maintaining and repairing central heating systems and installing heating system measures. The energy saving materials, which qualify for the reduced rate when installed by a contractor, are: insulation for walls, floors, ceilings, roofs, lofts, water tanks, pipes and other plumbing fittings; draught stripping for windows and doors; central heating system controls, including thermostatic radiator valves; hot water system controls; and solar panels. A reduced VAT rate can also be granted for renovation of dwellings that have been empty for three years or more; residential conversions that result in a change of number of dwellings in the property; converting a non-residential building into dwellings or the cost of converting residential property into residential communal homes, such as care homes. |
| Results achieved | No separate assessment exists on the contribution of the reduced VAT rate on energy saving. It is difficult to determine the impact of the VAT in particular because it is a supporting policy measures and for example building regulations can have a more direct impact in the same projects. However (as background information), there are general estimates of a total saving in carbon emissions of around 5 Mt per year in 2001: grants and subsidies would contribute 39% of this, building regulations 50%, and energy labelling and minimum standards 11% (Shorrock, 2005). |
| Lessons learnt - strengths | As building products and equipment, all subject to VAT, can have a considerable impact on the overall sustainability of the shell of a home, it is important to provide incentives to people to buy more sustainably. A reduced VAT rate on approved supplies would make these comparatively cheaper than the non-approved products, thus encouraging the sale of the more sustainable products. This type of demand-led change, which should result from this program, will encourage producers to try and meet the sustainability criteria, as the market share of their products will otherwise drop. |
| Lessons learnt - | This program is clearly a supporting measure and requires other financial |

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| weaknesses | instruments, and regulations, to encourage energy efficient investments. It is also doubtful whether a 5% reduced rate provides sufficient financial incentive to make a change. To increase its effectiveness and coherence, the program could be supported with the introduction of product charges on energy inefficient materials and equipment (for example in Austria a product charge on energy intensive appliances has been used for air conditioning equipment). |
| Other relevant info | |
| References | Drouet, D., 2003, Instruments economiques et construction durable, Arene, Paris.<br>WWF, 2002, Fiscal Incentives for Sustainable Homes, WWF-UK, London.<br>Shorrock, L., 2005, Assessing the effects of energy efficiency policies applied to the UK housing stock, ECEEE 2005 Summer Study, Ademe, France.<br>www.hmrc.gov.uk/ |

## 12. The Netherlands: Regulatory Energy Tax (REB)

*Regulatory Energy Tax (REB) was introduced in 1996 when it became clear that a European-wide CO2 tax would not materialise. This was the first tax introduced, not primarily for funding collective expenses, but for environmental reasons. As the tax was not intended to supplement overall government income, revenues were integrally recycled by lowering other taxes. Furthermore, from 2000 to 2004, so-called energy premiums on the purchase of energy-efficient appliances and other energy-saving measures by households were made available.*

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| Target area | new residential / existing residential / new commercial / existing commercial |
| Energy theme | $CO_2$-reduction, energy saving behaviour |
| Type of policy | economic |
| Level of policy | national |
| Targeted key barriers | Energy price increases and negative economic incentives are needed to persuade occupants to adopt less polluting patterns of behaviour, given that enormous differences have been noted in the energy consumption of identical houses. Taxation enables the external costs of environmental damage to be internalised, thus implementing the polluter-pays principle adopted by the EU. |
| Programme operation | Households pay a higher price for their energy in the energy bills. Revenue collected from Regulatory Energy Tax (REB) was redistributed to consumers through grants, the Energy Premium Regulation (EPR) and tax reductions for producers of renewable energy sources. |
| Results achieved | Despite its impact on energy prices (that is likely to encourage energy saving behaviour and investments), research shows that only half the population are aware of Regulatory Energy Tax (REB), and only 2% take it into account in their use of electricity (Van der Waals, 2001).<br>It is expected that, since the energy tax on fossil electricity (REB) does not apply to renewables, the green electricity market will grow further.<br>The Energy Premium Scheme (EPR) was well known to the target group, but it attracted a large proportion of free-riders, as many of the measures eligible for funding were already standard practice in the industry by the time it was introduced. The average cost to the government worked out at 300 euros per tonne of $CO_2$ reduction, and the administrative cost of handling the applications was high, with each application leading to a relatively small energy saving (Harmelink et al., 2005a). |
| Lessons learnt - strengths | As a policy instrument taxes are relatively easy to administer - and relatively difficult to avoid by taxpayers.<br>The REB can encourage technical energy-efficient innovations. Positive fiscal incentives in combination with taxes reward environmentally sound behaviour. Greater use will be made of renewable energy (green electricity) because the REB reduces the price differential between fossil fuels and renewables. |
| Lessons learnt - weaknesses | Households living in badly insulated homes already pay higher energy bills owing to higher consumption and thus suffer more from taxes, without having the resources or access to low-interest loans to invest in energy efficiency. Carbon tax should be progressive otherwise it punishes low-income households in most energy inefficient housing.<br>Energy taxes do not necessarily provide an incentive to invest in energy efficiency in the rental sector, as it is the tenant who pays the energy bill.<br>Price signals have not notably affected car use and would have to be high in order to change investment behaviour: although efforts to promote sustainable building through market-led measures and price signals may affect energy-consuming behaviour, they are not adequate to attract investments and |

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| | improve the energy efficiency of the existing housing stock. |
| Other relevant info | The premiums were paid by energy distributing companies, who could deduct them from the REB they have to pay on the energy sold to small-scale users. In the housing sector, the Energy Premium Regulation (EPR) scheme included the Regulatory Energy Tax (REB), the Energy Performance Advice (EPA) and Green Investment Scheme that were abolished in 2004, officially due to the free-rider effect. |
| References | Sunikka, M., 2003, The use of fiscal Instruments in sustainable housing policies in the EU and the accession countries, European Environment, 13(4), 227-239.<br>Van der Waals, J.F.M., 2001, $CO_2$ reduction in housing, Experiences in building and urban renewal projects in the Netherlands, Rozenberg, Amsterdam.<br>Harmelink, M., Joosen, S., Blok, K., 2005, The theory-based policy evaluation method applied to the ex-post evaluation of climate change policies in the built environment in the Netherlands, Proceedings of the eceee 2005 Summer Study. ECEEE, Stockholm.<br>www.minfin.nl |

## 13. Bulgaria: Residential Energy Efficiency Credit Line (REECL)

*The European Bank for Reconstruction and Development and the Energy Efficiency Agency of the Republic of Bulgaria have developed a crediting mechanism to the sum of €50 million to finance energy efficiency in the residential sector – the Residential Energy Efficiency Credit Line (REECL). The range of EE measures includes energy efficient windows, insulation of walls, floors and roofs, efficient biomass-fired stoves and boilers, solar water heaters, efficient gas-fired boilers, and heat pump systems for heating and cooling.*

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| Target area | Existing residential |
| Energy theme | Energy efficiency improvements in households |
| Type of policy | Economic: Financial incentives for households |
| Level of policy | National |
| Targeted key barriers | A very low energy efficiency and bad conditions of the household building stock in the country<br>A low income level of households which makes the investment in energy efficiency a high burden |
| Programme operation | The REECL facility aims to give householders across Bulgaria an opportunity to realise the benefits of energy efficiency home improvements by providing them with loans and incentive grants through local participating banks. Four banks in Bulgaria are providing loans for energy improvements in households.<br>There is a list of eligible products, materials and equipment. In case of compliance with the terms and conditions of the REECL Programme, householders are entitled to receive payments equal to 20% of the total amount financed by a Participating Bank toward implementation of their eligible energy efficiency home improvement projects, provided that the incentive grants payable in respect of each eligible energy efficiency measure do not exceed the maximum amount set forth different measures and the total incentive grant per borrowing householder do not exceed the cap of €850. For windows, roof, floor and walls insulation the maximum amount is €200 for each and for biomass boilers, solar water heaters, gas boilers and heat pump systems the total amount of the grant can not exceed €400 for each. Householders must apply for their incentive grants upon successful completion of the home energy efficiency project financed by a personal loan written by a Participating Bank. |
| Results achieved | From September 2005 to date, the REECL Programme has committed to 1103 energy efficiency home improvement projects, financed through personal loans totalling 2 933 130 leva and incentive grants amounting to 493 597 leva. To date, the REECL financed projects have saved a total estimated electricity equivalent of 6 679 MWh per year, which have brought reduction in CO2 emissions of 10 234 tonnes per year, which is equivalent to the amount of CO2 annually absorbed by a forest of 379 020 trees. |
| Lessons learnt - strengths | Energy efficiency improvements in residential sector are emerging after the introduction of the credit line, thus proving the importance of awareness raising and existence of financial sources as well as incentives for the residential consumers as a major prerequisite for end user activities in the area of energy efficiency |
| Lessons learnt - weaknesses | Most of the improvements made are usually in one apartment in a big block of flats which is good for the energy consumption in the apartment itself, but does not improve the energy performance of the whole building. |
| Other relevant info | |
| References | REECL Project Office<br>100, Maria Luiza Blvd Sofia 1000 |

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| | office 16<br>info@reecl.bg<br>http://www.reecl.org/indexen.php<br>http://www.seea.government.bg/inner.jsp?lang=bg |

## 14. United Kingdom: Landlord's Energy Saving Allowance (LESA) / Green Landlord Scheme

*In 2004, the UK government introduced the Landlord's Energy-Saving Allowance (LESA). The scheme provides private landlords who pay income tax with upfront relief of up to €2,150 on capital expenditure for installations of loft insulation, cavity wall insulation and now solid wall insulation in residential properties which they let. The 2005 budget stated that, in the context of its Green Landlord Scheme, the government would explore how other tax deductions and reliefs could be developed to reward landlords who improve the energy efficiency of their properties.*

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| Target area | existing residential |
| Energy theme | $CO_2$-reduction |
| Type of policy | economic |
| Level of policy | national |
| Targeted key barriers | As levels of household investment in energy efficiency are lower than would be expected given the potential financial benefits (e.g. lower energy bills), this implies that there are barriers preventing householders making the most efficient decisions on these investments. In the rental sector, the main reason for this is that the benefit of the investment flows to the tenant (in the form of lower energy bills) rather than to the landlord (who has to make the investment). |
| Programme operation | Individual landlords (paying income tax) who let residential property and install loft insulation, cavity wall insulation and solid wall insulation to properties have been able to claim a deduction in their income tax bill. The relief is available for investments of up to 2,150 Euros per property per year. Budget 2005 extended this to include solid wall insulation and in the 2006 Budget, the LESA was extended to include the allowance for expenditure from installing draught-proofing and for insulating hot water systems. |
| Results achieved | While the introduction of LESA has been considered very encouraging (although no quantitative data on the energy saving impact exists yet), many privately rented properties, such as those with solid walls, could not benefit from the measures to which LESA applies, although in 2005 and 2006 budgets the focus of the measures has been extended. |
| Lessons learnt - strengths | Landlords look to make the best possible return on the investment they make and the decision as to whether to invest in energy efficiency will be part of these considerations. This program targets a crucial barrier: the capture of benefits in the rental sector. |
| Lessons learnt - weaknesses | It has been criticised that a tax deduction is of little use to landlords whose expenditure already exceeds income: this can easily happen in the early years of letting a property when interest on the loan used to buy the investment (together with other costs) may already create a tax loss. In such cases a subsidy, which is unconnected to the tax system, could be a more useful incentive.<br>The LESA incentives are targeted at specific energy efficiency measures like cavity wall insulation. Alternatively, a more general approach directed towards thermal performance of the dwelling could be taken, where an annual tax relief would reward landlords whose properties meet a certain level of energy efficiency.<br>There has also been a more general discussion in the UK that all landlords should be treated as businesses (rather than private investors) for tax purposes. According to landlords, this would help them to improve their properties and make them more energy efficient through alleviating restrictive |

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| | capital gains taxes. |
| Other relevant info | The LESA scheme is due to expire in 2009. The Government announced its intention to consider the scope for encouraging further investment in energy efficiency through a Green Landlord Scheme. |
| References | http://www.hm-treasury.gov.uk/<br>http://www.e-lindsey.gov.uk/environment/energy-efficiency/landlords-energy-saving-allowance.cfm<br>http://www.icaew.co.uk/viewer/index.cfm?AUB=TB2I_91353 |

## 15. United Kingdom: Sustainable Communities Plan

*The UK government launched its Sustainable Communities Plan (Sustainable Communities: Building for the Future) in 2003. The plan sets out a long-term programme of action to develop sustainable communities in both urban and rural areas. It aims to tackle housing supply issues in the South East, low demand in other parts of the country, and the quality of public spaces. The plan includes not only a significant increase in resources and major reforms of housing and planning, but a new approach to how we build and what we build.*

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| Target area | existing residential / existing commercial |
| Energy theme | improvement of the existing housing stock, including energy efficiency |
| Type of policy | economic / communicative |
| Level of policy | national |
| Targeted key barriers | The UK has one of the oldest and least energy-efficient housing stocks in Western Europe, and around 4.3 million households in England are officially designated as 'fuel poor', i.e. unable to obtain adequate energy services (mostly space heating) for 10% of their income. Sustainable Communities program action includes also tackling low demand, which affects 850,000 homes in the North of England and Midlands, and housing shortages in the South East, four areas were identified to play a key role as national priorities for regeneration and growth. |
| Programme operation | Program Plan 'Sustainable Communities: Building for the future' was launched by the Deputy Prime Minister in 2003. It outlines a 56 EUR billion action program for economic, social and environmental development in both urban and rural areas in England. The Plan includes a significant increase in resources and major reforms of housing and planning, and aims to introduce a new approach to how and what to build. The principle of the program is the creation of communities, not housing estates, reflecting the idea that housing is important, but without jobs, schools and so on the community won't work.<br>Included in the Sustainable Communities program is around 7 billion EUR for affordable housing and 441 million EUR to encourage new housing. 735 million EUR is available for deserted and run down housing areas in the North and the Midlands, while improvements to social housing and to the local environment receive 4.1 billion EUR and 295 million EUR respectively. 381 million EUR is allocated to tackle homelessness, plus there will be legislation to deal with bad landlords through licensing. Additional investment to ensure the quality of social housing is supported by 2.9 billion EUR for ALMOs (Arms Length Management Organisations), 1,000 million EUR further credits for refurbishment via Private Finance schemes, as well as making stock transfer accessible to more councils by removing many of the barriers against such transfer. The Housing Corporation, which receives an extra 147 million EUR for its 290 million EUR Challenge Fund to encourage modern construction, leads a task force to review home ownership programmes. New Regional Housing Boards have been set up to advise on the strategic use of the housing resources. |
| Results achieved | Two progress reports have been published. Success has been reported in increasing sustainable development across the growth areas like the South East - a number of completed developments seen as blueprints for communities of the future. In the last three years 8.8 billion EUR has been invested in the Thames Gateway. In New Deal for Communities, partnerships have been established in 39 neighborhoods and over 10 years they will receive approximately 2.9 billion EUR.<br>72% of new development has been reported being built on previously used |

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| | land. New measures have been announced to raise environmental standards increasing energy efficiency in buildings by 40% and taking forward plans to regulate on water efficiency, and setting further stretching standards through the new Code for Sustainable Homes. |
| Lessons learnt - strengths | This program takes a holistic approach to address improvements in the existing housing stock, considering the importance of the neighbourhood in renovation. Urban renewal provides a good intervention point for improving energy efficiency, as energy improvements can be coupled with other renovation measures that would have been carried out anyway. Also, neighbourhood renewal -both physical and economic- is essential to ensure that investments in energy efficiency pay off, as the value of a building depends not only on the quality of the building itself but also on that of the surrounding buildings, the infrastructure and the neighbourhood; consequently urban renewal provides an incentive to spend more on improving building quality. |
| Lessons learnt - weaknesses | The program objectives are very generic and the theme 'sustainable communities' covers almost everything so there is a risk that despite good intentions the program and its objectives will remain vague for the stakeholders. Sustainable Communities program is primarily oriented towards neighbourhoods and addressing the housing shortage. Despite these being conditions for the feasibility of energy efficient improvements, the program does not aim at a concrete reduction of environmental load. |
| Other relevant info | |
| References | Making it happen: The Northern way, Second progress report by the Deputy Prime Minister dated 2 February 2004.<br>Making it happen: Thames Gateway and growth areas, First progress report by the Deputy Prime Minister dated 30 July 2003.<br>http://www.odpm.gov.uk/ |

## 16. United Kingdom: Energy Efficiency Commitment

*Under the Energy Efficiency Commitment (EEC), electricity and gas suppliers are required to achieve targets for the promotion of improvements in domestic energy efficiency. These suppliers provide subsidies to promote the installation of energy-saving measures by residential customers, and are rewarded with defined energy-saving benefits for each measure subsidised.*

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| Target area | Residential buildings |
| Energy theme | Energy savings in the residential sector (fuel and electricity) |
| Type of policy | Economic / regulatory: obligation on utilities to deliver energy saving measures; utilities typically subsidise the purchase or installation of energy saving measures |
| Level of policy | National, with regional implementation by utilities |
| Targeted key barriers | The programme obliges utilities to deliver a defined volume of energy savings, via the promotion of energy saving building measures and appliances. This provides an incentive for home owners to invest in building energy efficiency. |
| Programme operation | Utilities typically provide subsidies for the installation of cavity wall and loft insulation, cold and wet appliances, heating controls and CFLs, to fulfil their EEC obligations. Utilities are awarded pre-defined energy savings for each measure subsidised. Utility schemes must be 'additional', i.e. above what the market would realise without intervention.<br>At least 50% of energy savings must be focussed on a priority group of low-income consumers in receipt of certain benefits and tax credits/pension credit. So it is expected that the EEC will also contribute to the eradication of fuel poverty. |
| Results achieved | All major utilities have easily met their targets, and on average have been 20% more cost effective than anticipated. Annual savings realised amount to 0.4 Mt Carbon at a cost (to society) of - € 430/t Carbon.<br>38% of savings realised came from insulation; 12% from heating installation improvements; 16% from more energy efficient appliances and 34% from lighting (CFLs).<br>Lighting is the most common measure with nearly 40 million CFLs delivered over the 2002-2005 programme period. Further, 6.5 million A-rated appliances were subsidised.<br>The cost of saving a kWh of electricity is € 2 cents (the cost of delivered electricity € 10 cents/kWh); of a kWh of gas is € 0.7 cents/kWh (the cost of delivered gas is € 2.5 cents/kWh). |
| Lessons learnt - strengths | Since the programme requires energy savings to be delivered without a direct financing mechanisms, utilities are under competitive pressure to deliver savings as efficiently as possible. This has resulted in a lower-than-expected cost of promoting energy efficiency and a constant search for the most cost-effective energy saving measures.<br>The scale of the programme has resulted in transformations of the market, especially in some energy efficient appliances. The market for these products may have changes permanently towards a prominence of energy-efficient products. |
| Lessons learnt - weaknesses | As any subsidy policy, the EEC programme is subject to free riders (consumers that benefit from subsidies, but would also have invested in measures without them). The energy savings calculations compensate for this via a formula, but no data are available about the real impact of free riders on realised savings. There is evidence, however, of 'free drivers': consumers that also invest in measures, without claiming subsidies. |

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| | The scope of the EEC programme implies that it might distort the market, so that measures are 'only' applied if there is a subsidy available. Anecdotal evidence suggests that this has already happened with CFLs, which are hardly sold outside of EEC programme channels. |
| Other relevant info | |
| References | Sustainable energy: Energy Efficiency Commitment, http://www.defra.gov.uk/environment/energy/eec/<br>Evaluation of the Energy Efficiency Commitment 2002-05, Eion Lees Energy, http://www.defra.gov.uk/environment/energy/eec/pdf/eec-evaluation.pdf |

## 17. Canada: Energy Innovators Initiative (EII)

now also called **EnerGuide for Existing Buildings (EEB)**

*The Energy Innovators Initiative (EII) helps commercial and institutional organisations overcome barriers to pursuing improved energy efficiency through renovation, equipment upgrades and other energy-saving measures. The EII offers its members financial incentives of up to 50% of the cost of planning a renovation, such as energy management plans, audits and feasibility studies. Funding (up to 25% of costs) is also available for implementation of energy retrofit projects (based on actual energy savings).*

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| Target area | existing commercial |
| Energy theme | $CO_2$-reduction |
| Type of policy | economic |
| Level of policy | national |
| Targeted key barriers | Energy efficiency is not a sufficient market factor to attract investment in the existing buildings, especially when most measures are not yet cost-effective, only short payback periods are accepted in the commercial sector. A program like the EII can emphasise energy efficiency in decision-making where little is known about energy efficiency. As one example of how the program can facilitate the implementation, EII funding for the University of Montréal represented only 7.5% of total costs, but EII involvement helped in obtaining approval from the Board of Directors since it validated that the project was technically sound and the projected energy savings were feasible. |
| Programme operation | To become part of the voluntary Energy Innovators Initiative (EII), an organization's management sends a letter to the Minister of Natural Resources stating their commitment to energy efficiency. To assure projected savings are met, the EII conducts third-party audits on 25% of its projects. |
| Results achieved | Since 1998, over 1,600 organizations, representing 30% of the floor space in the Canadian commercial and institutional sectors, have joined the EII. In 1998-2005, the EII funded 315 projects (involving 3800 buildings and 32 million $m^2$ of floor space). Incentives of $41 million have leveraged over $700 million of private sector investment resulting in annual savings of 12.2 million GJ, $160 million in energy costs and 0.71 Mt of GHG emissions. Energy savings from incentives have been 20% on average. The EII is reported to rapidly gain recognition in the construction industry as its uptake has increased significantly in the past three years. |
| Lessons learnt - strengths | The program is quite comparable to Finnish energy audit system (see Fact Sheet no 3). As the allocated subsidies are based on total savings, the EII may encourage projects that take a holistic approach and focus on several energy efficiency measures simultaneously. As a special feature, the program offers special considerations for projects from Northern, Aboriginal and remote communities where distance, climatic conditions and lack of services can result in additional barriers. |
| Lessons learnt - weaknesses | The program has to be financed by government resources: disadvantages of subsidies as a policy instrument apply. |
| Other relevant info | Natural Resources Canada, through its Office of Energy Efficiency (OEE), has employed a number of programs to encourage market transformation and to build capacity toward greater energy efficiency. |
| References | Auger, A., 2005, Canadian strategies for energy efficient buildings, The 2005 World Sustainable Building Conference, Tokyo, 27-29 September 2005<br>http://oee.nrcan.gc.ca/commercial/existing.cfm?text=N&printview=N |

## 18. Finland: Energy audits

*Even if the energy performance of housing is relatively good in Finland compared to European average, according to energy audits of buildings and processes backed by the Ministry of Trade and Industry, Finnish buildings still have remaining energy-saving potential of up to 20.5% in heating, 7.6% in electricity and 13% in water consumption. Energy audits assess project-specific primary energy use, energy-saving potential and use of renewable energy sources, and offer improvement suggestions (with their $CO_2$ reduction impact) and cost calculations.*

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| Target area | existing residential |
| Energy theme | U-value improvement |
| Type of policy | communicative |
| Level of policy | national |
| Targeted key barriers | Compared to new construction, renovation is often carried out by non-professionals, particularly in the owner-occupied and private rental sectors. They tend to rely on their own informal repair diagnoses or those made by relatives or friends, who are not necessarily aware of energy matters and who are not involved in transactions or renovation decisions often enough to learn from them. Without practical assistance and information about loans, targeted with the energy audits, the active group may be smaller than those that the policies aim to address. |
| Programme operation | Depending on the floor surface, a subsidy of €720 - 1,369 is available for an energy audit for housing (covering maximum 40% of the accepted costs). There are also subsidies for the improvement measures in the order of priorities suggested in the audit. A subsidy is regulated by the Ministry of the Environment and allocated by municipalities. If an applicant has joined a national energy saving agreement (see Fact Sheet no 12), an increased subsidy rate can be applied. In Finland, € 15-17 million a year is allocated in the form of energy subsidies for apartment blocks. |
| Results achieved | Energy audits have become well known in Finland and contributed to renovation of the housing stock but no separate impact analysis has been conducted about the specific energy saving impact of the energy audits (see Fact Sheet no 12 on the evaluation of voluntary energy saving agreements). |
| Lessons learnt - strengths | More personal assistance, than for example energy assessment methods with their improvement suggestions can make, about the implementation of energy efficiency measures and access to loans can contribute to the fact that the recommendations given in the energy audits are actually implemented in practice. |
| Lessons learnt - weaknesses | This program is classified as a subsidy that always has a risk of a free-rider effect and is not always the most effective allocation of government resources.<br>Single-family homes, which account for almost 50% of space heating energy consumption in Finland, are outside the scope of publicly supported energy audit programmes. |
| Other relevant info | |
| References | L asuntojen korjaus-, energia- ja terveyshaitta-avustuksista (1184/2005)<br>www.motiva.fi<br>www.ymparisto.fi<br>Maarit Haakana and Harri Hakaste, the Ministry of the Environment |

## 19. Czech Republic: Demonstrating Low-cost, Low-energy Residential Buildings and Sustainable Urban Development

*High energy consumption in residential buildings incurs unnecessary energy costs and results in damage to the environment. This project supports the idea of avoiding such wasteful expenditures by designing and developing better housing in a cost-effective manner. Concepts are implemented through actual projects to persuade architects, developers and investors, through practical examples, that the concept of energy efficiency in new housing developments is attainable at a reasonable cost.*

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| Target area | New residential buildings |
| Energy theme | The project focuses on design concepts that can significantly reduce energy costs without increasing the cost of the building. |
| Type of policy | Organizational measures |
| Level of policy | National |
| Targeted key barriers | Communicative: The projects overcome the perception that energy efficient design and construction is more expensive than the conventional one. |
| Programme operation | The implementing organization SEVEn has identified partners and clients in renowned institutions who share their views, such as UNDP and GEF. These international institutions have supported and financed a three-year project to design and construct examples of small multi-family buildings that are energy efficient and environmentally friendly as a demonstration of the future. |
| Results achieved | In the new energy efficient buildings the energy consumption was reduced by 30-40 % compared with the current practice.<br>The investment costs are 15,500 - 16,500 CZK (€ 550 - € 585) per square meter of utilizable area, the same as the average of houses constructed with the support of the Ministry for Regional Development of the Czech Republic and the State Fund for Housing Development. The planned specific heating consumption is less than 50 kWh/$m^2$. |
| Lessons learnt - strengths | The energy consumption in the new buildings was reduced without increasing the cost for constructing the housings.<br>The project implementation was supported by the fact that there is no such high percentage of privately owned individual homes like in countries as Bulgaria.<br>The project was supported by public awareness campaign to disseminate the results. |
| Lessons learnt - weaknesses | As energy efficiency is a new concept and still the perception is that energy efficient buildings are more expensive, a lot of efforts are required for changing the attitude of the citizens.<br>There is not sufficient information about the new materials and technologies that contribute to energy efficiency. |
| Other relevant info | |
| References | www.svn.cz<br>www.ceacr.cz/<br>www.undp.org |

## 20. Finland: Voluntary energy conservation agreements

*In the context of its National Climate Strategy and associated Energy Conservation Programme, voluntary energy conservation agreements play a central role in the implementation of energy efficiency in Finland. Energy Conservation agreements are framework agreements between the Ministry of Trade and Industry (KTM) and various sector organisations. The voluntary energy conservation agreement programme was launched in Finland in November 1997, not just for industry concerns, but also for building, energy, transport and public sectors.*

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| Target area | new commercial / existing commercial / new public / existing public |
| Energy theme | $CO_2$-reduction |
| Type of policy | communicative |
| Level of policy | national |
| Targeted key barriers | The objective is that a total of approximately a quarter of Finland's targeted greenhouse gas reduction in 2010 will be achieved by energy conservation measures. Energy agreements are meant to approach this potential from voluntary, market oriented point of view, involving so the industry itself it can identify the most cost-effective $CO_2$-reduction measures. |
| Programme operation | Companies or municipalities, which have entered into energy conservation agreement, undertake to start up energy audit or analysis operations and to compile a plan on increasing the efficiency of energy use. The government subsidies for companies within voluntary agreement program are subsidised on energy audits with 50%, compared to 40% for companies that are not in the agreement program (see Fact Sheet no 3 on energy audits in Finland). |
| Results achieved | Monitoring of the energy saving agreements closed between the Ministry of Trade and Industry and all main economic sectors (including the building sector) for 1997-2005 concludes that the energy conservation agreement in the building sector has resulted at a total energy saving of 4,7 TWh per year. The program was evaluated successful regarding the coverage of the agreement, reaching the initial targets and the opinions of the agreement parties interviewed for in the evaluation.<br>There are also indirect impacts resulting from the program like the increased awareness of energy efficiency in the companies, the increased number of energy audits (see Fact Sheet no 3) and the improved abilities of companies for the emissions trading. |
| Lessons learnt - strengths | Compared to some other countries, where agreements have not been effective in reducing the environmental load, in Finland the results from voluntary energy saving agreements have been positive in the building sector. Compared to other countries, the Finnish program is characterised by wide coverage involving various sectors of economy and active participation inside one sector; focus on concrete energy saving actions (objectives in other countries are often related to environmental targets in general); specialised assistance in the implementation of the agreement (by non-profit energy agency Motiva); and extremely voluntary approach in meeting the agreement objectives, there are no sanctions for non-compliance and little fiscal incentives.<br>On the other hand, Finnish decision making and construction practice is characterised by compliance, even over-compliance for example with building regulations. |
| Lessons learnt - weaknesses | Although efforts to promote energy efficiency through market-led measures and price signals may affect energy-consuming behaviour, they may not be adequate to attract investments to improve the energy efficiency of the existing housing stock. |

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| Other relevant info | |
| References | http://www.motiva.fi/en/<br>Heikkilä, I., Pekkonen, J. Reinikainen, E., Halme, K., Lemola, T., 2005. Energiasopimusten kokonaisarviointi. Ministry of Trade and Industry, Helsinki. |

## 21. Netherlands, UK: Sustainable real estate investment trusts

*These trusts, a form of investment funds, aim to link building sustainability to added value, economic returns and reduced investment risks. These are private sector initiatives, supported by government funds to facilitate the development of methodologies.*

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| Target area | All types of large properties |
| Energy theme | All energy themes, related to life cycle costs, plus other green themes |
| Type of policy | Communicative / organisational: Policy to stimulate the development of these funds, mainly by communication, organisational support, and sometimes with tax incentives. |
| Level of policy | Regional to national and international |
| Targeted key barriers | The funds don't target a specific barrier, but provide financial means for building development. The main barrier targeted by government support is a solid assessment tool (for building sustainability), that can be trusted by investors, |
| Programme operation | The method is just like an ordinary real estate investment fund. The only addition is a required score in a green or sustainable assessment tool. Selection and development of this has been supported by the government (in the Netherlands) |
| Results achieved | First results are that indeed these buildings perform better, provide a higher profit, and give low interest rates and low insurance rates. The interest among other investors is growing, stimulating the construction industry to built more energy efficient and healthier buildings. |
| Lessons learnt - strengths | The main strength is the coupling of green development and economics: it makes sustainability profitable for large investors. |
| Lessons learnt - weaknesses | A possible weakness is that the funds' focus is mainly on (making a profit by including) a few elements of sustainable building which have a good economic return, instead of following an integral approach. |
| Other relevant info | An example of a pioneer REIT is Arden Realty. Arden Realty, a large commercial building REIT in southern California, has won several ENERGY STAR awards from the EPA. And it appears that the REIT's forward-thinking management may pay dividends in stock prices. A study by Innovest Strategic Value Advisors looked at the relative energy efficiency and energy management performance of publicly traded REITs. "Leaders in energy management achieved superior stock market and financial performance over the two-year study period," outperforming below-average companies by more than 3,400 basis points in the stock market.<br>Although the strategy is in an early stage, only few funds have been launched yet in Europe, they are very promising. With recent experiences in Austria and Finland on risk management and added value, with the scarcity of energy and resources on hand, and with climate change testing buildings more intensively, buildings with added value appear to have the future, especially for investors. |
| References | http://www.nareit.com/portfoliomag/03novdec/vested.shtml<br>http://www.u.arizona.edu/~gpivo/ULI%20article.pdf<br>www.urbanenvironment.org<br>http://www.triodos.nl/personal_banking/investments/investment_types/60406/?lang<br>http://www.morleyproperty.com/funds/uk_sector_focused_funds/igloo/index.htm<br>http://www.igloo.uk.net/ |

## 22. Switzerland: MINERGIE

*MINERGIE is a quality label for new and refurbished buildings. Comfort is the central theme – the comfort of the users living or working in the building. This level of comfort is achieved by high-grade building envelopes and the systematic renewal of air. Specific energy consumption is used as the main indicator to quantify the required building quality.*

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| Target area | Primarily new residential buildings, some existing residential and commercial buildings |
| Energy theme | Low energy demand for buildings and high comfort |
| Type of policy | Communicative / organisational: the programme provides a certificate, and includes some organisational measures |
| Level of policy | National |
| Targeted key barriers | The Minergie certificate provides the market with a clear energy performance target, which can be linked to product offers and financing. This facilitates the discussion about energy performance between building owners and market parties. |
| Programme operation | Minergie provides energy certificates for buildings that comply with their standards for new or renovated buildings, based on a calculation prepared during the planning stage and an inspection of the realised building. Manufacturers can offer solutions that match the Minergie criteria, and establish themselves as Minergie-member, and two banks offer a preferential loan (0.625 to 0.75% interest rate reduction) for new houses with a Minergie certificate. It should be noted that increased comfort is the (only) argument used to 'sell' the Minergie certificate to building owners.<br>The additional cost of a Minergie house (in new construction) is expected to be approx 10% of the total building cost. The cost of a certificate is substantial: SFR 750 excluding VAT (€ 480) for most single houses, to SFR 5000 excluding VAT (€ 3200) for larger multi-family buildings.<br>The MINERGIE Standard is widely accepted. There are many reasons for this, the most important: builders and planners – in other words architects and engineers – have complete freedom both in their design and choice of materials and also in their choice of internal and external building structures. The information provided by Minergie is of a rather technical nature, and seems to be aimed at assisting professionals in meeting the standard(s).<br>In the meantime, the building sector has developed a wide range of products and services for MINERGIE buildings. Suppliers include architects and engineers as well as manufacturers of materials, components and systems. The diversity of this market furthers quality. |
| Results achieved | The number of buildings with a Minergie certificate has been steadily increasing: in 1998, 205 buildings were certified; this has increased to 1275 buildings certified in 2005. Over the 8-year duration of the programme, 5221 buildings have been certified, of which 4397 new houses, 373 renovated houses, 356 new commercial buildings and 94 renovated commercial buildings. The Minergie-standard seems to be comparable to the German mandatory building energy standards KW40 and KW60. A more advanced level, for the Minergie-P certificate, has so far been realised in 61 buildings.<br>Minergie inspection results indicate that, overall, realised buildings comply with the standards and do realise the required energy performance level. Minergie reports no energy saving or carbon emission reduction impact achieved with its programme. |
| Lessons learnt – | The Minergie programme shows that a well-coordinated programme, with |

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| strengths | extensive links to building sector parties, can be developed to promote the voluntary adoption of higher energy performance levels |
| Lessons learnt - weaknesses | The cost of the Minergie certificate is substantial, and together with the added investment cost, very significant energy savings would be needed to make the investments cost-effective from an energy perspective. Preferential interest rates (on Minergie-mortgages) probably partly compensate for this.<br>The programme is of a rather technical nature; an average building owner would probably need expert advice to be able to understand the Minergy requirements.<br>There appears to be a mismatch between the (large) size and scope of the programme and the (low) number of buildings certified. |
| Other relevant info | |
| References | Minergie programme www.minergie.ch (in German / French / Italian); www.minergie.com (English summary)<br>Bank Coop - Minergiehypothek, http://www.bankcoop.ch/index/hypotheken/minergie-hypothek.htm<br>Aargauische Kantonalbank Minergie-Hypothek, http://www.akb.ch/AxCMSwebLive_AKB/publish/eih_ehf_minergie.aspx?ActiveID=613<br>Minergie, http://de.wikipedia.org/wiki/Minergie |

## 23. Japan: CASBEE assessment Tool

*A CASBEE assessment provides a rating of the environmental quality of a building (indoor environment, quality of service, outdoor environment on site) versus the environmental load (energy, resources, materials, off-site environment). The programme operates by providing all involved parties with a common language and target, to facilitate communication among stakeholders. A CASBEE assessment is now a mandatory requirement for a building permit in five municipalities, some of these also requiring a minimum performance level.*

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| Target area | All building sectors |
| Energy theme | All energy themes, as part of overall assessment |
| Type of policy | Organisational, with regulatory and communicative aspects |
| Level of policy | National to local (municipal) level |
| Targeted key barriers | It was recognized that the capacities of local environments, and the world as a whole, were reaching a limit . And that loads should be minimised. A Assessment tool was chosen for the development and use as binding factor between all stakeholders. Create a:<br>• Common target,<br>• Common language,<br>• Communication among stakeholders |
| Programme operation | Research and development of CASBEE have been carried out as a cooperative project between industry, government and academia with the assistance of Japanese Ministry of Land, Infrastructure and Transport. Newly-formed JSBC (Japan Sustainable Building Consortium) and its affiliated sub-committees provide overall management of CASBEE, and the secretariat is set within the Institute for Building Environment and Energy Conservation. Its still further develop jointly for different sectors.<br>CASBEE has been adopted by some local governments (Nagoya, Osaka, Yokohama and Kyoto), and many others are preparing to do so. Some of these require a CASBEE assessment as a requirement for obtaining a building permit for buildings of a certain floor area (2000m2 or 5000m2) and the results are published on the website of the local government.<br>The city of Osaka, for instance, gives the building developer the advantage of an extra Floor Area Ratio if the building meets a minimum CASBRR performance (a B+-score on the assessment). CASBEE results have been used in some advertisements for sales promotion, especially for housing. |
| Results achieved | The main output are assessment tools. The CASBEE rating leads to a classification, and building owners and designers have started competing to obtain the best rating. But also a joint perception of the direction of construction development between stakeholders.<br>In hard results: in June 2005 it was already adopted by 5 municipalities as a mandatory tool. The industry has adopted the tool and is advertising the contribution of their products to the tool results. Many first good scoring buildings function as archetype for new designs. |
| Lessons learnt - strengths | By jointly developing the tool by all stakeholders, the Tool is positioned as central in the SB development. And its way of valuing makes it easy for partners to use it for their own developments and contributions.<br>By separating quality and environmental load, it provides two ways to improve things.<br>Further strong points are the visual way of presentation, and the relation to show factor x improvement. |
| Lessons learnt - | None identified |

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| weaknesses | |
| Other relevant info | CASBEE is a programme operating with government, academic and industry partners (building designers, contractors, subcontractors, utilities, building owners). There are CASBEE components for various building sectors. |
| References | Casbee Tool management Website:<br>http://www.ibec.or.jp/CASBEE/english/index.htm<br>Building example: http://www.takenaka.co.jp/news/pr0509/m0509_04b2.html<br>Government annual report:<br>http://www.mlit.go.jp/english/2006/p_g_b_department/05_env-report/index.html<br>Sustainability approach Japan: http://www.japanfs.org/en/column/akaike01.html |

## 24. Germany: Chance Energiepass Partner Programme

*A German public-private partnership, involving the German Energy Agency and various professional parties, initiated the Chance Energiepass (Opportunity Energy Certificate) Partner Programme. It consists of an Internet tool that can be used by professional home owners (housing corporations, professional managers) for their own use, and DIY stores for advice to customers. The tool provides energy ratings of homes, and advice on how to improve energy performance. The system is characterised by several degrees of advice, from basic to more advanced, with increasing involvement of experts at increasing prices.*

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| Target area | Residential new and existing buildings |
| Energy theme | Building energy efficiency |
| Type of policy | Communicative / organisational: providing home owners with a detailed advice about building energy efficiency improvements |
| Level of policy | National / Local: the programme is national, but is implemented via various local parties |
| Targeted key barriers | Home owners lack a detailed understanding of the energy performance of their house, and the impact of improvement measures. This is addressed via tailored advice.<br>Home owners are obliged to obtain an (EPBD) energy certificate for their house, in some circumstances. Providing these certificates via a construction sector party, with a building energy renovation advice, offers an opportunity to promote the application of |
| Programme operation | Local partners address home owners about building energy efficiency, and provide a detailed advice about improvement options, including an energy performance assessment via a calculation software on an Internet-platform (Builddesk). Local partners are supported by national partners, who provide marketing materials, a consumer website, and technical support. Via the website, consumers can assess additional informational, such as an overview of available financial support options in their region.<br>Local partners, mainly building materials / DIY-stores, are trained in building performance issues (construction-related physics, technical services in buildings, etc) and the use of building energy performance calculation software; are provided with the software tools (calculation package + Internet platform); and are provided with marketing materials. The programme can provide home owners with a building certificate for the German national EPBD implementation.<br>The programme is a cooperation of private parties (Rockwool Germany, BuildDesk) with the German National Energy Agency (dena). |
| Results achieved | In the last year (spring 2005 – spring 2006), more than 150 'chance energiepass'-partners have joined the programme, and around 230 employees of these partners have been trained to become an energy expert advisor in the building materials industry (all from construction materials retailers). These specialists have been equipped with the 'Energy Consultant' software package.<br>Many of the CEP partners have recognised the great chance of energy efficiency and certification for their business. The demand for modernisation measures is increasing rapidly, due to rising energy costs and attractive subsidy programmes (e.g., the KfW $CO_2$ reduction programme). Some real success stories have been written where dealers have attracted modernisation business for more than € 50,000, as a result of their high energy efficiency competence combined with their authorisation to issue energy passes. |

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| Lessons learnt - strengths | The programme is rather new, and it is too soon to describe lessons learnt. It is noted that linking energy certificates to a building improvement advice, provided by a building materials retailer, provides a shortcut for the long trajectory from advice to investment. This could improve the impact of the energy certificate, while at the same time reducing the cost of obtaining one. |
| Lessons learnt - weaknesses | The programme is rather new, and it is too soon to describe lessons learnt. It is noted that the provision of energy certificates by a partner with an obvious interest in selling building materials might lead to a reduced home owner confidence in the certificate, and that sufficient attention is needed to guarantee a trustworthy image of the 'Energy Consultants'. |
| Other relevant info | The system can also be used to provide home owners with an EPBD-energy certificate. |
| References | www.chance-energiepass.de |

## 25. The Netherlands: Energy Performance Advice

*To stimulate investments by home owners in the energy performance of existing houses, the Dutch government initiated a programme of subsidised energy performance advice. This was coupled with a subsidy programme for energy measures, and subsidies were higher if the investments had been recommended in an energy performance advice. Almost three-quarters of home owners indicated that the advice had not changed their planned investments in the energy performance of their homes. This subsidised advice has proved particularly popular with housing corporations.*

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| Target area | Existing residential buildings |
| Energy theme | Building energy efficiency |
| Type of policy | Organisational: a subsidised energy-saving advice to building owners |
| Level of policy | National |
| Targeted key barriers | The programme targeted the limited understanding of building owners of the specific energy saving options that could be implemented in their property, with detailed technical advice, and investment and energy saving calculations. |
| Programme operation | Upon request of the building owner, a trained professional performs an in-situ assessment of the energy quality of the building. The owner later receives a report, including an advice on potential improvements with the associated investment cost and energy savings specified. Advisors have a had a training, and operate according to a defined method. Building owners pay the advisor for the advice (around € 200 for a single-family home), and can later ask for a government subsidy for the same amount, in the first years of the programme only if they would implement at least one recommended measure. In later years, subsidies were also given for the advice itself. Home owners that implemented (parts of) the recommended energy improvements would receive a 25% higher subsidy than those who implemented improvements without an advice (later reduced to 10%). |
| Results achieved | Following a slow start in the first years, the number of houses for which an advice was delivered increased to almost 300,000 in 2003. The vast majority of these advices was for rented houses, typically owner by housing associations (75% of all advices) and usually covering 6 to 200 houses in a single assessment. The number of advices for owner-occupied homes (27,000 in 2003) was far below target. One possible explanation for the high number of advices in recent years is the expectations that the advice will be accepted as a sufficient basis for a building energy certificate under the EPBD-scheme.<br>An evaluation in 2002 learned that 89% of the owners of private homes who asked for an advice were already planning energy improvements in their homes. Of the people who asked for an advice, 61% indicated that they though that the advice stimulated them to invest in the energy quality of their home, and approx. 30% indicated that, with the advice, they would invest in more measures than planned before the advice. Of the housing corporations that asked for an advice, approx. 75% indicated that the advice had little or no impact on their decision to invest in energy measures. |
| Lessons learnt - strengths | Private home owners usually ask for an advice when they are planning investments in energy measures in their house. The advice thus contributes to a better planning, and for approx. 30% of the private home owners leads to more investments than planned without the advice. If an advice is received, more than 80% of the private home owners also implements at least one of the recommended measures.<br>Approx. 25% of the housing corporations that asked for an energy advice have consequently changed their investment decisions. |

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| | The energy measures taken in the houses for which an advice has been given in total contribute to a 0.4 Mtonne/year $CO_2$-emission reduction. There is no calculation of the share of these savings that is a direct result of the advices. |
| Lessons learnt - weaknesses | The main reason for housing corporations, and a major reason for private home owners, for asking an energy performance advice was that it allowed for a higher subsidy for already planned energy investments in houses. Almost three quarters of the owners that asked for an advice did not change any investment decision, and just benefited from a higher subsidy for the measures already planned.<br>In recent years, many housing corporations seem the be using the subsidised (often free) advice as a means to comply with the future requirements of the EPBD-directive |
| Other relevant info | |
| References | Voortgang Klimaatbeleid Gebouwde Omgeving 2003, Instrumentmonitor, SenterNovem, Utrecht, 2004<br>Instrumentmonitor Gebouwde Omgeving 2002, SenterNovem, Utrecht, July 2003 |

## 26. Bulgaria: Sustainable Homeowner's Associations of Multi-family Apartment Buildings

*While multi-apartment residential buildings represent a large share of the total building stock in Bulgaria, many shortcomings can be observed in the management of such buildings, which impedes the implementation of energy efficiency measures. The promotion of housing associations to improve sustainable housing management of multi-family buildings, combined with recommendations for energy efficiency measures and appropriate financing mechanisms, facilitates the process of improving energy efficiency in existing apartment buildings.*

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| Target area | Existing residential |
| Energy theme | The project supports energy efficiency measures in existing residential buildings, which include measures in building envelope (insulations and others), heating, ventilation and lightening systems and have impact on the U-value, $CO_2$ emissions reduction, energy savings and improvement of the comfort. |
| Type of policy | Organizational measures: establishing a pilot for Bulgaria housing association; Economic: innovative funding mechanism; communication: public awareness campaign |
| Level of policy | National |
| Targeted key barriers | The financial management for both day-to-day management and for major renovation projects is poor. The financial resources are often lacking. Long-term multi-stakeholder strategies on building maintenance and renovation are often lacking and are developed without involvement of homeowners and their associations.<br>Municipal housing planning is not well developed and very fragmented. The role of homeowners is very small.<br>All those are barriers to the systematic improvement of the building stock energy efficiency.<br><br>[describe: which barriers are targeted with the programme. Consider motivational / enabling / reinforcing factors] |
| Programme operation | The Programme was implemented in the following stages:<br>Investigations for proper financial, legal and partnership structure for management and maintenance (Owners Union, Development Unit, banks, municipality involvement).<br>Establishment of an Owners Union in the pilot condominium building.<br>Establishment of a Development Unit (entity formed by two Dutch Housing Associations, and local municipality in order to implement the investment activities and secure payments collection afterwards).<br>Development of renovation and maintenance plan of the building selected and signing contracts between the partners involved (Owners Union, Development Unit, bank).<br>Execution of renovation plan and collecting the monthly payments to cover the investments made. |
| Results achieved | The following results were achieved by the project:<br>Detailing financial, legal and organisational structure<br>Establishment of a guarantee structure<br>Establishment of Development Unit and of Housing Association<br>Execution of renovation plan (energy efficiency measures) and replicating the scheme on a revolving base |
| Lessons learnt - strengths | The establishment of a housing association is important step in the improvement of the facility management, respectively energy efficiency of the housing stock. |

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| | Appropriate financial instruments should support such projects in the building stock.<br>Public awareness campaigns should be organized to provide wider information to home owners and educate them on the process. The project cooperates with municipalities to have wider outreach to the citizens. |
| Lessons learnt - weaknesses | Individual homeowners and homeowner associations do not have enough expertise to manage their buildings and plan and implement major renovation projects. More than 90% of the individual housings in Bulgaria are privately owned, which makes difficult the establishment of housing associations.<br>There is insufficient information about the materials and technologies that can be used in housing renovation to make homes more energy efficient.<br>There are no governmental programmes to support the home owners and to foster the process. |
| Other relevant info | |
| References | Bulgarian Housing Association: www.bha-bg.org<br>www.denieuweunie.nl<br>http://www.woondrecht.nl |

## 27. Czech Republic: ESCO Contracts for Municipal Buildings

*The municipality of Jablonec nad Nisou conducted a review of the energy bills of municipally owned buildings and identified buildings with higher than average energy consumption. They proposed a series of improvements to a group of municipal buildings - three elementary schools, eight infant schools, a former infant school now divided into a multi-use unit (private school, children's day centre and health centre), and a swimming pool. Energy efficiency measures were adopted in all the buildings, except five schools, where only energy management measures were proposed and implemented by the ESCO.*

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| Target area | Existing public buildings |
| Energy theme | Energy efficiency measures |
| Type of policy | Public-private partnership: ESCO contract |
| Level of policy | Local |
| Targeted key barriers | Lack of municipal funds to implement energy efficiency measures<br>Inefficient district heating installation in the buildings |
| Programme operation | Jablonec municipality has entered into energy service contract has been MVV EPS, s.r.o. for a ten year period for the municipal buildings concerned. This energy performance contract proposed savings of CZK 2.35 million at 1999 rates, which was 23.4% saving of the current energy consumption of the buildings. |
| Results achieved | An investment of 10.6 M CZK produced a saving of 2.35 MCZK in 1999 or 23.4% of total energy costs. This was carried out at no cost to the local authority but it is tied into this contract until at least 2008. Furthermore the ESCO company has made savings in water and other costs and deterioration in, for instance, the swimming pool was reduced due to the reduced relative humidity. The regulation system has also improved the comfort in the buildings since it has ensured an even distribution of heat, avoiding problems of under heating of some rooms. |
| Lessons learnt - strengths | Municipality lacking own finances for energy efficiency improvement has made a right choice by selecting private investors which offer money and services, thus making possible the implementation of projects in selected buildings. Energy management of the buildings which importance is usually underestimated is performed by the ESCO company during the contract duration. |
| Lessons learnt - weaknesses | All the investments proposed have a short payback - so if the local authority had had access to money and expertise it could have obtained better results by investing itself.<br>The low initial baseline of some of the buildings (possibly due to under heating) made it impossible to implement energy efficiency measures by using the proposed ESCO contract. |
| Other relevant info | The municipal buildings were all connected to the municipal district heating system. |
| References | Energy Cites good practise database - www.energie-cites.org<br>Save II Programme, Local Energy Policies Contract N°4.1031/P/99.355, Local Energy Policies in Poland and the Czech Republic, FINAL REPORT, June 2001 |

## 28. Denmark: Electricity Saving Trust

*The Danish Electricity Saving Trust (Elsparefonden) has developed a push/pull mechanism to promote the adoption of energy-efficient products. The trust urges manufacturers and retailers to put more efficient products on the market by providing information about upcoming programme activities, creates consumer awareness of new products and provides subsidies for qualifying products. The trust's mechanisms are tailored towards end-use products.*

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| Target area | Primarily all residential buildings, some attention for public and commercial buildings |
| Energy theme | Efficient use of electricity |
| Type of policy | Organisational / communicative / economic: The Trust organises the promotion of more energy efficient products, by using various types of communication and rebates |
| Level of policy | National |
| Targeted key barriers | The Trust typically addresses three barriers:<br>• Lack of energy-efficient alternatives, and the consumers' ability to recognise these, by stimulating the supply-side to offer (a range of) energy-efficient products<br>• Lack of confidence in novel products, like new energy-efficient technologies, by providing unambiguous information about the quality of products and labelling<br>• The price of energy-efficient products, by creating price transparency and by providing subsidies to the end-user |
| Programme operation | The Danish Electricity Saving Trust has carried out activities – together with its partners in this area – that generate awareness of the product class in order to make the consumers demand the concrete products – for example A-class CFL's – more. This included both mass communication – TV ads, ads in newspapers, a homepage and press releases – and more direct consumer incentives such as a lowering of the price level of products (with subsidies) and guaranteeing the quality of products tested by an accredited test laboratory.<br>The increased demand creates motivation for the manufacturers and the retail trade to focus more on this product group instead of other related products. This is the so-called pull effect, where consumers' demand pulls the suppliers into supplying the product in demand. |
| Results achieved | The Trust's activities have resulted in savings of approx 15,000 GWh in electricity consumption over the life span of the Trust. More than half of these (approx 9,000 GWh) are the result of electric heating conversion campaigns (electric to gas), and one-fifth (approx 3,000 GWh) resulting from a low energy light bulb (CFL) campaign.<br>The cost-efficiency of the Trust's varies substantially between campaigns. Overall, the initiatives are very cost-effective for the Danish society, with an average cost of the Trust's work of 0.075 Dkr (€ 0.01) per kWh of electricity saved. |
| Lessons learnt - strengths | The Trust has proven that a strategy integrating organisational, communicative and economic instruments can be very effective in transforming the market towards energy efficient products and in realising energy savings at a gain to society.<br>The Trust has employed a variety of instruments, addressing also a variety of barriers that consumers experience in purchasing more energy efficient products. This, combined with a strategy that targets both supply and demand sides of the market, appears to be a recipe for success. |

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| Lessons learnt - weaknesses | The operations of the Trust are developed to work with a products market, with a distinctive number of suppliers and identifiable product ranges. It is unknown what results a similar approach would yield in a building market, although it can be assumed (based on some critical differences between an appliance and buildings market) that adjustments would be needed. |
| Other relevant info | |
| References | Evaluation of the Danish Electricity Saving Trust, Rambøll Management, 2004.<br>How to double the annual sales of CFLs with energy label A, Peter Karbo et al., ECEEE 2001 Summer study proceedings, ECEEE 2001. |

## 29. Spain: New building regulations, including minimum requirements for solar energy use

*New Spanish building regulations require, amongst other things, that all new domestic buildings cover 30 - 70 per cent of hot water needs using solar thermal energy, depending on location and quantity of hot water used. The obligation also applies to buildings undergoing substantial renovation. In addition, new building codes will oblige all commercial buildings over 4000 $m_2$ to be equipped with photovoltaic panels to generate electricity.*

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| Target area | New residential buildings, substantial renovations residential |
| Energy theme | Renewable energy use |
| Type of policy | Legislative: The new regulations are mandatory by March 2007, although the parts related to renewable energy and energy efficiency will come into force in October 2006. |
| Level of policy | National, with local component: Municipal solar thermal obligations, such as those in Barcelona and Madrid, will continue to apply, provided they are stronger than the national legislation. |
| Targeted key barriers | Key barriers addressed are:<br>A lack of innovation in building practices, by providing a performance-based regulation that allows for more flexibility for developments<br>A lack of harmonisation with other EU countries<br>A lack of a solid basis for renewable energy in the construction sector |
| Programme operation | The law will include:<br>• Energy demand limitation<br>• Efficiency of the HVAC equipments<br>• Lighting system efficiency requirement<br>• Minimum contribution of solar domestic hot water systems<br>• Minimum contribution for electricity using a PV system |
| Results achieved | Since the scheme was recently introduced, no actual impacts can be reported yet. However, as the scheme is mandatory, it may be expected that:<br>• an average reduction of the heating demand of 25%<br>• 30-70 % of hot water energy consumption by solar thermal energy<br>• creating a market for PV<br>will be achieved.<br>Spain is the first country in Europe, if not in the world, that makes renewable energy a mandatory part of construction. This sets a precedent, that could have a major impact on other countries' legislation as well. |
| Lessons learnt - strengths | |
| Lessons learnt - weaknesses | Verification and enforcement are crucial elements in the implementation of such a new building regulation. |
| Other relevant info | The new regulations are mandatory by March 2007, although the parts related to renewable energy and energy efficiency will come into force in October 2006.<br>The law builds on pre-existing municipal legislation in Barcelona and Madrid.<br>Thanks to existing feed-in laws, PV is already growing quickly in Spain and this requirement looks set to increase its application even further. |
| References | The code explained: http://www.codigotecnico.org/<br>General info and English translation of parts of the code related to solar thermal: http://www.estif.org/index.php?id=46&backPID=2&pS=1&tt_news=71<br>All info regarding Renewable energy in general: www.idea.es |

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European Insulation Manufacturers Association