
The New European GreenBuilding Programme to Promote Energy Efficiency Investments in non-Residential Buildings

Paolo Bertoldi

European Commission DG JRC

Objectives of the GreenBuilding Programme

GBP is designed and will be operated in order to contribute to the EU objective to **reduce energy demand in buildings**.

GBP main goal is to **stimulate “additional” cost-effective energy efficiency and renewable energies projects in non-residential buildings**.

GBP will help and facilitate the implementation of the new Directive on Energy Performance of Buildings (EPB Directive) by promoting and disseminating its requirements.

The objective of the GBP is to help overcome **most of the barriers** to energy efficiency and renewables in buildings - in particular the **lack of interest and information, technical capabilities and access to finance**.

Objectives of the GreenBuilding Programme

GBP will also **complement the EPB Directive** by stimulating energy efficiency measures in **existing** buildings, in particular stimulating energy efficiency in **smaller refurbishments** (compared to what required by the EPB Directive) and/or by stimulating other energy efficiency projects (without building refurbishment, for example for office equipment, lighting, HVAC) and by introducing mandatory energy management in building (not covered by the EPB Directive).

GBP will create a set of **resources and building examples** to facilitate the technical developments associated with the EPB Directive

HOW ?

by **providing information and technical support**, including information about:

- energy management and energy audit;
- building and system upgrades;
- M&V;
- ESCOs and financial opportunities;

to **companies wanting to commit to adopting energy-efficient measures** (both equipment/building upgrading and energy management practices) in buildings and by providing **public recognition** for their efforts and results.

The GreenBuilding Approach

- GreenBuilding applies to individual buildings and or to companies (corporate commitment), when they decide to apply GreenBuilding to 30% of the building space;
- Greenbuilding cover both existing buildings (this is the main target of the GBP) and new buildings;

The GreenBuilding Approach

In the case of an existing building:

- A company/organisation becomes Partner when they decide to upgrade an existing building, following the recommendation of the energy audit provided that the upgrades pass the profitability test. The criteria (use of best technology and most possible cost-effective more efficient alternative).
- The company can choose a whole building energy approach or a modular approach (e.g. renovating only a specific end-use sector, e.g. air-conditioners, lighting, etc. - see next slide) provide the chosen module captures a large part of the potential energy savings.

Areas of Action in GreenBuilding

Electricity loads:

- Lighting;
- Office Equipment;
- Electric Appliances (refrigeration, washing, cooking);
- Distribution Transformers and UPSs;
- Lift and elevators;
- Heat pumps;
- Air-conditioning and Ventilation;

Other fuels:

- Heating, water heating and steam (boilers);
- co and tri-generation;

Building shell (insulation, windows);

Passive cooling, heating and natural ventilation;

Renewable Energies (solar, biomass, etc.);

GreenBuilding Modules

HVAC

Lighting

Co-generation

**Management
Policies**

**Distribution
transformers**

**Commercial
Appliances**

**Office
equipment**

Renewables

Contents of the Modules

- . Guide on how to do the energy audit for the relevant systems:**
- . Typical technical information on efficiency improvements for the equipment/system concerned, including:**
 - System Design (size, topology, etc.);**
 - Equipment Selection (including alternatives system/equipment);**
 - Equipment and system control;**
 - System Operation and Maintenance;**
- . Tips on how to formulate a Action Plan and how to report**

Procedures in the GreenBuilding Programme

- . Initial Building **Energy Audit** by the company willing to join for any building(s)
- . The company submits a building(s) **Action Plan** defining:
 - key characteristic of the building(s) to be upgraded
 - energy efficiency and renewable actions and specific measures to which the commitment applies:
 - HVAC
 - and/or Lighting
 - and/or Commercial appliances
 - and/or Co-generation
 - and/or Office equipment
 - and/or Renewables
 - and/or Boilers and Water Heaters

Procedures in the GreenBuilding Programme

2. (cont'd). The company submit the Energy Management Plan.
3. If the Action Plan is approved by the EC, the Company granted the status of **Partner** at least until the building upgrade is completed and for an initial period of three years.
4. Partners **execute** their Action Plan
5. Partners are expected to **report** annually on their progress.
6. The EC **renews** Partner status every year, upon reviewing the annual report. If no additional projects/buildings submitted 3 years after the last project completion Partner Status will expire.

Procedures in the GreenBuilding Programme

- In the case of New Buildings, a full description of the expected energy performance of the new building together with the technologies used is required. The guiding principle for New Buildings is that the building shall consume 35% less energy of the building standard in force at the time or of a “conventional” new building presently constructed.
- Building completed or renovated/refurbished within the last 5 years (refurbished after on 1.1.1999), are to be treated as New Buildings. In this case the detailed record of the energy performance before and after the refurbishment has to be presented together with a description of the systems/equipment upgraded. At least 30% of energy have been saved or building shall consume 30% less energy of the building standard in force at the time or of a “conventional” building presently constructed

Possible Content of the A/C Module

- **Measurement of cooling loads;**
- **Properly sizing of cooling systems;**
- **Upgrading of the existing cooling system;**
 - Centralised versus unitary systems
 - Use of variable-speed drives (VSDs)
 - Replacement of chillers with new, more energy-efficient, non-chlorofluorocarbon (CFC) models
 - Two-pipe systems versus four-pipe systems
 - Installation of absorption chillers using recovered waste heat
 - Zoning requirements
 - Use of poly-generation systems
 - Use of solar assisted air conditioning systems
 - Use of district heating and cooling networks
- **Optimisation of operation of heating and cooling systems;**

Key principles of the GreenBuilding Programm

- **Elevate** decision-making about efficiency in buildings to senior corporate officials.
- Appoint **GreenBuilding Manager** in the company.
- “**à la carte**” commitment.
- The programme contains **Modules** defining the technical nature of an appropriate commitment for each energy service. Modules recommend:
 - cost-effective measures (IRR > 20% or LLCC)
 - which maintain or improve working conditions (air quality, lighting quality, etc.)
- Obligation to **Report** building projects and data.
- Adoption of company **Energy Management Policy**.

Key principles of the GreenBuilding Programm

- The "**Management Policies**" Module is required by all participants and is supposed to aid them in making energy efficiency an element of management priorities at every step of the life cycle of a building.
 - Results of DoE energy management programmes showed that up to 80% of the savings could be attributed to the energy efficient practices of staff and the operations and maintenance staff.
 - Examples include continuous and preventive maintenance, building commissioning, equipment purchasing policies (e.g. LCC), continuous monitoring of energy consumption.

Key principles of the GreenBuilding Programm

- Easy reporting.
- Based on IPMVP.
- Spread sheet to account for building consumption and technologies installed before and after the upgrade as been implemented.
- Facultative simple benchmarking tool.

Benefits for participants in the GBP

- Direct **financial** benefits by saving money and in most cases improving working conditions.
- Indirect benefits resulting from the **growing attention** of consumers and investors.
- Possibility to link the project to national **CO2 emission** reduction programme or other (Green/White certificates).
- **Information** resources.
- **Public recognition/endorserment.**

Benefits to public authorities

- Support for other programmes such as **Energy Star, Audit;**
- No need for **direct financial incentives** to trigger energy efficiency/renewable projects;
- Building up of **building data set** for case studies and benchmarking exercise;
- Possibility to test/verify early versions of the integrated new **measurement test** for building energy performance;
- Early **implementation of building Directive** and possibility of testing of national building certification schemes. It goes beyond the Directive as also small refurbishments are included and specially targeted;
- Establishment of effective **public/private partnerships;**

Other important & positive “side” effects

- Helps promoting the Energy Service and **ESCOs** industry.
- Foster a **real integration** at building level of energy efficiency and renewables.
- Promote the energy efficiency and renewable industry.
- Promote the role of the **Energy managers** as a professional figure.
- Create awareness for important practices such as **M&V, energy audit, continuous maintenance, commissioning, “Green” procurements, Life Cycle Costing.**

Expected results

- The GBP focuses on the existing stock of buildings as it represents the largest potential for improving energy performance in the short and medium term, promoting energy efficiency also in minor refurbishment;
- The GBP is compatible with the Building Directive, EMAS and ISO 14000;
- The GBP intends to facilitate the implementations of the Building Directive by fostering the introduction of efficiency improvements; the use of building certification; the inspection of heating and cooling plants, initially on a voluntary basis;
- The GBP integrates the lessons learned in the previous EU voluntary schemes and SAVE studies and projects.

Expected results

- The GBP is expected to start with 10-20 pilot partners in the first pilot phase (June 2004)
- then 100 Partners in its first two years and 100 more new companies/buildings every year as the programme gains public image.
- Partners will belong to the private and public sectors.
- Expected savings of at least 385,000 tCO₂/year after a 5 year period (based on GreenLight where the average Partner will have achieved ca. 350 tCO₂ annual savings)
- In addition, the GBP shall foster **active energy services, ESCOs and energy audit and M&V**

THANK YOU

FOR MORE INFO

paolo.bertoldi@cec.eu.int

<http://energyefficiency.jrc.cec.eu.int/>