



Buildings for a Better Future

MARRAKECH TASK FORCE ON SUSTAINABLE BUILDINGS AND CONSTRUCTION

Of all energy, almost 40% is consumed in buildings.

The potential for savings is enormous, and the know-how is here.
But the great pilot projects have not gone mainstream.

What can the public sector do?
This publication will point out some answers.
We need your support in finding more.

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Buildings + Energy = Public Policy

Foreword

Buildings, their construction, maintenance, operation, refurbishment and finally demolition have an enormous impact on human health, natural resource use, national and local economies, employment, and the functioning of societies. The Government of Finland wants to highlight the importance of these issues at all levels by contributing to the publication of these best policy practices.

Worldwide 30-40% of all energy is used in buildings. Almost all of this energy is consumed during the operational phase of buildings (heating, cooling, lighting, appliances and demolition). We know that the saving potential is huge and that saving energy saves cost, the climate and human health.

Given the present construction boom in many parts of the world, low-energy construction should be the rule, not the exception! It does not need rocket science but mainly basic technology, which is already available. Why don't we mainstream it? How can public policies and legislation promote energy efficiency, energy savings and renewable energy use in the built environment?

A complex network of different professions and industries is required in new construction, maintenance and refurbishment of buildings. However, the Government of Finland acknowledges that the public sector has to make a strong commitment to sustainable construction. Regional, national and local governments are not only regulators but also as users and owners of buildings.

A Clearinghouse of Ideas

User's guide

Of all energy, almost 40% is consumed in buildings. Transport takes some 20% and industry the rest. You can argue the accuracy of the figures, but taken as a whole, the use and maintenance of buildings (heating, cooling, lighting, equipment) is the single biggest consumer of energy. It is shocking to see how much energy is spent on cooling and lighting alone. – The proportions may differ from one country and continent to the other, but the main message remains the same: buildings can be an energy and climate hazard – or one of the solutions in combating climate change.

The best way to learn is from one's peers: government to government, city to city. We can borrow and steal inspiring practices, processes and policies from our colleagues. This is the simple purpose of this publication, which is meant to be the kernel of an open clearinghouse in the future.

Best Policy Practices – why not simply best practices? We are focussing on the potential of the public sector now, even if we are acutely aware of the vast range of stakeholders involved in the process of constructing the built environment.

The public sector has several roles: it can regulate, give guidelines, collect taxes, set an example as a client and user,

finance and subsidize housing and renovation, and invest in research and development – among other things.

The mini-cases – some very short, others with a bit more information and links – have been grouped under twelve headlines, each essential from our point of view, even if many of the stories would fit into several:

1. New construction
2. Housing
3. Refurbishment of existing buildings
4. Energy savings and energy efficiency
5. Renewable energy sources
6. National and federal policies, practices and programmes
7. Local policies
8. Public procurement
9. Research and development
10. Building certification systems

For more information, see link ...

Marrakech Task Force on Sustainable Buildings and Construction
– who are we?

1. NEW CONSTRUCTION

Engineers can calculate the thermal insulating capacity of construction materials, and the industry knows how to produce excellent windows, as examples. But politically, it has not been popular to set ambitious energy targets for new construction, even if every singly new building could be a zero-net-energy building with marginal extra cost.

The technology is here.

It is emblematic that we don't have any best policy practices to show you under this title yet. Please, make sure that the next edition of this publication will have several!

No doubt, several countries have detailed legislation, guidelines and certification systems where energy efficiency is also considered. But we'll need to go far beyond business-as-usual standards and we'll also have to make sure that there is technical capacity and good governance to secure the implementation.

2. HOUSING

Housing concerns everyone.

And the sector is also the highest consumer of energy.

Housing links together communities and sustains societies
or accelerates their disintegration.

Energy efficient housing programme

City of Pune, India

The programme has four major components: solar and wind energy, recycling of solids and wastewater, rainwater harvesting, and construction materials.

Name of the programme: Pune Eco-housing Programme

Lead institution: City of Pune, India, Pune Municipal Corporation

Other institutions and stakeholders involved: architects, construction companies, building supply companies

Timeframe: 2001-2005 | **Status:** Ongoing

Policy and main objectives: The City of Pune has started to promote and work towards ecological values in building construction. Such values are needed in any growing city, especially for cities like Pune with an unusually fast urban growth. The Pune Eco-housing Programme has four major components: solar and wind energy, recycling of solids and wastewater, rainwater harvesting, and construction materials.

The programme aims to establish guidelines for eco-construction, develop financing mechanisms for eco-housing, and establish showcases of eco-housing projects to serve as case studies for contractors who are interested in eco-friendly construction. Pilot projects for eco-housing are lacking in India with the result that few contractors and developers trust the eco-friendly building techniques and instead use more well-known, but less sustainable ones.

Results achieved: The Pune Municipal Corporation (PMC) has established eco-housing assessment criteria which serve as tools for architects, contractors, financial institutions and building owners to measure the environmental sustainability of their buildings. Eco-housing certificates are being issued, which result in reduced taxes and effectively promote further eco-housing development. These activities have also increased the interest of Indian contractors in improving environmental aspects of new construction.

Link: <http://gec.jp/gec/EN/Activities/2006/Eco-Towns/Pune.pdf>

Housing Policies and Pilot Project

Lithuania

How to deal with energy inefficient buildings
a thorough account of new housing policies
and financing mechanisms in a former Soviet
Republic, now a European Union member state.

Since 1990 Lithuania has been privatizing apartments in multifamily buildings. Currently, 97% of the housing stock is privately owned and only 3% of apartments belong to local municipalities and are used as social housing stock. Most of the multifamily buildings were constructed in Soviet times and are energy inefficient. In 1996 a pilot project on energy efficiency in housing was started in Lithuania at the initiative of the World Bank and the Lithuanian government.

The Energy Efficiency Housing project was officially launched in September 1996, and the first loan agreement with a homeowners association was signed on 8 July 1997. The pilot phase of the project ended on 30 June 2001, and since then the project has been financed from the repaid funds which formed the revolving fund. The Central Project

Management Agency has administered the project and the Housing Agency has taken care of the technical administration.

The project objectives were to support private and public initiatives to reduce energy use in residential and public buildings and to support the housing privatization process through increased private initiative in housing maintenance.

The project was also aimed at creating an investment-conducive environment including a well-tailored legal framework, affordable financing, comprehensive institutional support for homeowners, improved services of energy consultants and enhanced public awareness of energy efficiency and housing renovation issues.

Before the project was implemented the legal framework was amended to allow homeowners associations the right to obtain bank loans without mortgaging individual apartments, thus reducing transaction costs and lessening household reluctance to take on loans. The project financing consisted of a long-term loan, a state grant and a special support scheme for low-income families to improve affordability. The Housing Agency through its regional centres provided comprehensive

support to participating homeowners and conducted numerous public awareness campaigns. A training programme for local energy consultants was expanded, which improved their services and significantly contributed to the positive results of the implemented renovations.

The World Bank extended a USD 10 million loan for the project, of which USD 5.3 million was allocated for homeowners to implement energy efficiency measures in residential buildings (Part A) and USD 4.7 million was allocated for municipalities to invest in energy efficiency measures and renovation of public schools (Part B). The Lithuanian Government contributed matching funds of 30% and the Danish and Dutch Governments provided the main technical assistance funds for the project. Homeowners associations had to contribute a 10% down payment to be eligible for a loan.

The main beneficiaries of the project were homeowners associations, that is, associations of owners of apartments in multifamily buildings. As of the end of 2004, more than 1100 associations were involved in various stages of the project and 532 of them had signed loan agreements for more than EUR 21 million. A number of associations implemented more

than one project.

All decisions regarding participation in the project and investments were taken by homeowners associations; therefore, the project success greatly depended on how active and how motivated these associations were. Significant public outreach efforts were needed to get associations involved in the project, especially during the pilot phase.

The early involvement of associations' members and the thoroughly discussed renovation plans contributed to the zero-default rate of the project. Technical and social monitoring of the project revealed that the performed building renovations not only reduced heating bills and increased comfort levels but also improved relationships among associations' members, thus establishing a foundation for sustainable management of the existing housing.

This was a genuinely demand-driven undertaking which initiated a societal shift in Lithuania from the "Soviet-style" centralized housing maintenance and renovation system towards a market-based sustainable system that, at the same time, provided needed support for disadvantaged families, thus promoting social cohesion.

The project success required the integration of a well-tailored legal framework, affordable financing, comprehensive institutional support for homeowners, expanded and improved services of local energy consultants and enhanced public awareness of energy efficiency opportunities in residential buildings. Because of the synergy between the stakeholders, all bottlenecks were removed and the overall success of the project was ensured.

To continue the successful activities that started with the Energy Efficiency Housing Pilot Project, the Government of Lithuania adopted a Housing Strategy at the beginning of 2004. The top three priorities of the strategy are to ensure efficient use, sustainable management, and renovation and modernization of the existing housing stock. The focus is on education, raising public awareness, encouraging renovation and modernization of residential buildings to increase their energy efficiency, improving maintenance and administration of multi-apartment buildings to optimize their value, supporting low-income households in maintaining and renovating housing, and establishing a sustainable housing-sector management system.

One of three Lithuanian Housing Strategy programmes is “Refurbishment of multifamily buildings”. Under the programme, building problems will be identified through energy audits and investment proposals will be put forward. Then, the apartment owners will decide whether to finance the refurbishment with their own funds or by taking a loan without a mortgage. When the decision on financing has been taken, the modernization measures will be implemented. The Lithuanian Government provides a state grant (15%, 30% or 50% – depending on the planned energy efficiency measures) and support to low-income families. In 2005–2006 the state grant was EUR 2.89 million and in 2007 it is planned to be EUR 4.3 million.

The intent is to refurbish 70% of multifamily buildings built before 1993 by 2020 and save around 1.700 GWh, worth EUR 55 million. That would reduce CO₂ emissions by 365,500 tons.

Link: www.bkagentura.lt

New apartments with low energy consumption

Landskrona, Sweden

How does one save energy and CO₂ emissions in new construction, using straight-forward solutions and existing technologies?⁹

The goal of the investments – both in new construction and refurbishment – is to create energy efficient buildings, which, at the same time, have a good indoor climate. The buildings must also remain energy efficient and have a good indoor climate over their entire service-life; this can be achieved through good management

In Landskrona, in the Southern part of Sweden, the municipal housing company, AB Landskronahem, erected 35 new rental apartments during 2003-2004. The apartment

layout is quite traditional and the sizes vary between 70 and 115 square meters of usable floor area. When compared to standard new single family houses, the energy savings in the 35 apartments measure approximately 40-70 kWh per square metre per year.

No conventional heating is used, that is, no radiators or under the floor heating systems (the costs saved were invested in thicker insulation and higher window quality, i.e. triple glazed with krypton, U-value approx. 0.90 W/m² K). This type of building is called a 'passive house'. The energy needed comes from equipment, and is called process energy. There are mechanical ventilation systems with heat recovery. The apartments cost no more than conventional ones and the rent paid is less than for other apartments built during the same period.

Technical Sustainability Standards for Housing and Public Buildings

China

A design for the Beijing Olympics, and a housing project will implement new technical standards for housing and public buildings

Tsinghua University's super-low-energy building, which is located on the University's grounds, was built in 2006 under the Beijing Green Olympic Games pilot program demonstrating sustainable buildings and construction (SBC) principles in public buildings.

Additionally, Dalian Dayou Yiyuan, which is located in Liaoning Province, was built in 2005 as a MOF pilot program demonstrating SBC principles in housing.

A technical standards system and a technical standards framework consisting of national standards and local standards are key to promoting SBC in China. China has other pilot programs run by local governments demonstrating SBC in housing and public buildings: in Beijing, Tianjin, Shanghai and Chongqing.

China has established the primary level of a design standard system of 50% or 65% energy savings, and has confirmed the technical standard system and established the technical standard framework consisting of national standards and local standards.

- Energy-saving Design Standard for Housing in Hot-summer and Cold-winter Areas
- Energy-saving Design Standard for Housing in Hot-summer and Warm-winter Areas
- Energy-saving Design Standard for Public Buildings

Sustainable buildings and construction (SBC) principles are the main focus of the national energy strategy of China, and have been included in long-term and mid-term development planning. China will confirm the defined goal of SBC in the eleventh planning period by promoting the primary level of the design standard system of 50% or 65% energy savings in pilot programs run by local governments.

3. REFURBISHMENT

Every year, new construction adds only a small fragment to the built environment but many existing structures need refurbishment.

In more cases than we realize, renovating old buildings results in better homes and communities than demolishing them.

Kuyasa Low-Cost Housing

City of Cape Town, South Africa

The first clean development mechanism (CDM) project in Africa! In a joint energy upgrade project, national Government and the City will retrofit 2300 low income housing units.

Name of the programme: Kuyasa Low-Cost Housing Project

Lead institutions: The Government of South Africa and the City of Cape Town

Other institutions and stakeholders involved: SouthSouthNorth (NGO)

Timeframe: 2001-2005 | **Status:** Ongoing

Policy and main objectives: South Africa has constructed much low-cost housing to meet the needs of its rural poor. Under a new policy, the Government has decided to upgrade such housing to make it more sustainable. In order to provide a new model for sustainable housing, the Cape Town City Council, in partnership with SouthSouthNorth, a non-profit development organisation, has implemented the Kuyasa Low-Cost Urban Housing Energy Upgrade Project. The project involves the retrofitting of 2300 low-income housing units. Un-

der the project, a number of technological interventions were introduced in the Kuyasa housing area, including the installation of energy efficient lighting, solar water heaters, ceilings, and ceiling insulation. The result has been many sustainable development benefits.

The application of suppressed demand* in the development of baselines for future housing development projects in poor parts of the world, and notably Africa, could provide necessary leverage to speed infrastructural development that involves a leap-frog to cleaner energy technologies. Kuyasa became the first clean development mechanism (CDM) project to be registered in Africa and the first Gold Standard Project in the world.

Results achieved: These interventions resulted in reduced greenhouse gas emissions through the avoidance of electricity or alternative fossil fuel use by households. The project provides numerous additional sustainable development benefits such as improved health, access to energy services, and employment creation.

The project was validated as a CDM project and was

registered with the CDM in August 2005. The project will generate 130,000 tonnes of credits over a 21-year crediting lifetime. The first 10,000 tonnes were sold to the United Kingdom to offset the G8 summit at Gleneagles.

The results have been impressive, but the project currently lacks a viable financing mechanism to enable further replication. Despite the carbon income, Kuyasa is financed predominantly by one-off government grant funding. In response to this challenge the Renewable Energy and Energy Efficiency Partnership (REEEP), working with SouthSouthNorth, has funded a project to develop a sustainable financing model to enable replication of similar projects in the housing sector of South Africa.

*** Editor's note: Suppressed demand refers to an inadequate state of access to basic services because of income or infrastructure constraints, and thus does not show real demand for these services by poor households.**

Link: <http://www.reeep.org/index.cfm?articleid=1198&ros=1>

Renovation of Gårdsten apartments to save energy

Sweden

Traditional technologies in contemporary use!
This is one of the many projects initiated within the KLIMP programme of the Government of Sweden. Going beyond the Kyoto targets is the main objective. The European Union has supported the project, as well.

In Gårdsten, Göteborg, in Western Sweden, the tenants actively participated in the renovation of multifamily houses, and influenced the whole renovation process.

The housing area was built at the beginning of 1970 and consists of about 1200 flats. The buildings are six-storey balcony-access buildings and three-storey staircase access buildings, grouped in eleven blocks. Ten of the buildings comprising 255 flats belong to the “Solar Buildings” project, which has led to the following solutions.

- Prefabricated solar collector elements have been erected on the roofs of the balcony-access buildings. The solar collectors are used to heat water for the flats. The solar-heated water is stored in tanks in the basement of the balcony access buildings.

- Air based solar heating: Some of the external walls have been insulated on the outside, with an air gap between the insulation and the wall. Air heated by the solar collectors, which are integrated into the southern façade, is circulated through the air gap in the wall, and the heat is stored in the thick concrete walls. The temperature of the previously cold external walls is increased, which both reduces heat consumption and provides better comfort.
- Preheated supply air: Air inside the glazed balconies is heated by the sun.
- Additional thermal insulation has been installed in all buildings (façade, roofs) and windows have been replaced by low energy ones. A system for individual metering of electricity, heat, and hot and cold water for each flat makes for greater energy awareness and lower consumption.

After the renovation, the annual consumption of district heating has been reduced from 270 to 160 kWh per square metre, or by 40 %. Electricity consumption has decreased by about 30%. There was some funding from the EU (Thermie) and from the Swedish government.

4. ENERGY SAVINGS AND ENERGY EFFICIENCY

What is the cheapest energy available? Saved energy!

Talking about new power plants seems to be more respectable, however, than promoting savings and efficiency. If efficiency is discussed, it is often implied that it requires new technologies, and more time. Wrong! Efficiency is efficiency - which of course leads to a smaller growth of energy consumption but saving energy does not always require hi-tech solutions.

You can switch off the light, you can leave your car in the garage and walk or take the bus, and you can pull off the plug of the mobile phone charger when you don't need it. These require a change in attitude and behaviour. Sorry!

You cannot blame your lack of action on an engineer or politician.

Investment into energy saving

China

“China to invest billions in energy-saving buildings” made headlines in several newspapers around the world in January 2007. Here are excerpts from Mail & Guardian (Thursday, 18Jan2007)

China will invest 1,5-trillion yuan (\$193-billion) to make existing buildings more energy efficient by 2020 in a bid to save millions of tonnes of polluting coal, an official said on Thursday.

Warning that energy waste was hurting economic growth, Vice-Minister of Construction Qiu Baoxing said 350-million tonnes of coal could be saved in the next 15 years if existing buildings were renovated to make them more efficient and new buildings adhered to green standards.

But he added that China was already failing to meet existing energy efficiency targets.

“The yearly targets to improve energy efficiency through upgrading existing buildings have not been fulfilled,” Qiu told

a news conference. “Energy-intensive buildings have resulted in huge waste of energy, which has become an obstacle for national economic development.”

Qiu said despite the huge investment in upgrading existing buildings, the country’s priority would be to ensure new construction met efficiency requirements. Half the world’s new buildings between now and 2020 are projected to be in China.

“Most of the construction in the world is done in China,” said Qiu. “For China to act in compliance with energy efficiency standards is important in the drive to build a resource-saving and environmentally friendly society.”

Inspections showed about 10% of 600 new construction projects were in violation of energy efficiency standards and would have their licenses revoked, Qiu said.

Sustainability vs growth

As China grows richer and its citizens shift from the countryside to the cities, demand for comfortable, heated and air-conditioned housing is growing, straining resources.

China's leaders have tried to emphasise sustainability and environmental protection after years of breakneck economic growth that has stretched resources and led to widespread degradation.

But the message has been slow to filter down to local officials accustomed to being judged on growth alone, and the central government is still in the process of making policies to encourage green buildings.

“Powerful economic incentive policies are not in place,” Qiu said, adding the government should work out guidelines on subsidies and preferential taxation “as soon as possible”.

Basic changes such as heat metres, for example, had yet to be widely installed.

“Since a metre-based heat charging system is absent, pricing fails to exert its regulating role in the market,” Qiu said.

Qiu also said the use of renewable energy should be expanded, adding basic measures such as renovating walls and replacing windows would improve insulation and result in energy savings of 50%. – Reuters

Source: Mail & Guardian Online, http://www.mg.co.za/articlePage.aspx?area=/breaking_news/breaking_news__business/&articleid=296094

ESCO – Energy Service Company

European Union

The cheapest energy is Negawatts.
How does one buy savings in energy?

Name of the programme: European Platform for the Promotion of Energy Performance Contracting - EUROCONTRACT

Lead institution: Berliner Energieagentur

Other institutions and stakeholders involved: 11 partners from 9 countries.

Market actors: financial institutions, ESCOs, building owners. The project receives support under the “Intelligent Energy – Europe” programme of the European Community.

Status: Ongoing.

Policy and main objectives: Energy consumption in Europe is 20% higher than economically feasible and around 40% higher than technically possible. The building sector is a major player and offers a large potential for saving energy. Energy performance contracting (EPC) has proven its viability to tap private capital for cost effective improvements, and for energy and cost savings in the building sector.

EUROCONTRACT is a coordinating network among relevant market actors and experts on EPC. It develops standards for EPC projects. Funded by the European Union’s Intelligent Energy Europe programme, EUROCONTRACT directly involves building owners, energy service companies, and financial institutions.

EUROCONTRACT is led by Berliner Energieagentur and consists of 11 partners from 9 countries. The main objective of EUROCONTRACT is to contribute substantially to market development for energy services in Europe by further developing and promoting the model of energy performance contracting.

For an EPC project, an Energy Service Company (ESCO) provides its know-how for energy-saving measures in buildings and guarantees a certain level of savings, based on an energy cost /consumption baseline. The ESCO takes on the performance risk to ensure that adequate measures are implemented and that the stipulated energy savings are achieved. The investment is refinanced through the savings. The choice of the ESCO is based on a (preferably EU-wide) public tender. The tender – through performance-based specifica-

tions – defines the project goals (e.g. “at least X per cent of savings”, etc.) and thus invites potential bidders to take part in a contest of ideas and best value for money.

The client and the ESCO sign a contract – usually over a term of seven to twelve years. The core elements of the contract are the level and structure of the investment, the level and sharing of the savings implementation, and the control and maintenance of the energy-saving measures. If savings do not materialize, the ESCO pays the difference, not the client. To ensure savings the ESCOs usually also offer staff training and long-term maintenance services.

Results achieved: Guaranteed savings vary from 10% to 30%. Since 2005, 23 projects were supported by different partners and countries in Europe. Model documents and guidance are available through Berliner Energieagentur and project partners.

Links: www.eurocontract.net and www.energyservicescoalition.org/resources/whatis.htm

Retrofit of the Parow Municipal Building

City of Cape Town, South Africa

A city leading by example, demonstrating how to save energy and lower the energy bill with simple measures.

Problem statement: The City of Cape Town itself is a large user of energy through various energy intensive activities and a great number of municipal buildings and facilities. Energy consumption of municipal owned buildings is estimated to account for 16% of the total greenhouse gas emissions of the municipality as a whole.

The city employs over 20 000 municipal staff. It can significantly influence the on-the-job behaviour of energy users by supporting the staff working in the buildings and facilities and promoting their active involvement in contributing proactively towards improving the energy efficiency of the municipality. This will have positive implications further down the line, for example, in their communities and private homes.

Main objectives: Implementation of a public sector-led demonstration project to encourage the shift towards more efficient and sustainable energy use in buildings and the positive benefits thereof.

The intervention: The retrofit of the Parow Municipal Building (which previously housed the city's environmental department) showcases the positive human, environmental and economic benefits of energy efficiency in buildings. The intervention involved:

- Replacing existing incandescent lightbulbs with the installation of 600 energy efficient compact fluorescent lightbulbs (CFLs)
- The installation of solar water heaters
- Staff awareness campaigns to encourage cooperation and participation, and to ensure human actions and behaviour that contribute improving energy efficiency and conservation.
- Initiating behaviour-changing programmes to improve personnel use of air conditioners, lights and computers

Timeframe: Implemented in August 2003

Results achieved: 20% savings on the energy bill (or R3 200 per month). This project has the potential to save up to 130 000 kilowatts of electricity per annum (or R37 000) and 140 tonnes of carbon dioxide per year.

Recent energy audits of other municipal buildings have indicated that by 2020, sustained implementation of such activities could amount to a financial saving of R14million and the reduction of 44 000 tonnes of carbon dioxide.

Other municipal facilities such as the main municipal buildings are now being investigated for future energy efficiency interventions, as are the municipal fleet (approximately 7 700 vehicles), bulk water supply facilities, wastewater treatment plants and the electricity distribution infrastructure.

5. RENEWABLE ENERGY SOURCES IN USE

Increasing the proportion of renewable energy sources in energy production is the third pillar of sustainable energy consumption – after savings and increasing efficiency.

Because renewables – solar, wind, hydro, geothermal and biomass – are often local energy sources, their use will create local jobs and lessen dependency on energy imports.

Renewables will keep the global CO₂ bookkeeping in balance.

Brightness program

China

Funding for solar energy projects in Inner Mongolia and Qinghai Province

Name of the programme: Brightness Rural Electrification Program

Lead institution: Chinese Central Government

Other institutions and stakeholders involved: local governments of the Inner Mongolia Autonomous Region and Qinghai Province

Timeframe: 1996-2010 | **Status:** Ongoing

Policy and main objectives: The Government is supporting the development of solar energy by funding R&D activities, establishing necessary administrative services, and subsidizing families willing to install solar equipment (subsidies between 15% and 20% of total expenditure). About USD 50 million has been allocated by China's State Council to support the Brightness Program during the Tenth Five-Year Plan period (2001-2005).

Results achieved: The following results were achieved as part of the first stage of the Brightness Program.

- Installed 1,780,000 household systems, 2000 village systems, and 200 station systems
- Established national and local government bureau financing approaches and practical financing mechanisms
- Established industrialized production enterprises which can fulfill the demand of the market
- Set up a distribution and service network and marketing mechanism
- Installed a technical training system providing different levels of training for local technicians and engineers

Link: www.nrel.gov/docs/fy04osti/35790.pdf

Solar Water Heater By-Law

City of Cape Town, South Africa

A project to install solar water heaters in 10% of houses by 2010 and in 50% by 2020.

Name of policy: Solar Water Heater By-Law

Lead institution: City of Cape Town

Other institutions: Sustainable Energy Africa

Timeline: 2004 – 2007

Status: Work in progress, on track to be adopted in July 2007

Main objectives

- Substantially reduce electricity consumption in the residential sector
- Improve Cape Town's energy security
- Reduce Cape Town's greenhouse gas emissions

Proposed implementation: The installation of solar water heaters will be required in:

- All new buildings built in the city from the date of enactment, except for in industrial buildings which require a water

temperature higher than that which a solar water heater can provide, and in any privately funded residential building which is below the current subsidy level (approx. R3600)

- All existing buildings in the city, where additions are made which require the use of hot water (e.g. new kitchens, bathrooms) from the date of enactment.

Benefits: The By-Law is the implementation mechanism to assist in meeting the target of the City's Energy and Climate Change Strategy, of having 10% of houses fitted with solar water heaters by 2010 and 50% by 2020.

In South Africa, the residential sector uses 17% of electricity consumed. The largest consumer of electricity in the residential sector is the electric water heater. It makes up 40 – 50% of the total electricity used in a household (or 8% of the country's energy consumption).

Using a solar water heater is a way to reduce this energy by half or more. By replacing the conventional geyser with a solar water heating system, a large portion (60%) of water heating costs can be saved. This amounts to 40% of the electricity bill and a reduction of household carbon dioxide emis-

sions by about 2 tonnes per year. As a comparison, an average family driving 6000 kilometres by car, produces 2 tonnes of carbon dioxide.

The lifecycle of a solar water heater has been shown to be 15 years, minimum. However, some still function well after 25 years. Depending on the system used and the amount of hot water required by a household, studies show that a solar water heater will pay for itself in electricity saved over a 3 -7 year period.

Cape Town's temperatures do not drop below freezing, making choosing a solar water heater easier than in other parts of the country.

Progress to date

- Draft by-law prepared
- Consultation with professionals, manufacturers and suppliers.
- Funding of approximately R144 000 (South African rands) secured through Sustainable Energy Africa to assist in the drafting process over a period of four months.
- Internal funding of approximately R120 000 over six months budgeted and spent on stakeholder awareness processes.

Link <http://www.sustainable.org.za/focus-areas/solar-water-heaters.html>

Solar Home System Distribution Project

Philippines

The Philippines Government is leading by example and helping to install solar heater systems in rural areas. This is also development cooperation.

Name of the programme: Solar Home Systems Distribution Project

Lead institution: Philippine Government, Philippine National Oil Co. (PNOC)

Sponsoring organisation: The Government of the Netherlands

Other institutions and stakeholders involved: Department of Energy, the National Electrification Administration (NEA) and Shell Solar Philippines Corp. (SPRC), the Philippine Veterans Bank and the Sta. Catalina Rural Bank

Timeframe: 2002-2007 | **Status:** Ongoing

Policy and main objectives: The Government is promoting the adoption of solar home systems (SHS) throughout the country by “leading by example” and installing over 15,000 of them in rural areas. To make the package affordable to rural folks, a community-based credit program was set up to finance the

costs through cooperative initiatives. A unit costs P37,000 (USD 667), but because of subsidies granted by the Government (thanks to the Dutch sponsorship) and provincial governments, people need not spend more than P15,000 for each. Furthermore, loans that are payable in three years are also available from the partner rural banks in the province. The loan (through the cooperative initiatives) would only cover a monthly amortization of between P420 to P440.

Results achieved: Around 2000 SHS were installed by the end of 2003, with a further 100 to 200 systems being installed every month. Because of the project, the economy is strengthened, while air, water and soil pollution are reduced. Literacy and quality of life are improved, and better lighting makes reading and working easier. Health problems are reduced as people inhale less toxic fumes from kerosene lamps. And there is better access to information from TV and radio, too.

Link: www.partnerships.nl/article-1026.3538.html

RERED-Project

Sri Lanka

In Sri Lanka, the government is removing barriers to renewable energy, and more. International financial institutions are involved, too.

Name of the programme: Renewable Energy for Rural Economic Development (RERED) Project

Lead institution: Government of Sri Lanka

Other institutions and stakeholders involved: World Bank, the Global Environment Facility (GEF), local governments

Timeframe: 2002-2007 | **Status:** Ongoing

Policy and main objectives: The Central Government is in charge of the whole project. The main objectives are to reduce atmospheric carbon emissions by removing barriers to and reducing implementation costs for renewable energy, and to promote and improve energy efficiency. Additionally, the private sector and local communities are involved in order to foster rural economic development.

The project targets include (a) provision of electricity access to 100,000 rural households through solar home systems and off-grid electricity connections via independent mini-grids powered by micro-hydro, wind and biomass generators; and (b) electrification of 1,000 small and medium-sized rural enterprises through renewable energy resources. Funding under the project is channelled through participating credit institutions (PCI) to individual investments. Grant funds are also available from the GEF for selected technical assistance activities. Provincial-level governments also participate in the project by providing a matching grant to residents of the provinces who purchase or connect to renewable energy technologies.

The amount of a grant varies; for instance, the price per watt peak (Wp) of a solar unit is USD 70 with a capacity of 41 Wp to 60 Wp.

Results achieved: Off-grid projects completed include the electrification of 66,267 rural homes through solar home systems and 3,036 homes through 72 village hydro projects.

Link: www.energyservices.lk/

6. NATIONAL AND FEDERAL POLICIES, PRACTICES AND PROGRAMMES

National governments must not only regulate,
but also lead by example!

They have a role in initiating programmes and offering carrots,
as well as in promoting research and development

Climate Investment Programme (KLIMP)

Sweden

KLIMP is an ambitious programme that goes beyond the Kyoto targets by using subsidies as carrots to support local-level action.

In 2002 the Swedish Parliament resolved that Sweden must reduce its emissions of greenhouse gases by four per cent over the period from 2008 to 2012. This was done even though the Kyoto Protocol and the European Union burden-sharing agreement actually permit Sweden to increase emissions by four per cent. So far, emissions have been reduced by two per cent since 1990. As one means of putting this objective into practice, Sweden introduced the Climate Investment Programme (KLIMP) in 2002.

The climate investment programme enables municipalities and other local players to receive assistance for long-term investments that reduce the greenhouse effect. Other aims

are to strengthen local climate work and cooperation between various players and, further, to collect and disseminate information on and experience of climate investments.

The Government provides support through a subsidy. One condition for getting the subsidy is that part of the environmentally funded costs for the measures are financed by those responsible for a project. When the project is finalized, a report has to be sent to the Swedish Environmental Protection Agency, which will then decide on the subsidy amount.

From 2003 to the present, there have been 72 climate investment programmes in 54 municipalities. The investments were made in sectors with the largest impact on climate such as transport and energy. The main focus has been on energy production and distribution, transport and waste.

More information at

www.naturvardsverket.se/klimp

www.internat.naturvardsverket.se/investment

Building, Living, Property! – Management for the Future

Sweden

Construction involves a large number of different professions and interest groups. Cooperation and mutual understanding is a must. This is a Swedish stakeholder dialogue project.

Voluntary environmental agreements can complement instruments such as legislation and government-financed incentives. The project Building, Living, Property Management for the Future is based on a voluntary agreement between the government, some municipalities, and companies within the building and property sector. The approximately 40 different participants include housing companies, contractors, consultants and municipalities. The agreement was signed in 2003.

Three strategic topics are especially highlighted:

- Healthy indoor environment
- Efficient use of energy
- Efficient use of resources

The commitments that the participants have signed include seven strategic areas:

- Sustainable community planning
- A holistic view to the entire life cycle of a building
- Quality and efficiency in the construction and property management processes
- Energy efficiency and the environment in property management
- Energy rating and environmental classification of buildings according to energy use
- Invest in research, development and training for a sustainable building and property sector
- Follow-up and evaluation

The project also includes training programmes. As a first step, all workers involved in the building process and in building maintenance have been trained.

The written agreements between the participants and the government help in making the commitment stronger, as compared to a totally informal roundtable. The names of the participants are published and the participating companies

are regarded as pioneers in the field. As a sign of recognition, they are allowed to display the trademark 'Participant in the dialogue project Building–Living'. To show its commitment to the dialogue project, the Government is funding a secretariat to initiate and organise training programmes, among other things. Within the project there are also activities to create local Building–Living dialogues.

The first evaluation of the project was presented in 2006. The Government and Parliament have decided that the project will continue until 2010.

Further information at: www.byggabodialogen.se

Applying voluntary consensus standards

United States

The text refers to certification systems; if you want to learn more, please click www.usgbc.org/LEED/ or see also Chapter 10 in this publication.

The National Technology Transfer and Advancement Act (NTTAA) requires Federal agencies to “use technical standards that are developed or adopted by voluntary consensus standards bodies” in both their procurement and rulemaking unless such use is inconsistent with applicable law or otherwise impractical. In cases where no voluntary consensus standards exist, agencies can also use other technical standards.

There was great wisdom in the NTTAA. Consumers benefit from standards in that they provide confidence in the quality, safety, and reliability of a product or service. Businesses benefit from standards in that they reduce cost, provide interoperability, promote regulatory compliance, reduce liability exposure, and provide organizations with a competitive advan-

tage. Governments benefit from standards in that they achieve public policy objectives for a host of environmental concerns, lower regulatory and procurement costs, promote exports, trade, and economic growth, and comply with the World Trade Organization (WTO).

Green building standards are at the forefront of environmental preferability standards in many ways: taking a holistic, systems approach; pushing the science of life cycle assessment; asking the tough questions about chemicals of concern; and balancing environmental, economic, and social considerations. And, the leaders in developing green building standards are engaging stakeholders in a very open, transparent process. These standard methodologies, rating systems, and other metrics provide a larger framework in which to organize and implement green programs at the national level. The use of green building standards fits well in the government context, considering the Federal government’s massive size, hierarchical structure, and typical way of doing business. The use of green building standards will also make the job of implementation easier, reducing the duplication of background research by the many parties working on green building, and giving an

official stamp of approval to justify sustainable design and construction work.

The Office of the Federal Environmental Executive (OFEE) encourages the development of sustainable buildings using agreed upon criteria that are determined in a scientific and life-cycle based manner, and that can be verified by a process that is credible and transparent to the public. To date, the LEED® has been the most widely available and advanced mechanism available to do that. As a result, many federal agencies, including the General Services Administration (GSA), the Environmental Protection Agency (EPA), and the Department of Defense (DOD), have made LEED a policy for their own facilities. However, we are open to other models and tools as they become available, and at the same time, applaud those who use LEED to enhance their buildings and have received various levels of certification.

In the interim, we are working with the U.S. Green Building Council (USGBC) to address environmental performance criteria and standards development process issues as they move into new standards and later versions of the existing standards. We are also working with Green Globes and other organizations as they develop sustainable building standards. Specifically, the OFEE and EPA are coordinating with ASTM International (formerly the American Society of Testing and Materials), to host the first “International Symposium on Common Ground, Consensus Building & Continual Improvement: International Standards and Sustainable Building”. The symposium, featuring peer-reviewed papers from the major players in sustainable building product standards and rating systems from around the world, was held in April 19-20 2007 in Washington, DC.

Link: <http://www.astm.org/MEETINGS/COMMIT/e06symp.htm>.

Agency-specific use of standards and ratings systems in policy:

- The General Services Administration (GSA) is the Federal government's landlord and the largest real estate organization in the country, with more than 340 million square feet of buildings and an additional 90 million square feet currently under construction. GSA requires that all building projects meet the LEED-Certified level with a target of LEED-Silver.
- In completing design-build contracts, the Pentagon strives to achieve the highest performance possible utilizing LEED as a benchmark; and the Pentagon Renovation Program's long-term goal is to obtain a LEED rating for the entire Pentagon Reservation.
- The Air Force has committed to achieving 100% LEED certifiable facilities by fiscal year 2009.
- The Army requires that all military offices construct all vertical projects to the LEED-Silver level, beginning in fiscal year 2008.
- The Assistant Secretary of Navy for Installations and Environment directs Department of Navy to plan, program and budget to meet the requirements of the Energy Policy Act of 2005, the Federal Leadership in High Performance

and Sustainable Buildings Memorandum of Understanding (MOU) and to earn a LEED Silver-level rating minimum, in new and replacement buildings, in a memorandum dated August 4, 2006.

- The Environmental Protection Agency (EPA) aims to have all of their new facility construction and new building acquisition projects of 20,000 gross square feet or larger meet LEED Silver. The EPA also aims to use LEED for new commercial interiors and existing building standards where space in an existing building is acquired.

Beyond policies and goals, however, are the success stories of individual building projects and the marketplace trends that they signify. In the Federal community, approximately 320 buildings (accounting for more than 60 million square feet) are currently registered for LEED certification, 51 have been certified (accounting for more than 5 million square feet) with many more certifications pending.

Link: www.ofee.gov/sb/sb.htm Office of the Federal Environmental Executive (OFEE)

Leading by Example:

Voluntary Agreement Elevated to Presidential Mandate (EO 13423), United States

Every government can and should decide how it builds, uses, maintains and renovates its own buildings. If governments don't set an example, who will?

As the owner of approximately 445,000 buildings and lessee of an additional 57,000 buildings—the largest real estate portfolio in the world—the US Federal government recognizes that its facilities have tremendous impact on the natural environment, the economy, and the thousands of people that work in, live in, and visit these buildings every day. Stepping up to this responsibility, the US Federal government is rethinking how it builds today to secure and enhance the future. High performance and sustainable building involves maximizing environmental and human health benefits throughout entire life-cycle of a building – from siting through design, specification, construction, operation, maintenance, renovation, and eventual removal.

On January 24-25, 2006, more than 150 Federal facility managers and decision makers came together at the first-ever “White House Summit on Federal Sustainable Buildings” to witness the signing of the “Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (MOU).” The MOU is the flagship Federal effort to define guiding principles of green building and provide leadership in the design, construction, operation, and maintenance of high performance and sustainable buildings.

These 19 Federal agencies, controlling more than 90 percent of the total Federal facility square footage, joined to minimize the environmental footprint of their buildings by adopting the MOU's Guiding Principles, which include:

- Employing integrated design;
- Optimizing energy performance;
- Protecting and conserving water;
- Enhancing indoor environmental quality; and
- Reducing the environmental impact of materials.

Best Policy Practices

To build from this and other accomplishments and to pave the way for future success, President Bush signed Executive Order 13423 “Strengthening Federal Environmental, Energy and Transportation Management” on January 24, 2007. The new Executive Order (EO) consolidates and strengthens a number of prior EOs by establishing new and updated goals, practices, and reporting requirements for environmental, energy, and transportation performance and accountability. In the area of sustainable design and high-performance buildings, the new EO makes mandatory the five Guiding Principles of the MOU for all new construction and major renovations and sets an aggressive goal for applying these practices to our existing capital assets over the next decade.

Link: www.ofee.gov/whats/eo_13423.htm

The Interagency Sustainability Working Group

United States

No sustainability without cross-departmental and cross-sectoral cooperation. This is not “bureaucracy” but “coherence”!

The Interagency Sustainability Working Group (ISWG) was established in September 2001 in response to Executive Order 13123 - Greening the Government Through Efficient Energy Management. Chaired by the Department of Energy's Federal Energy Management Program (FEMP), the ISWG is composed of more than 180 representatives from a cross-section of Federal agencies.

The purpose of the ISWG is to:

- Serve as a forum for the exchange of information within the federal government on individual agency sustainable design activities;

- Foster and encourage each Executive Branch department and agency to consider the adoption of sustainable design practices and the technologies in new federally owned, operated, and leased buildings as well as major renovations of existing federal facilities; and
- Identify and propose solutions to barriers for the adoption of sustainable design in the federal sector.
- Review and update as necessary the Guiding Principles for Federal Leadership in High Performance and Sustainable Building.
- Develop Technical Guidance on the Whole Building Design Guide in support of EO 13423.

Recognizing that a formal commitment between agencies to implement sustainable building practices was required, the ISWG initiated the “Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (MOU)” in January 2003.

Link: www.eere.energy.gov/femp/technologies/sustainable_workinggroup.cfm

The Whole Building Design Guide

United States

How to weave together building accessibility, productivity, cost-effectiveness, functionality, aesthetics, historic preservation, security and sustainability? The WBDG is one of the key elements of the Federal sustainable buildings policy.

In addition to information and resources covering project management, operations and maintenance, and a myriad of building-related policies, criteria, and mandates, the Whole Building Design Guide (WBDG) holistically and seamlessly weaves together the following design objectives: building accessibility, productivity, cost-effectiveness, functionality, aesthetics, historic preservation, security, and sustainability. The WBDG is so thorough in its treatment of these complex and interrelated issues that many Federal agencies, including all the Department of Defense (DOD) services, have closed down their own construction criteria websites in favor of contributing that content, as well as other tools and resources, to the WBDG.

In particular, the Sustainable Design Objective (SDO) section of the WBDG has grown exponentially in recent years, drawing attention and accolades. Essentially, the SDO begins with an overview of the key principles of sustainable design.

Within each principle category, a number of more detailed sections, called resource pages, educate users on specific topics, such as daylighting, environmentally preferable products, and natural ventilation. These resource pages are written by nationally-renowned experts in their field, in the public and private sectors, as well as in academia. Each resource page contains links, additional resources, and publications to explore the topic further and is updated on an 'as needed' basis.

In response to the Federal Leadership in High Performance and Sustainable Building Memorandum of Understanding and EO 13423, the Interagency Sustainability Working Group (ISWG) is developing Technical Guidance for implementing these mandates.

Link: <http://www.wbdg.org>

Policy for public buildings and government Offices

China

It is good policy to look, where there is room for improvement. The best starting place is one's own house.

After establishing a statistical, auditing and disclosure system for energy consumption of government office buildings, the Ministry of Construction (MOC) will identify ten energy-inefficient buildings in Beijing, and in other cities, and publish the information every year. (Source: China Construction Daily 2006-08-02)

In China, government office buildings and large public buildings are important targets in the field of sustainable buildings and construction (SBC).

China currently has about 500 million square metres of large public buildings. The electricity consumption is around 70–300 kWh per square metre per year, which is 10 to 20

times more than in housing, making these buildings an important target for reducing energy consumption. By just fixing equipment, 30% to 50% energy will be saved, while after reconstruction, around 50% to 70% energy will be saved.

There is also about 600 million square metres of government office buildings, which is about 6.2% of the total area of urban civil buildings. If energy-saving reconstruction in all the government office buildings is carried out, resulting in 50% energy savings, it will save 18 million tons of coal equivalent (TCE).

Energy-saving reconstruction of government office buildings will be the breakthrough, it will take about 5 to 10 years to basically complete the work to change society's behaviour and improve energy efficiency in buildings.

China will establish the statistical, audit and disclosure system for energy consumption of government office buildings and large public buildings.

Programme for Ecologically Sustainable Construction

Finland

A Government resolution made in 1998 to speed up the sustainability of construction.

Name of the programme: The Finnish Government Programme for Ecologically Sustainable Construction

Lead institution: The Ministry of the Environment

Other institutions and stakeholders involved: Major organisations in the Finnish Real Estate and Construction Sector

Timeframe: 1998-(2002) | **Status:** Finished

Policy and main objectives: A good way to promote and guide sustainable construction in the early stages of development is through a comprehensive programme with common targets. The Finnish Government Programme for Ecologically Sustainable Construction has been one of the most effective instruments for promoting ecological sustainability. The programme, which was drawn up by the Ministry of the Environment, was approved as a Government Resolution in

late 1998. The intention of the programme was to speed up the development processes associated with the ecological sustainability of construction that were already under way. The programme was drawn up in close cooperation with the construction and property sector, which allowed joint targets to be established in promoting ecological sustainability.

The strategic goals of the programme were to substantially reduce the environmental loading caused by construction and the building stock, to turn environmental expertise and environmental technology into a national competitive factor for the construction sector, to increase the readiness of the construction and property sector to accept environmentally based and customer motivated decision-making, and to strengthen ecological sustainability in the development of communities.

Results achieved: The programme implementation was monitored in late 2001 and early 2002. The results showed that the building sector has a considerable environmental awareness at the theoretical level. Progressive sectors include the assessment of ecological factors, indoor climate, water economy and the management of building waste. On the other

hand, it was found that in practical building activities, these principles were not so thoroughly implemented.

The programme was important in that it gave an unambiguous and transparent orientation to sustainability for the whole sector. The intention is to use the monitoring results as a foundation for promoting ecological sustainability in the future.

Link: www.ymparisto.fi/default.asp?node=4779&lan=en

7. LOCAL LEVEL POLICIES

If sustainability strategies are not both
formulated and implemented at the local level, too,
they'll not be implemented at all.

In many cases, cities show the way,
because they know that there is no alternative.

Energy labels for buildings

Shanghai, China

We take it for granted that our refrigerators have energy labels, and we ask about the fuel consumption of cars. Why not buildings, too – and for a much better reason?

The Shanghai Government will start certification and labelling of energy-efficient buildings from 2007 onwards. The first to be certified and given an energy-efficient label will be public buildings. (Source: Shanghai Construction and Transport Commission, 2006-11-08)

There is 30 million square metres of buildings in Shanghai where reconstruction is needed to reduce energy consumption by 50%. Additionally, under the Eleventh Five-Year Plan about 0.18 billion square metres of new buildings will be added.

Besides demonstrating energy-efficient labelling of buildings, the Shanghai Government's policy is to provide similar economic incentives to promote the development of sustainable buildings and construction. For example:

- Favourable tax policy for new buildings that incorporate energy savings, land savings, water savings and material savings, and for energy-saving reconstruction. Favourable interest policy for pilot projects.
- Establish special funding for promoting energy-efficient buildings.
- Advance the energy price reform to accelerate energy savings.
- Encourage the society to participate in the reconstruction and promote foreign investments.
- Reform of the award appraisal methods.

Energy and Climate Change Strategy

City of Cape Town, South Africa

A comprehensive urban strategy is being developed and implemented by an African city.

The Strategy of the City of Cape Town is the first of its kind on the African continent. It is based on a comprehensive State of Energy assessment. The ongoing project, which was initiated 2003, has the political support of the City Council and the Mayoral Committee, and is implemented in cooperation with Sustainable Energy Africa (SEA).

Among the objectives of the strategy are diversification of the energy mix, mitigation of the impacts of global warming, and maximising the role of energy in the socio-economic development and environmental sustainability of the City. A set of visions includes access to appropriate, affordable, safe and healthy energy services, efficient and equitable transport systems based on public transport and compact planning, and energy supporting economic competitiveness and increasing employment.

These visions have significant implications for the built environment and are measured against a set of targets, such as having 10% households installed with solar water heaters and all city-owned housing installed with compact Fluorescent Light bulbs (CFLs) by 2010, and all existing houses to be retrofitted with insulated ceilings and 90% of the households to use CFLs by 2020. The electricity consumption of the municipality is to be reduced by 5% by 2010. The target for renewable energy supply is 10% by 2020, and reduction target for CO-emissions by 2010 from 2005 levels is 10%.

Links:

www.sustainable.org.za/downloads/reports-documents.html#reportscapetown
www.capetown.gov.za/wcmstempltes/ERM.aspx?clusid=465&catparent=6319&IDpathString=6239-6319
www.capetown.gov.za/wcmstempltes/Electricity.aspx?clusid=458&catparent=6003&IDpathString=5992-6003

Congestion charge

London, United Kingdom

Talk about “political will,” see what Mayor Livingstone has done in London to get rid of traffic jams.

Congestion charge in London targets SUVs is an interesting policy measure, see link for more information: [Full text...] January 10, 2007; Mayor Ken Livingstone of London (UK) is proposing that high polluting cars be charged £25 (approx USD 47) per day to enter the central congestion charge zone.

Solar thermal ordinance

City of Barcelona, Spain

The City of Barcelona enacted the ordinance first, then other Spanish cities followed; now it is included in Spain's national legislation.

The annex on Solar Thermal Energy Capture in the general environmental ordinance of the Barcelona City Council went into force in August 2000 for the purpose of regulating the incorporation of solar thermal energy capture and use systems for the production of sanitary hot water in the city's buildings.

The Solar Ordinance affects newly built and refurbished buildings and those where a change of use is planned, with a forecasted volume of sanitary hot water demand equal to an average annual energy consumption of over 292 net megajoules (MJ).

The regulation applies to buildings intended for residential, health-care, sports, commercial and industrial use and, generally, any activity leading to a large consumption of hot water, for example, in dining rooms, kitchens, laundries or related to other circumstances.

The monitoring and assessment of the development of the Solar Thermal Ordinance is one of the projects of the Barcelona Energy Plan, which the Barcelona Energy Agency (see below) has been managing since May 2003 through an agreement with the Barcelona City Council.

The Barcelona Energy Agency is preparing a new text of the Ordinance with a lower threshold of application in order to make it applicable to almost all the city's new and rehabilitated buildings. In order to achieve the maximum consensus for its development, the Barcelona Solar Energy Bureau has been formed. All the stakeholders involved in the application of the rules and the implementation of solar energy in general in the city are represented in this body.

The Solar Thermal Ordinance came into force in August 2000, and by December 2005, 428 building and construction projects were processed under the ordinance, with a total of 31 050 square metres of new solar heat capture surface area, producing an estimated energy savings of 24 840 MWh/year.

For more information, see
www.barcelonaenergia.cat/eng/operations/ost.htm

Agència d'energia de Barcelona

Barcelona, Spain

It is a strategic political choice whether a city decides to invest in a coherent energy policy or not. Barcelona does.

The Barcelona Local Energy Agency – Towards a New Energy Culture – is a public consortium created to drive, manage and monitor Barcelona's Energy Improvement Plan. The Agency is an instrument to facilitate collaboration and coordination among various stakeholders.

The Barcelona Energy Improvement Plan of 2003 addresses all citizens, companies and administrations to improve environmental quality and to contribute to a sustainable development of the city. Setting up the Barcelona Energy Agency was one of the actions proposed in the plan, which calls for increased awareness and the promotion of clean, renewable energies, as well as more efficient systems. It includes projects for which the City Council has direct responsibility or has to approve, such as

- in housing: improvement of windows and insulation in refurbished dwellings, high-performance boilers, energy saving lighting, and review of energy standards
- in public buildings and facilities: replacing existing street lighting, LED traffic lights, improving energy management of lighting, solar power in schools, energy management programmes in schools and universities, performance contracting and energy pools, energy use standards, reduction of energy used for decorative lighting
- in infrastructure networks: district heating and cooling network as well as a photovoltaic power central for the 2004 Forum site, district heating and cooling network for District 22@, use of cold produced by the LPG re-gassing plant in the Port of Barcelona for air conditioning purposes

Links

www.barcelonaenergia.cat/ and www.barcelonaenergia.com/homeeng.htm

Local Green Building Programs

United States

Public awareness about the benefits of sustainability is a must. Prejudice and misconceptions can be the worst barriers.

In the United States, local green building programs are making great strides toward promoting public acceptance of green building and its benefits, as well as encouraging builders to adopt green building practices. While some green building programs are sponsored by state or local government, others are administered by home building industry associations or by other nonprofit groups.

Link: <http://www.smartcommunities.ncat.org/buildings/gbprogram.shtml>

8. PUBLIC PROCUREMENT

Public procurement amounts to
about 15% of the GDP of OECD countries.

If wisely used,
it can be a powerful strategic tool to support innovation,
decent work and fair trade,
and to save energy and other resources.

Top-Runner Approach

Japan

The best product on the market sets the standard for public procurement in Japan.

For more information, see

www.worldenergy.org/

wec-geis/publications/reports/eepi/a1_labelling/japandata.asp

Marrakech Task Force for Sustainable Procurement

Switzerland

Switzerland is the lead country for this voluntary international initiative, which is looking for tools to promote sustainable procurement.

For more information, see
[www.uneptie.org/
pc/sustain/10year/taskforce.htm](http://www.uneptie.org/pc/sustain/10year/taskforce.htm)

Sustainable Procurement Action Plan

United Kingdom

One of the goals is “a sustainably built and managed central government estate that minimises carbon emissions, waste and water consumption and increases energy efficiency”.

The recently (2007) published report can be downloaded at www.sustainable-development.gov.uk/publications/pdf/SustainableProcurementActionPlan.pdf

Preventing corruption on construction projects (PACS)

Unfortunately, real estate development and construction are infamous for corruption all over the world. The most perfect legislation, the clearest guidelines and the best of intentions don't make construction any more sustainable, if corruption cuts the long process into fragments and pushes original goals aside.

Transparency International has developed a Project Anti-Corruption System (PACS) specifically for construction projects. The continuing prevalence of corruption in construction projects requires governments, funders and project

owners to take preventive measures to limit corruption on a project-by-project basis. PACS is designed for this purpose.

Implementation of PACS may be required by governments as a prerequisite for project approval, by funders as part of the funding package, or by public or private sector project owners as a condition for participation in a project. The use of PACS will not only help governments, funders and project owners to ensure that projects are properly identified and executed, and that funds are properly spent. It will also demonstrate their commitment to the prevention of corruption.

To find more information and the whole PACS package, see www.transparency.org/tools/contracting/construction_projects

Executive Order 13423, January 2007

United States

Strengthening the environmental, energy, and transportation management of Federal agencies through procurement.

A new Executive Order requires Federal agencies to lead by example in advancing the nation's energy security and environmental performance by achieving these goals:

VEHICLES: Increase purchase of alternative fuel, hybrid, and plug-in hybrid vehicles when commercially available.

PETROLEUM CONSERVATION: Reduce petroleum consumption in fleet vehicles by 2% annually through 2015.

ALTERNATIVE FUEL USE: Increase alternative fuel consumption at least 10% annually.

ENERGY EFFICIENCY: Reduce energy intensity 30% by 2015.

GREENHOUSE GASES: Reduce greenhouse gas emissions through reduction of energy intensity by 3% annually or 30% by 2015.

RENEWABLE POWER: At least 50% of current renewable energy purchases must come from new renewable sources (in service after January 1, 1999).

BUILDING PERFORMANCE: Construct and renovate buildings in accordance with sustainability strategies, including resource conservation, reduction, and use; siting; and indoor environmental quality.

WATER CONSERVATION: Reduce water consumption intensity by 2% annually through 2015.

Best Policy Practices

PROCUREMENT: Expand purchases of environmentally-sound goods and services, including biobased products.

POLLUTION PREVENTION: Reduce use of chemicals and toxic materials and purchase lower risk chemicals and toxic materials from top priority list.

ELECTRONICS MANAGEMENT: Annually, 95% of electronic products purchased must meet Electronic Product Environmental Assessment Tool standards where applicable; enable Energy Star® features on 100% of computers and monitors; and reuse, donate, sell, or recycle 100% of electronic products through the application of environmentally sound management practices.

ENVIRONMENTAL MANAGEMENT SYSTEMS: By 2010, increase to at least 2,500 the number of Federal operations that implement environmental management systems, up from about 1,000 today.

Link:

[www.whitehouse.gov/
news/releases/2007/01/20070124-2.html](http://www.whitehouse.gov/news/releases/2007/01/20070124-2.html)

Federal Green Construction Guide for Specifiers

United States

Specs have to go “green” as well, how else could the final product be environmentally any better?

To address the need for a comprehensive guide for procuring green building products and construction services within the Federal government, the US Environmental Protection Agency (EPA) partnered with the Federal Environmental Executive and the Whole Building Design Guide (WBDG) to provide model green construction specification language to be used to supplement full project specifications and to ‘green’ guide specifications. Organized according to the Construction Specifications Institute’s MasterFormat™, the 60+ section Federal Green Construction Guide for Specifiers provides users with multiple, performance-based options, allowing for flexibility in application. Specifically, the Guide is helping federal agencies meet their project-specific environmental goals and mandates including:

- Executive Order 13423 www.whitehouse.gov/news/releases/2007/01/20070124-2.html
- Energy Policy Act of 2005 www.energy.gov/about/EPAAct.htm
- EPA’s Final Guidance on Environmentally Preferable Purchasing www.epa.gov/oppt/epp/
- EPA’s Comprehensive Procurement Guidelines for recovered content www.epa.gov/cpg/
- USDA’s Federal Biobased Products Preferred Procurement Program www.biobased.oce.usda.gov/fb4p/
- ENERGY STAR www.energystar.gov and DOE Federal Energy Management Program (FEMP) Product Efficiency Recommendations www.eere.energy.gov/femp/procurement/index.html
- ASTM, LEED, Green Globes, and other rating systems and standards
- And other ‘best practices’ as determined via industry and public comment

Find the Guide at <http://fedgreenspec.wbdg.org>.

9. RESEARCH AND DEVELOPMENT

Quantum leaps in the sustainability of energy use in buildings can be done with the technology that is already available everywhere.

Some of it is centuries old, and still valid.

Many construction elements and processes are low-tech.

However, more research, development, monitoring and reporting are urgently needed.

TEKES – Public Funding Agency for Technology and Innovation

Finland

In the highly competitive construction market, private companies alone won't invest enough in research and development. The Finnish government has acknowledged its responsibility to fund of public-private projects and EU-wide research cooperation.

The Finnish Funding Agency for Technology and Innovation (Tekes) is the main public financing and expert organisation for research and technological development in Finland. Tekes finances industrial R&D projects and projects at universities and research institutes, and also promotes innovative, risk-intensive projects. The funds for Tekes come from the state budget via the Ministry of Trade and Industry. It has a budget of 450 million euros, allowing it to fund 2,000 projects annually.

The primary objective of Tekes is to promote the competitiveness of Finnish industry and the service sector by assisting

in the creation of world-class technology and technological know-how. Specifically, Tekes' activities aim to diversify production structures, increase production and exports, and create a foundation for employment and social wellbeing.

Selective project funding is the basis of Tekes' operations. Funding and expert services are channelled to business R&D projects run by companies, research institutes, and universities. Tekes assists companies in their search for ideas, the finalisation of business plans, and their quest to conduct meaningful and valuable research. It has adopted an open and proactive approach towards companies' technology planning. But, it does not derive any financial profit from its endeavours, nor does it claim any intellectual proprietary rights, these stay strictly with the enterprise that Tekes is working with at that point in time.

Tekes' funding is intended for challenging and innovative projects, some of which will hopefully lead to global success stories. The funding may be a low-interest loan or a grant, depending on the stage of the innovation and the nature of the proposed project.

Technology programmes – where projects with potentially the greatest impact are chosen for R&D financing

TeKes uses technology programmes (www.tekes.fi/eng/programmes/index/frontpage.html) to allocate its funding, networking and expert services to areas that are important for business and society. It launches programmes in areas of application and technology that are in line with the policies outlined in its strategy. TeKes allocates approximately half the funding granted to companies, universities and research institutes through the technology programmes. For twenty years, TeKes' technology programmes have been contributing to changes in the Finnish innovation environment. Additionally, TeKes publishes information about programmes that have started, financing, and participants, as well as project summaries. More detailed information on the ongoing technology programmes is available on the Internet (www.tekes.fi/eng/programmes/all/all.html#Ongoing).

How are the technology programmes implemented?

TeKes plans the technology programmes in association with companies, universities and interest groups. The planning is

done in work groups and open seminars. The decision to start a programme is taken by the TeKes board. The programmes last an average of five years and their costs range from 50 million to 300 million euros. TeKes generally finances about half the costs of a programme. Every programme has a supervisor and an operational team at TeKes, and possibly a programme manager outside TeKes who is responsible for the practical operational arrangements.

Additionally, every programme has a steering group whose task is to direct the strategic areas of focus in the programme in accordance with the plan confirmed by the TeKes board. The steering group also follows the progress of the programme, that is, the group approves the annual implementation plan and monitors its performance. TeKes selects experts in technology and business for the steering groups in its programmes. Possessing both vision and extensive work experience, the steering group members do not represent their background organizations but are involved in a personal capacity. No remuneration is paid for participation in a steering group.

Tekes technology programmes for sustainable construction and climate change

During the last decade Tekes has invested a few hundred million euros in technologies for preventing climate change, in green and clean technologies, and in sustainable technologies. At the moment Tekes is preparing a new technology programme called “Sustainable Community”, which will be launched during autumn 2007. The programme will focus on both the building level and the community level. More detailed information will be available on the Tekes web site (www.tekes.fi/eng/programmes/all/all.html#Ongoing) during summer 2007. Ongoing and completed technology programmes related to sustainable construction and the prevention of climate change are listed below:

ClimBus Technology Programme 2004-2008 – Business Opportunities in Mitigating Climate Change (akseli.tekes.fi/openccms/openccms/OhjelmaPortaali/ohjelmat/ClimBus/en/etusivu.html)

CUBE - The Building Services Technology Programme 2002-2006 (www.tekes.fi/eng/cube/)

ClimTech - Technology and Climate Change Programme 1999-2002 (akseli.tekes.fi/openccms/openccms/OhjelmaPortaali/ohjelmat/CLIMTECH/en/etusivu.html)

Healthy Building - Construction Technology, Indoor Climate and Quality 1998-2002 (akseli.tekes.fi/openccms/openccms/OhjelmaPortaali/ohjelmat/Terve_talo/en/etusivu.html)

Environmental Technology in Construction 1994-1999 (www.tekes.fi/english/programmes/envcon/envcon.html)

Energy use in buildings - RAKET 1993-1998 (www.tekes.fi/english/programmes/raket/raket.html)

Water Services Technology Programme 1997-2001 (www.tekes.fi/english/programmes/water/water.html)

ProGresS

Finland

A Finnish cooperation project between the public and the private sectors. In R&D, ProGresS is D for development.

Name of the programme: ProGresS (Profitable Green Development in Real Estate and Construction Business)

Lead institutions: Finnish Association of Building Owners and Construction Clients

Other institutions and stakeholders involved: Major organisations in the Finnish real estate and construction sector

Timeframe: 1999-(2002) | **Status:** Finished

Policy and main objectives: ProGresS (Profitable Green Development in Real Estate and Construction Business 1999-2002) was a three-year joint environmental development programme which was launched and implemented by the main players in the real estate and construction sector. The aim of the ProGresS programme was to link environmental factors as a profitable part of business in the property and construction sector by packaging environmental expertise as compet-

itive technologies, products and services. The programme has been one of the most important channels for disseminating environmental information to the real estate and construction sector.

Results achieved: The ProGresS programme served as a cooperation network used by players in the industry for developing their expertise, products and services, for exchanging information and experiences, and for finding partners for their projects. Around one hundred companies took part in the programme and about thirty pilot projects were implemented within its framework. Thanks to the ProGresS programme, property owners are increasingly embracing life-cycle thinking and information has been distributed on long-term environmental thinking on financial profitability. Furthermore, the ProGresS programme has given rise to a number of important innovations and initiatives, including a joint environmental award by the construction and property sector. The Internet has been the most important channel of communication for the programme.

Link: www.rakli.fi/attachements/2005-11-16T09-09-3139.pdf

10. BUILDING CERTIFICATION AND RATING SYSTEMS

We are accustomed to asking for more information when we buy a refrigerator or a car than when we buy a house or rent space.

Building rating systems are voluntary certification systems for new construction and renovation of buildings.

There are several such systems;
for more information you'll find some useful links here.

PromisE, LEED™, BREEAM, CASBEE, Green Globes™

United States

Who is who in the acronym soup of different building rating systems? Some deal with sustainability, others with the environment only.

To compare various systems: “Sustainable Building Ratings Summary” (July 2006) by Fowler, K.M. and E.M. Rauch, completed by the Pacific Northwest National Laboratory, operated for the U.S. Department of Energy by Battelle, can be downloaded at www.aia.org/SiteObjects/files/COTENotes%20fall%2006%2022%20GSA%20Green%20Rating%20Systems.pdf

LEED™-Certification for buildings is best known in North America, where the focus is still on “green building”, instead of “sustainable construction”. A basic document “LEED – NC, Green Building Rating System for New Construction and Major Renovations, Version 2.2, 2005” can be downloaded at www.usgbc.org/ShowFile.aspx?DocumentID=1095

The U.S. Green Building Council describes the system on its website www.usgbc.org/LEED/: “The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED gives building owners and operators the tools they need to have an immediate and measurable impact on their buildings’ performance. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.”

Other building rating systems are, among others, BREEAM, CASBEE, Green Globes™ U.S. and SBTool. For an overview, see www.aia.org/SiteObjects/files/COTENotes%20fall%2006%2022%20GSA%20Green%20Rating%20Systems.pdf

Last but not least, don’t miss the Global Reporting Initiative (GRI), see www.globalreporting.org/Home - in several languages!

SF GreenPRINT

United States

A scorecard as a tool to monitor, measure and compare environmental and economic impacts.

Making the impacts of our buildings real to the public and decision makers is critical to advancing green building. Equally important is the need to compare the environmental and economic results achieved through various green building practices and technologies. The resulting information can drive decisions today as well as the research priorities for the future. Wouldn't it be nice to have a simple scorecard that could explain, with real numbers, the environmental and economic impacts of green buildings? Yes, and it has become a reality through the SF Green Project Reporting and Information Tool www.sfgreenprint.org.

SF GreenPRINT quantifies individual building-level environmental and economic impact information that can also be aggregated across agencies or entire sectors, such as the Federal government, local government, or a university system.

The web-based application tracks and reports on the environmental benefits and economic savings that accrue to a building owner throughout all phases of the design and construction of green building projects using the LEED Green Building Rating System. Developed by the San Francisco Department of the Environment under a grant from the US Environmental Protection Agency (EPA), it was designed to be adapted to incorporate other organizations' local environmental and economic metrics and unique requirements.

SFGreenPRINT:

- Monitors the progress of projects and LEED for New Construction and Major Renovations, Existing Buildings, and Commercial Interiors (LEED-NC, LEED-EB, and LEED-CI) credits for which they are applying.
- Evaluates green building projects based on calculated environmental and financial savings based on achieving specific LEED credits.
- Incorporates adjustable settings to reflect local avoided emissions, energy and water rates, tipping fees, and other data that vary across the nation.

Best Policy Practices

- Provides an Environmental Scorecard with an automated .pdf file generator to show the status and effects of green buildings in the agency, including project location, certification level, environmental impact, and cost savings.
- Reports on green buildings at the project level and provides aggregated data across multiple projects to support overall impact assessment and project comparisons.

San Francisco and EPA are working with Federal agencies and the USGBC to make this tool publicly available.

Link: www.sfgreenprint.org

FOR MORE INFORMATION

SEE LINK ...

European Union - The European Commission has published several papers on An energy policy For Europe, there is one in particular on buildings. (The papers published by the Commission are available in all EU member country languages.) ec.europa.eu/energy/action_plan_energy_efficiency/doc/buildings_en.pdf

Holcim Foundation for Sustainable Construction (www.holcim-foundation.org/) is a private foundation promoting innovative approaches to sustainable construction mainly through Awards competitions, where sustainability criteria are applied, and an international Forum. The objective of the foundation is to encourage sustainable responses to the technological, environmental, socio-economic and cultural issues affecting building and construction, regionally as well as globally.

ICLEI – Local Governments for Sustainability is an organization and network of about 500 cities worldwide. It offers guidance and cooperation initiatives at the local level. Cities are joining forces and developing strategies and action to fight climate change. Two ICLEI programmes in particular target energy

efficiency from two different perspectives. CCP – Cities for Climate Protection (www.iclei.org/ccp) looks at various energy efficiency measures that cities can take, and Sustainable Procurement (www.iclei.org/procurement) with its city network BiG-NET develops tools and mechanisms for public purchasing. See www.iclei.org

REEEP – The Renewable Energy and Energy Efficiency Partnership (www.reeep.org/) is a global public-private partnership that structures policy and regulatory initiatives for clean energy, and facilitates financing for energy projects. Backed by more than 200 national governments, businesses, development banks and NGOs, REEEP contributes to policy dialogues. Its aim is to accelerate the integration of renewables into the energy mix and to advocate energy efficiency as a path to improved energy security and reduced carbon emissions, ensuring socio-economic benefits. You can register free or charge and become an Associate Member.

TI – Transparency International is a global civil society organisation leading the fight against corruption. TI is a network including more than 90 locally established national chapters and chapters-in-formation. These bodies fight corruption in the national arena in a number of ways. They bring together relevant players from government, civil society, business and the media to promote transparency in elections, in public administration, in procurement and in business. TI's global network of chapters and contacts also use advocacy campaigns to lobby governments to implement anti-corruption reforms. Politically non-partisan, TI does not undertake investigations of alleged corruption or expose individual cases. TI has the skills, tools, experience, expertise and broad participation to fight corruption on the ground, as well as through global and regional initiatives. For a lot more information and tools, see www.transparency.org/

UNEP – UNEP's Sustainable Buildings and Construction Initiative (SBCI) is a "sister initiative" of the Marrakech Task Force on Sustainable Buildings and Construction. It has its own website, where also the main documents of the Task Force are available: www.unepsbci.org. Among other activities, SBCI is forming a partnership with a university to undertake as complete as possible a review and analysis of existing governmental policies and tools to encourage energy efficiency in buildings. The intention is to have well over a hundred countries covered from all over the world. First results will be available towards the end of 2007.

US EPA, the United States Environmental Protection Agency's Green Building Programs, see www.epa.gov/greenbuilding

WB – the World Bank has several publications on corruption. For more information also in Arabic, Portuguese, French and Spanish, see web.worldbank.org/WBSITE/EXTERNAL/WBI/EXTWBIGOVANTCOR/0,,contentMDK:20725263~menuPK:1977002~pagePK:64168445~piPK:64168309~theSitePK:1740530,00.html

WBCSD – World Business Council for Sustainable Development has its own construction initiative, Energy Efficiency in Buildings. The project will comprise three phases, each producing reports that together will form a roadmap to transform the building industry. The first report will document existing green building successes and setbacks, the second will identify the full range of present and future opportunities, and the third will present a unified industry strategy for realizing those opportunities by 2050, specifically in China, India, Brazil, the United States and the European Union. Each report will take one year to complete and will involve hearings and conferences with building contractors and suppliers, sustainability experts, government representatives, regulators, utility officials and others. See www.wbcd.org/ and www.wbcd.org/templates/TemplateWBCSD5/layout.asp?type=p&MenuId=MTA5NQ&doOpen=1&ClickMenu=LeftMenu

Marrakech Task Force – what is it?

Who is behind this publication?
Let us introduce ourselves. And please,
get back to us with more information
about your best policy practices!

Rio – Johannesburg – Marrakech – Costa Rica – Stockholm – ?

The Marrakech Process on Sustainable Consumption and Production (SCP) was initiated in 2003 after the Johannesburg World Summit on Sustainable Development (WSSD) in 2002. The 2nd International Meeting was held in Costa Rica, September 2005, and the third one in Stockholm, June 2007.

A Marrakech Task Force (MTF) is a voluntary initiative to support the implementation of the Marrakech Process. A country interested in leading a certain issue on SCP, and willing to involve other partners, can initiate a task force. They co-operate with UNEP and UN DESA. The long-term goal is to contribute to both the concept and the substance of the 10 Year Framework Programme (10YFP) of Sustainable

Consumption and Production. For more information see www.unep.org/pc/sustain/10year/taskforce.htm

The Marrakech Process will be up for policy review and recommendations in the 2010/2011 cycle of the UN Commission on Sustainable Development (CSD), and is a cross-cutting issue for all CSD cycles. Task Forces linked to the respective substantive themes of each CSD will take part in the discussions and report on progress achieved and lessons learnt.

Marrakech Task Force on Sustainable Buildings and Construction

A complex network of different stakeholders, professions and industries is required in the construction, maintenance and refurbishment of buildings. However, the Government of Finland acknowledges that also the public sector has to make a strong commitment both as regulator and landlord, as consumer and producer. As part of its contribution, in 2006 Finland took the lead of the Marrakech Task Force on Sustainable Buildings and Construction (SBC).

In cooperation with UNEP's Sustainable Buildings and

Construction Initiative (SBCI), the Task Force has published a baseline report: Energy Use and Greenhouse Gas Emissions from Construction and Buildings, see www.unepsbci.org/resources. As the outcome of the first international workshop in June 2006 in Helsinki, the Task Force drafted Policy Action Points, (see www.unepsbci.org and www.environment.fi/sbc).

The international core group of the Marrakech Task Force on SBC has included China, France, Lithuania, Mexico, Sweden, the United States, the City of Cape Town, and Finland as the lead country. Finland has also its own national advisory committee with a broad representation of different stakeholders. To join the Task Force, please contact

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Acknowledgements

For their assistance in compiling this publication,
we'd like to extend our warmest thanks to the following people

Erkki Aalto, Ulla Ahonen, Helena Barracó Nogués, Alison Kinn Bennett, Agne Dulkyte,
Helmut Frischenschlager, Terry Forster, Harri Hakaste, Jarmo J. Heinonen, Peter Henshall-Howard,
Hu Tao, Pekka Huovila, Petri Jaarto, Aira Kalela, Christian Kornevall, Anne Koskela, Philip Kristensen,
Pietro Lancini, Tuomas Leppo, Lynn Lewis, Riina Loukola, Taina Nikula, Marjo Nummelin,
Abdul Waheed Patel, Mohan Peck, Edwin Pinero, Toni Pujol, Verena Radulovic, Valius Serbenta,
Grace Stead, Niclas Svenningsen, Jukka Uosukainen, Kerstin Wennerstrand, Wu Yuping.

Editor: Kaarin Taipale

Lay-out: Ahoy | Photo credits: Gorilla

MARRAKECH TASK FORCE ON SUSTAINABLE BUILDINGS AND CONSTRUCTION

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