display®

Towards Class A
GUIDELINES

Energie Cités

www.display-campaign.org

Produced by the Centre for Energy Efficiency, EnEffect, in collaboration with Energie-Cités, the European Alliance of Companies for Energy Efficiency in Buildings, EuroACE, the Council of European Municipalities and Regions, CEMR and the Architects' Council of Europe, ACE, as part of Towards Class A - Municipal Buildings as Shining Examples Project.

These Guidelines would not have been possible without the support of the local authorities presented in the examples, and of the associated partners of the Display® Campaign who are advertising in this brochure.

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I. Introduction

The Display® Campaign as a tool complementary to national Energy Performance of Buildings Directive implementation schemes

The aim of these Guidelines

From January 2006, the European Energy Performance of Buildings Directive (EPBD) placed a legal obligation on municipalities to measure and publicly "display" the energy performance of their buildings. In response, the Display® Campaign, "Towards Class A" was set up to help municipalities benefit from these requirements by developing strategies to engage with the public and maximise the rewards of better environmental management of public buildings.

The "Towards Class A" Guidelines form part of the Display®/Towards Class A Help Centre, and aim to help both elected representatives and building energy managers reduce the environmental impacts of municipal buildings by providing systematic, practical advice. The central objective is to assist municipalities improve the performance of their low-rated buildings rapidly, from Classes E, F or G to Classes B, C or even A.

The Guidelines aim to address six key questions:

- How can general energy management of municipal buildings be improved, and what activities need to be part of the building energy manager's daily routine?

- For which buildings will a Simple Building Performance Check suffice, and which will need a detailed energy audit?

- Is it possible to scale up a class by making small investments?

- Is it possible to reach Class A through major refurbishment?

- How can the labelling process affect building users' behaviour? Will an awareness campaign bring the results anticipated?

- What are the common mistakes to avoid?

Advice and recommendations in these Guidelines have, where possible, been reinforced by evidence found in the Towards Class A Shining Examples, where the benefits of taking concrete actions have been measured using the Display® Poster.

Complementing these Guidelines, 100 "Shining Examples" from across Europe will be promoted and showcased to all European municipalities via a specially created Shining Example search engine. Shining Examples are currently accessible on the Display® website (*www.display-campaign.org*).

The legal framework

Display® - the European Municipal Building Climate Campaign deals directly with key elements of the EPBD. Formally adopted in December 2002, the Directive was to be transposed into the national legislation of all Member States by January 2006, and implemented between 2006 and 2009. This Directive requires all Member States to take (among others) the following steps:

- Develop a common methodology for calculating and certifying the energy perform-

ance of buildings, taking into account climatic conditions

- Determine and apply minimum standards of energy performance both to new buildings and to the major refurbishment of large existing buildings

- Implement, through a consistent system of certification, the public display of information on the energy performance of buildings occupied by public authorities

The Display® Campaign

In municipal buildings all over Europe, vast quantities of energy and water are being needlessly wasted - and at significant cost to both the taxpayer and the environment. Two key and related points often lie at the heart of this problem: inadequate energy management by municipalities, and/or careless energy consumption habits by building users oblivious of their impacts. Display® aims to address both issues - with the EPBD as its underlying driver.

The objective of the European Campaign is to accelerate the Directive's implementation and provide European municipalities with an opportunity to take a strategic approach - and be one step ahead. Display® is a voluntary scheme designed via a networking process involving municipal energy experts from towns and cities across Europe. It has provided local authorities with a rare opportunity to contribute to the development of an EU-wide toolkit used at the local level, to implement a European Directive. As a result, something pragmatic and appropriate for municipal managers has been created: the new poster and labelling system designed are readily accessible and can be adapted to complement any national implementation scheme.

Using Display® local authorities can:

- **Communicate** with citizens and show local initiatives to the public

- Display an **eye-catching** poster which is easily understandable by the public

- Obtain instant access to an **efficient, user friendly and pragmatic** internet-based **tool**

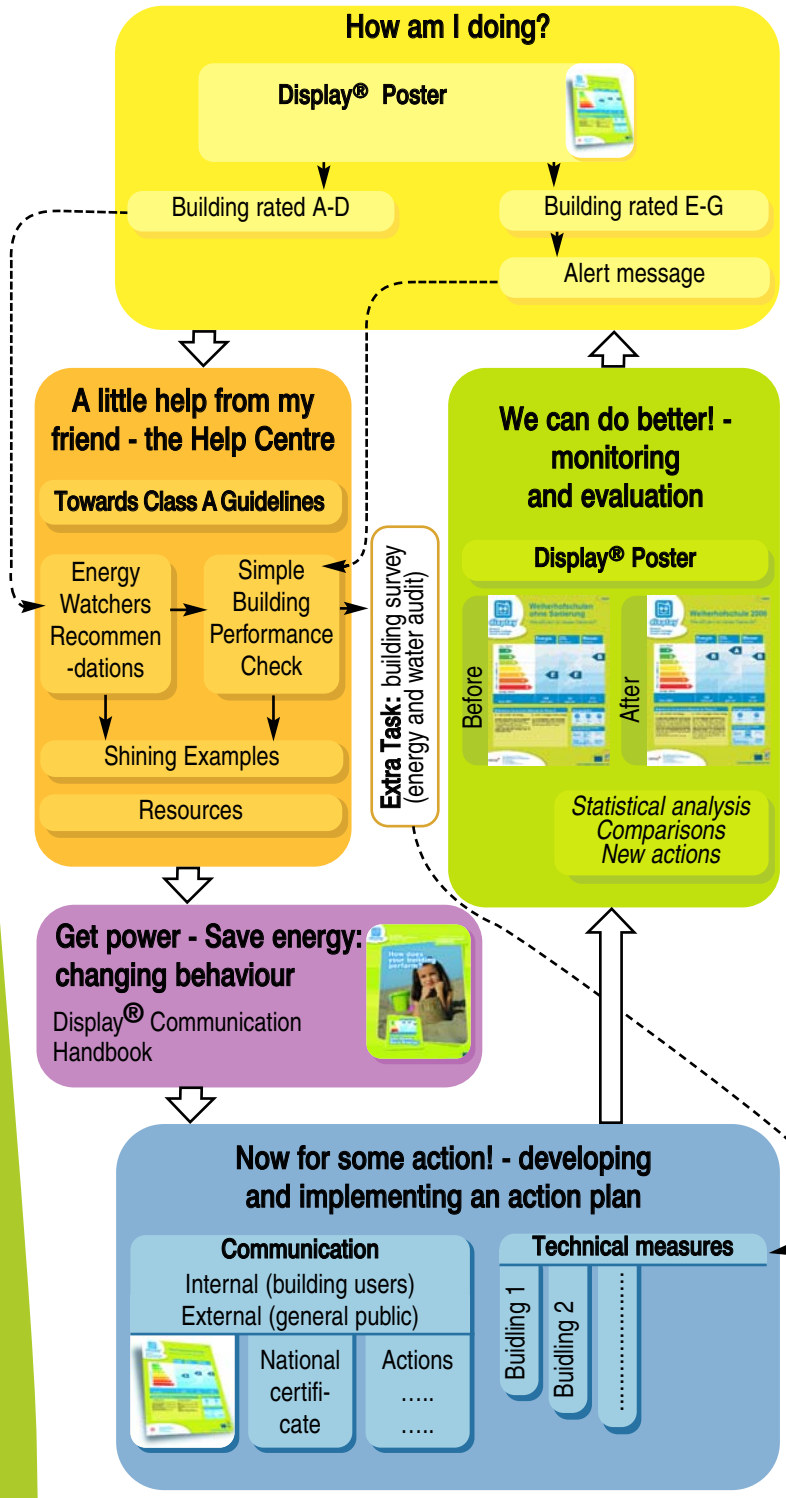
- Calculate the performance of **buildings of all sizes** (thus including those <1000 m^2)

- **Monitor and evaluate** the progress of the public building stock by **updating the poster every year**

- Display the **water consumption** in addition to energy and CO_2

- Become a member of an innovative **European Campaign** to combat climate change

II. The "Towards Class A" journey



Like all sustainable processes, the journey towards "Class A" in public buildings is iterative, not linear. The Towards Class A process chart **(see figure 1)** illustrates the logical process that needs to be followed to improve the performance of both individual buildings and the building stock in general.

The five steps are as follows:

1. "How am I doing?" - Producing and utilising the Display® Poster
2. "A little help from my friend" - Accessing the Help Centre
3. "Get power - Save energy: changing behaviour"
4. "Now for some action!" - Developing and implementing an action plan
5. "We can do better!" - Monitoring and evaluation

Figure 1:
the "Towards Class A" journey

III. How am I doing? - The Display® Poster

Producing and using the Display® Poster

The first step for all local authorities who are members of the Display® Campaign is to collect simple baseline data and feed this into the Display® calculation tool. Data requirements include readily available information such as:

- Annual consumption for lighting and equipment in kWh
- Annual heating and hot water consumption in kWh
- Annual water consumption in m^3

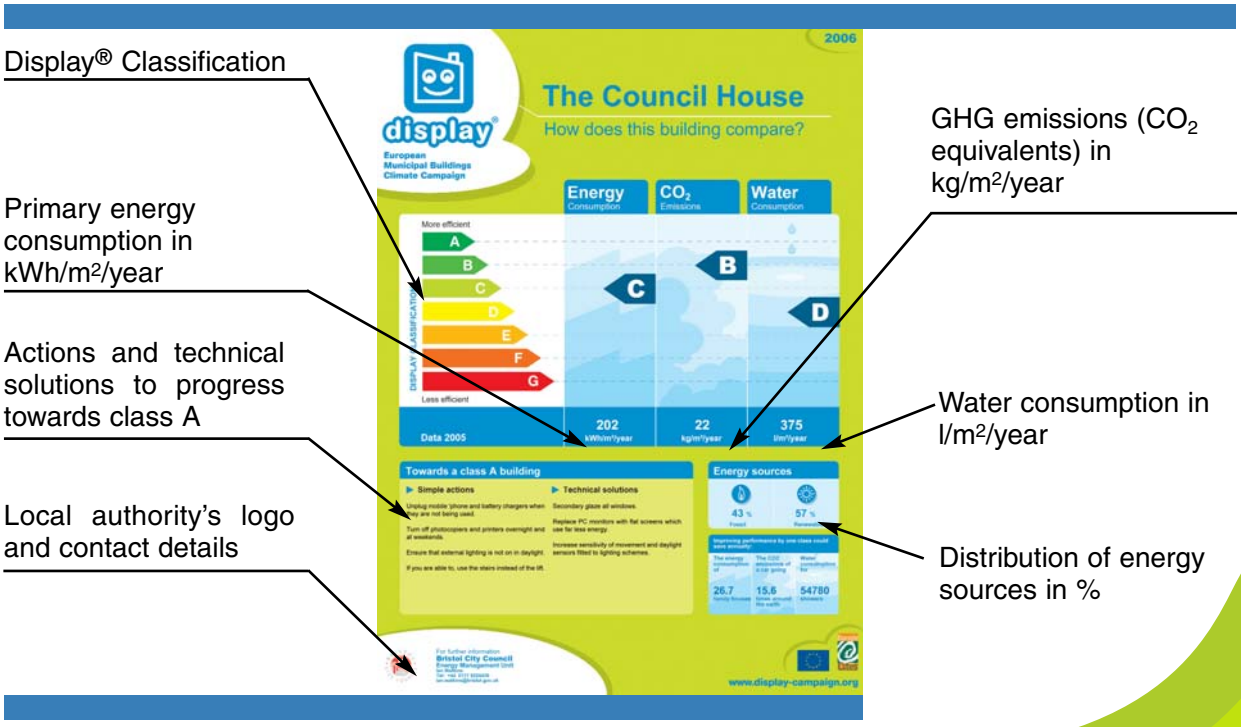
The Display® calculation tool then produces the Display® Poster **(see figure 2)**:

- The Poster is the most visible part of the Campaign: its attractive appearance is based on the widely-known household electrical appliance labels
- The design of the Poster took more than one year of extensive discussions with municipalities and other stakeholders

Understanding the Display® Poster

The building is classified in three distinct categories: primary energy consumption; CO_2 emissions; and water consumption. The Poster features seven classes from A (green) to G (red) for each category, presented in a format highly familiar to the public.

Figure 2: Display® Poster



The Poster also specifies the contribution of each primary fuel source (fossil, nuclear, and renewable energy) to meeting the building's final demand for electricity, heat and hot water. This feature addresses a key element of the Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity (and repealing Directive 96/92/EC), which requires electricity supply companies to specify the fuel mix and related environmental impacts of the electricity they sell.

Next, examples of measures that will improve the building's performance by one class (or more) are listed in each category: this helps building users visualise the extent of change needed to make clear progress. Measures target both the building users, through "Simple Actions", and building managers, through "Technical Solutions"

- "Simple Actions" aim to engage with building users by bringing their energy and water using habits into focus. The measures listed here allow them to participate in improving the building's rating in each category
- "Technical Solutions": the Poster also summarises and promotes the municipality's activity in terms of realised or planned technical solutions. The "Towards Class A" building section of the Poster provides a platform upon which a public declaration of the municipality's commitment can be made: for example, how it intends to improve the energy performance of the building in the next three years. This can be a difficult part of the Poster to complete, and for this reason the Towards Class A Help Centre was developed **(see section IV "A little help from my friend - the Help Centre" below)**

Finally, the details of a contact person are provided next to the local authority logo, enabling users of the building to make contact with the relevant department, to ask questions or make suggestions.

The Display® Poster as an analytical tool

Municipalities can use the Posters as part of a benchmarking system to profile and analyse the entire building stock, and compare the certified building/s with others (**see section VI "Now for some Action! - Developing and implementing an Action Plan" below**).

The bigger, the better

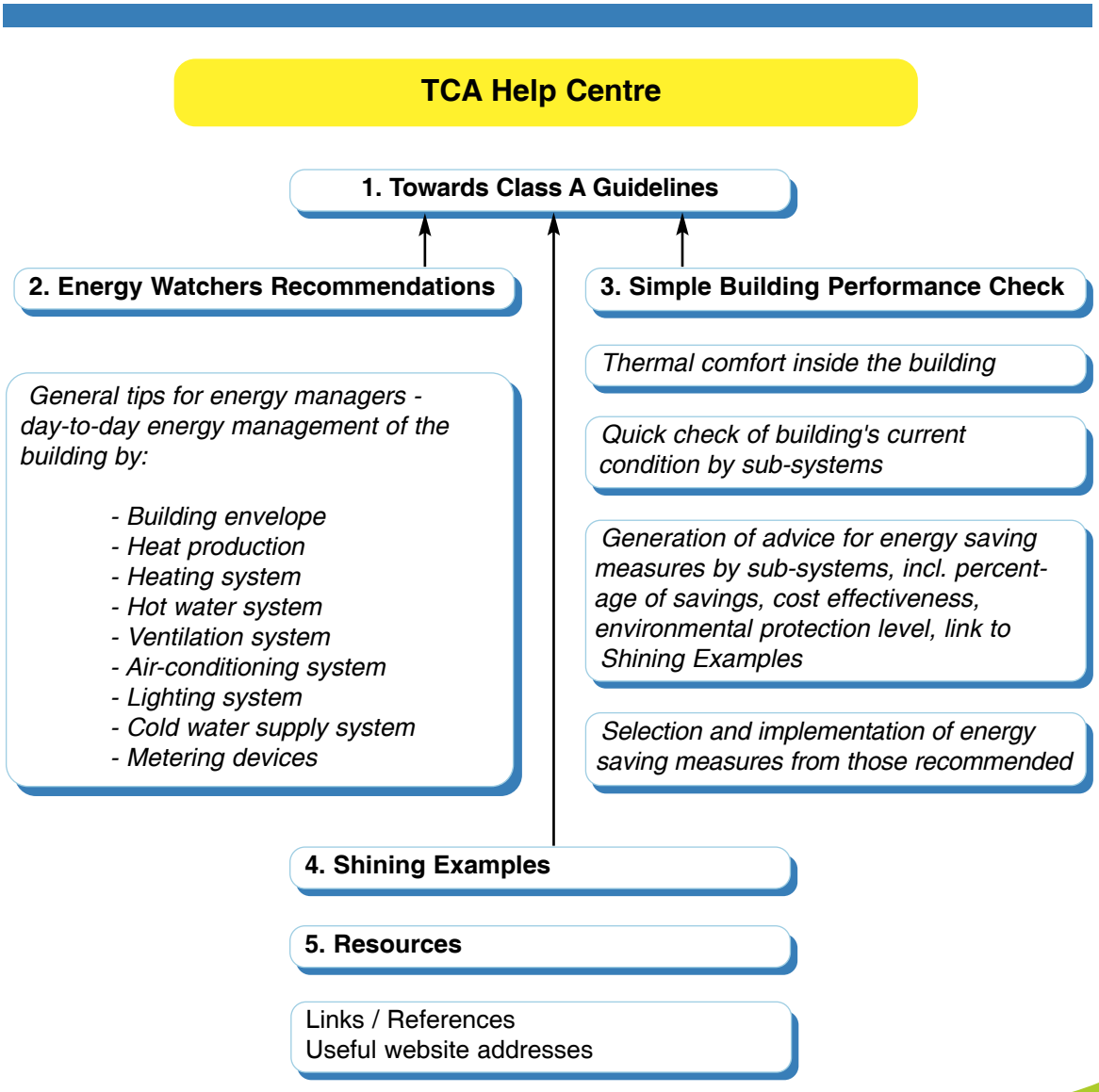
This Romanian school has displayed the building label prominently, which in turn encourages citizens - and other local building managers - to take notice. Organisers report that most building managers put up Display® labels at building entrances in an A3 size, but they are hopeful that more and more will manage to create large labels like the one pictured.

IV. A little help from my friend - the Help Centre

Accessing the Help Centre

The "Towards Class A" Help Centre provides a number of tools encouraging municipalities to upgrade and improve the energy efficiency of their buildings. Its primary purpose is to identify practical measures that can be taken, and can thus be added to the "simple actions" and "technical solutions" section of the Display® Poster.

Figure 3: structure of the Help Centre



The Help Centre is composed of five elements **(see figure 3)**:

- Towards Class A Guidelines
- Energy Watchers Recommendations (EWR)
- Simple Building Performance Check (SBPC)
- Shining Examples
- Resources

Poor-performing buildings are referred directly to the Simple Buildings Performance Check. Even if the Simple Check cannot replace a professional audit the building manager should use it to identify simple and obvious tasks and improvements systematically, and implement these without necessarily paying for a full audit.

The Energy Watchers Recommendations

Routine energy management for owners and managers

The Energy Watchers Recommendations give advice on how building owners and energy managers can save energy on a day-to-day basis. Ideally, to save energy and money a municipality that both owns and occupies buildings should appoint an energy manager. A rule of thumb used by some local governments is to employ one energy officer for every two million Euros spent on energy and water - to ensure staff levels are adequate for successful energy management.

A building that performs well will use less energy and achieve a better Display® or national energy rating. Building energy labelling/certification stimulates energy savings in both existing and new buildings by making the considerable potential for energy savings more visible.

Advice for building owners

Getting organised

- Keep all drawings of the building and its installations; all design documentation; equipment certificates and manuals; test protocols and letters of guarantee as well as operation and maintenance manuals
- Encourage the occupants of the building to save energy. Behavioural change can reduce energy consumption by 10-15% **(see section V "Get power - save energy: changing behaviour" below)**
- Identify potential suppliers, installers or contractors of energy or water saving measures (where possible contact suppliers that have been recommended to you)
- Ensure that controlled (mechanical) ventilation systems are well maintained: a minimum amount of fresh air is required for health and safety reasons

Planning ahead

Introduce a maintenance programme. The aim of a maintenance programme is to implement operation and maintenance routines that ensure that the building and its sub-systems, such as the heating system, function properly, thereby providing healthy and safe conditions within the building. Periodical, "planned" maintenance should be scheduled at regular intervals to maintain the condition of the building, while more "response" maintenance is necessary when systems breakdown and require either replacement of individual components or the whole system. It is important that regular maintenance and the installation of new systems or individual components is carried out by appropriately qualified skilled professionals. Implementing a maintenance programme and utilising the skills of trained professionals when necessary should help to minimise the operating costs of the building, including the energy and repair costs.

Procurement and major projects

- When replacing equipment/installations or purchasing new equipment, seek information on the costs and benefits of different options. Useful information can be found by searching the internet; looking at the Shining Examples on the Display® website; contacting local energy agencies and experienced municipalities; and talking to different suppliers

- New appliances should generally have an energy label rated class A (or even A++)

- Review existing energy supply contracts, in particular with respect to "green" electricity.

- In the case of bigger refurbishment projects, order an energy audit **(see "Extra Task: building survey (energy and water audit)" below)** and consider: changing the fuel type used; installing a cogeneration plant or utilising an alternative heating source (such as geothermal or ground source heat pumps, solar or other renewable energy sources)

- If third-party financing or contracting are being considered in order to realise efficiency measures, request model contracts and contact experienced municipal energy managers

Pitfalls to avoid

Do not automatically buy the cheapest equipment on the market - it could be more economically and environmentally costly over the long term: instead consider using **green public procurement schemes!**

Public purchasers command a large share of the market. Local authorities can use their purchasing power when they opt to purchase goods and services that also respect the environment. Green public procurement covers areas such as the purchase of energy-efficient computers and building components, lighting equipment, recycled paper, clean vehicles, environmentally-friendly public transport and electricity stemming from renewable energy sources.

Advice for building managers

Generally, success or failure, in terms of energy management, rests with the energy manager! The absence of an energy manager can lead to a number of significant obstacles preventing sound energy management. Without an energy manager:

- There is no clear "voice" to advise the owner on investments in energy efficiency

- The absence of this advice can mean annual budgets for energy conservation measures etc. are overlooked

- The lack of a budget will mean energy efficiency measures cannot be implemented

- Without implementation of energy efficiency measures, energy costs and pollution will be higher, and surpluses lower

However, once an energy manager or officer is in place, there are a number of day-to-day activities that can be undertaken.

Getting organised

- Develop and maintain up-to-date operation and maintenance manuals for the building (including records of inspection, cleaning and repair, technical installations and related documentation)

- Produce a schedule for checking the building and systems for visual damage or failures

- Analyse and compare the energy consumption of the building over time and with other buildings

- Analyse energy consumption by category of energy use if possible (space heating, water heating, ventilation, air conditioning/cooling, lighting, power)

- Measure weekly energy consumption and outdoor temperatures. Establish the Energy Temperature curve (ET-curve) of the building. An ET-diagram indicating mean outdoor temperature [°C] and the relevant energy consumption [kWh/m²week] is a basic tool in an energy management system

- An ET-curve describes the correct energy consumption for a building. Deviation from the ET-curve indicates malfunctioning equipment. This should be investigated and remedied

- Have heating and cooling systems fully serviced every 6 to 12 months, and determine whether and when a replacement is needed

Getting around the site

- Ensure correct installation and operation of the equipment

- Check thermostat settings to ensure that the heating and cooling system turns on and off at the programmed temperatures

- Advise occupants to switch off electrical equipment instead of leaving it on stand-by mode (a typical photocopier left switched on overnight wastes enough energy to make 5300 A4 copies; a PC monitor left switched on overnight wastes enough energy to laser-print 800 A4 copies!) **(see section V "Get power - save energy: changing behaviour - Display® Communication Handbook").**

Pitfalls to avoid

Do not just hang Display® Posters in the best buildings. Bristol (UK), was not too shy to hang up the Posters in buildings rated E, F or G. This generally provoked debate and helped focus people's attention on the need for improvement.

Simple Building Performance Check

The Simple Building Performance Check (SBPC) is an easy-to-use on-line tool allowing a systematic evaluation of a building's performance. Found in the Help Centre section of the Display® website, it is especially useful to managers of Class E, F and G-rated buildings, as it identifies the most appropriate solutions and energy-efficient measures that could improve performance.

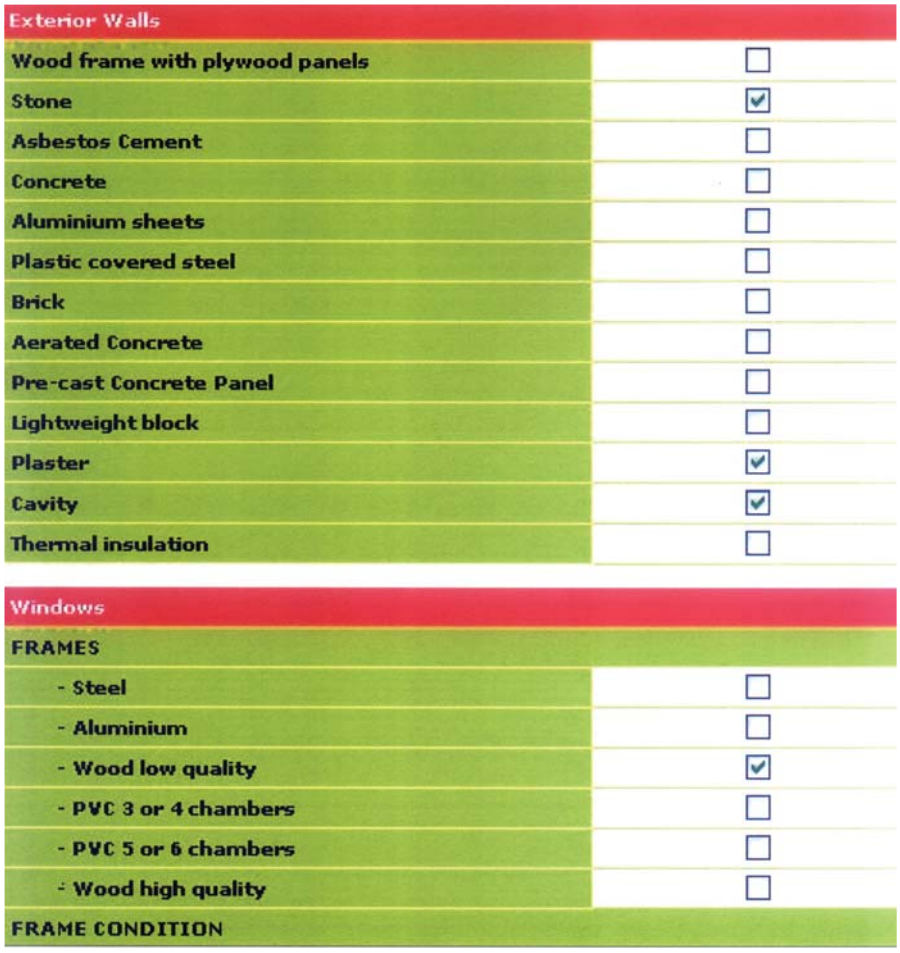
Once the performance of a building is calculated, an alert message for all E, F or G-rated buildings is generated: "This building is in E-G class. You can easily improve its performance. Please have a look at the Simple Building Performance Check". In the near future an additional function will indicate whether heating, electricity or water consumption figures exceed benchmarks for the corresponding building type.

The SBPC allows the user to check a building's performance in three steps. The first step is to select one of the sub-systems for analysis **(see figure 4).**

Items of the building	
Building Envelope	◉
HEAT PRODUCTION:	
- Central Heating System	○
- Individual Heating Units	○
Heat Supply System	○
Hot Water System	○
Ventilation System	○
Air-Conditioning System	○
Lighting System	○
Water System	○
Metering	○
Maintenance	○
Control	○

Figure 4: building's sub-systems

The second step **(see figure 5)** is to complete the sub-system sheet by selecting all of the characteristics listed that describe the building.



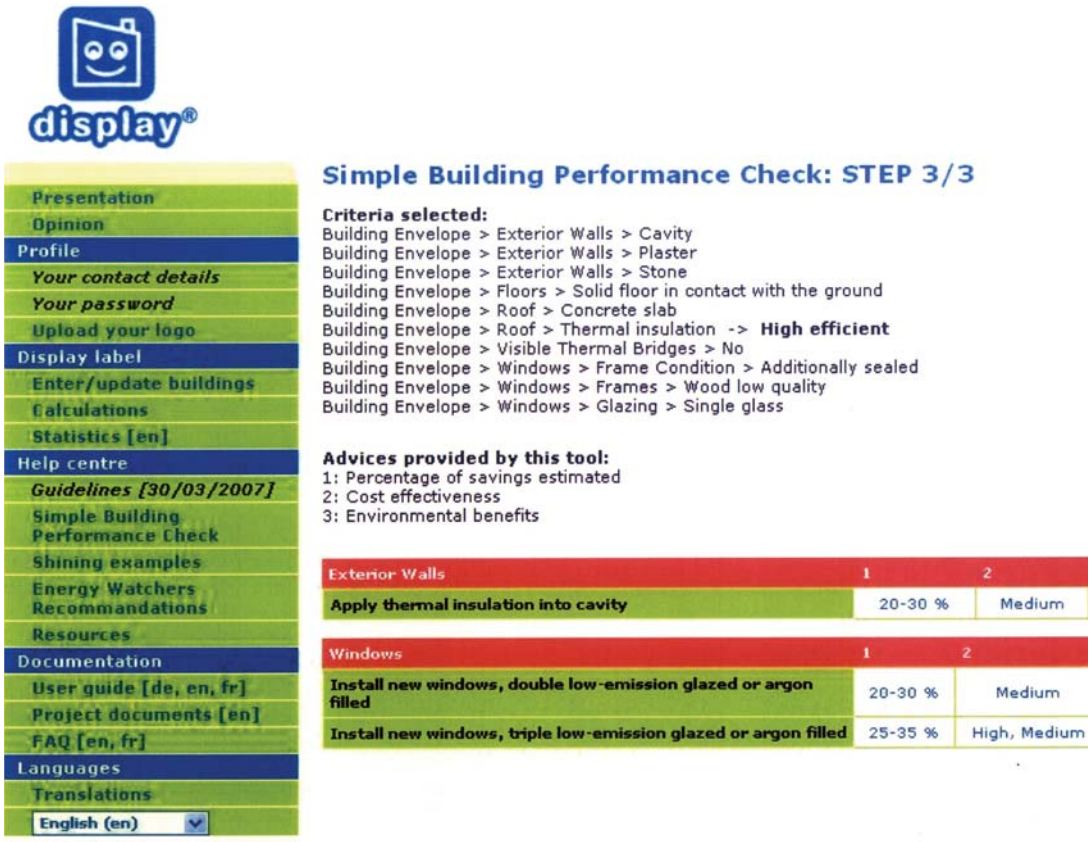
Exterior Walls	
Wood frame with plywood panels	☐
Stone	☑
Asbestos Cement	☐
Concrete	☐
Aluminium sheets	☐
Plastic covered steel	☐
Brick	☐
Aerated Concrete	☐
Pre-cast Concrete Panel	☐
Lightweight block	☐
Plaster	☑
Cavity	☑
Thermal insulation	☐

Windows	
FRAMES	
- Steel	☐
- Aluminium	☐
- Wood low quality	☑
- PVC 3 or 4 chambers	☐
- PVC 5 or 6 chambers	☐
- Wood high quality	☐
FRAME CONDITION	

Figure 5: SBPC for the building envelope

In step 3 **(see figure 6)** the SBPC generates advice addressing all of the building sub-system characteristics that were selected, detailing improvement measures, estimates of achievable energy/water savings, cost effectiveness and environmental benefits.

Figure 6: advice page for the building envelope



Percentage of energy and water savings depends to a great extent on: the building's condition before measures are implemented; the quality of the materials and measures used; climate and indoor temperature. Savings will also depend on the interaction between measures implemented simultaneously and on human factors such as user behaviour and maintenance.

Cost effectiveness depends on investment cost, energy and water prices; climatic conditions and operational procedures within the building; building's performance before the measure's implementation; and percentage of savings.

Environmental impact depends on the type and quantity of the resource saved.

The examples in Annex 1 (below) using "before and after" Display® Posters illustrate how measures suggested by the SBPC can be used to improve a building's performance.

"Shining Examples"

The idea of "Shining Examples" is to promote good practice and learning amongst municipalities and to provide evidence that good examples of buildings and schemes are everywhere. Some of the Display® Campaign Shining Examples are summarised in Annexes 1 and 2 of these Guidelines. The full range of Shining Examples is available on the Campaign's website (*www.display-campaign.org*).

Resources

The resources part of the Help Centre provides municipalities with useful information and links to websites for national and international organisations and NGOs that work in the field of improving the energy and environmental performance of buildings, and networks of the EU Member States. The information is organised in an easy-to-use manner.

EXTRA TASK: building survey (energy and water audit)

The "Towards Class A" Help Centre is a repository of information containing standardised improvements. It also helps managers select those buildings which are in need of a more detailed analysis/energy audit. Municipalities that do not have the "in-house" capabilities needed to perform a detailed energy audit should appoint a specialist. This appointment is generally achieved though a tendering process and therefore it is important to establish the key requirements to be included in an Invitation to Tender.

An energy audit should provide data about the building and all sources of energy used. The energy specialist is likely to make use of a specially designed computer programme to carry out the audit using a broad range of specific building data. Crucial data likely to be analysed includes:

- The state of the primary heating system (controls, burner and distribution of heat; bills)

- Insulation levels, U-values of the building envelope: windows and doors, lowest floor, external walls and roof

- Ventilation and air conditioning systems

- Consumption of electricity (i.e. lighting and equipment) and electricity bills

Having undertaken a detailed analysis of these key elements, the consultant/auditor should identify the potential for energy and water saving and develop clear recommendations for an energy/water saving strategy.

The audit report must identify likely savings (in fuel bills, CO_2), the associated investment costs, and the payback period. Other useful indicators may include the Net Present Value (NPV), Internal Rate of Return on investment (IRR), projected maintenance costs and lifetimes of the hardware to be installed. In order to consider the replacement of the central heating system, the heating demand profiles and the boiler sizing need to be determined.

Note

Any desire to consider renewable energy should be conveyed in the tender document so that, for example:

- The suitability of the roof can be assessed for solar heating, PV or roof-mounted turbines etc.
- Any provision of biomass-based heating considers the availability of locally sourced fuel, and the provision of on-site fuel storage facilities.

V. Get power - save energy: changing behaviour

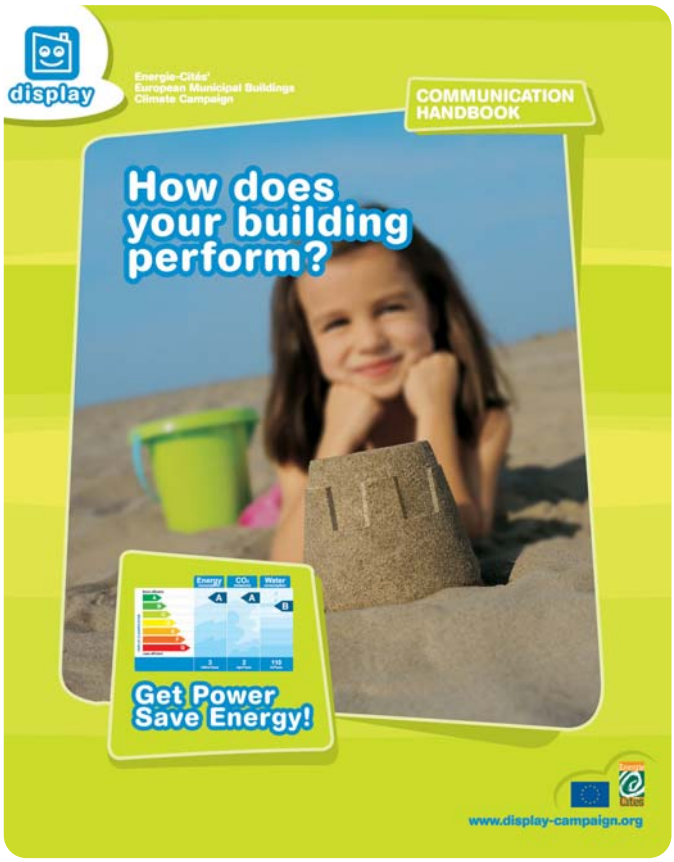
Background

Attempts to improve energy efficiency often fail due to the difficulty energy specialists experience when communicating with the rest of the community. Energy and climate-related jargon is often incomprehensible to non-specialists: MWh, Gigajoules, tonne-CO_2 equivalent and other units mean nothing to most people.

However, improving energy efficiency includes making decisions that involve and must be understood by the vast majority - people such as elected representatives, building contractors, SME managers, housing estate managers, and the general public.

Display® is a communication tool geared to positively influence the behaviour of these stakeholders - and the Display® Poster is in fact an interface between the municipality and the population.

Figure 7:
Display® Communication Handbook



Display® Communication Handbook

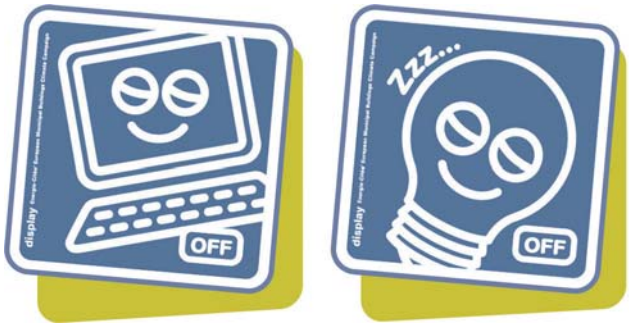
IIn order to strengthen communication on energy in municipal buildings labelled in Display®, a communication handbook has been produced by Energie-Cités together with energy experts and the Display® pilot group **(see figure 7)**.

The Handbook is intended to help municipalities organise successful awareness raising activities. The step-by-step guide takes Display® municipalities through the planning, implementation and evaluation of a communication campaign. The Handbook also addresses important elements such as: data collection for the Poster; media activities; promotional products; and good practice - "Shining Examples".

The Handbook is organised as a handy folder. This format allows sheets to be taken out (e.g. to photocopy) or added / updated. The Handbook has been published in English, French, German, Italian and Polish. It has been translated and soon will be published in Bulgarian too.

Tip

E, F and G-rated buildings can be powerful drivers for the Display® Campaign and should not be left out of communication activities. Culturally, some countries are reluctant to display any label not rated Class A. But at the heart of this Campaign is an intention to improve the performance of all buildings and building users. The potential for progress is much greater if a building's label is in the E-G range: this potential should be realised and celebrated!



VI. Now for some action!

Developing and implementing an action plan

The development of an action plan is essential to success. Using the tools described above, the performance of buildings can be calculated, specific problems identified, and a clear and realistic set of actions drafted. This process provides a solid basis on which to develop an action plan, complete with technical measures and communication activities **(see examples in Annexes 1 and 2).**

The objective of the action plan is to define the activities (technical measures, management and communication) that should be implemented to improve the performance of the building or buildings. The plan may be developed and implemented in the following steps:

1. Planning of the activities in time: start-date of activities, duration, etc.

2. Ensure that the plan addresses both "Technical Solutions" and communication of "Simple Actions" - or behavioural change

3. Establish clear goals that fit within existing Municipal Action Plans and which can be monitored

4. Organise each activity identifying the role of:

- The local government
- The utility companies
- Target groups
- Specialists involved from each group; their tasks

5. Plan activities in terms of finance and personnel capacity - tendering and bidding; contracts for works and services

6. Monitor and record energy consumption in the building

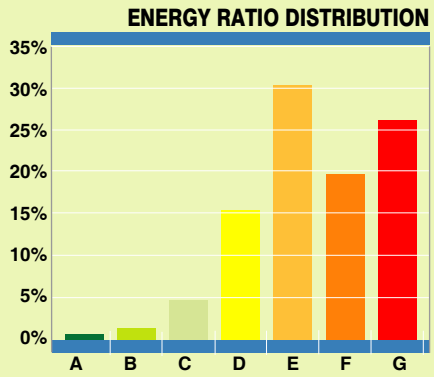
7. Analyse and report the results after energy saving measures have been implemented

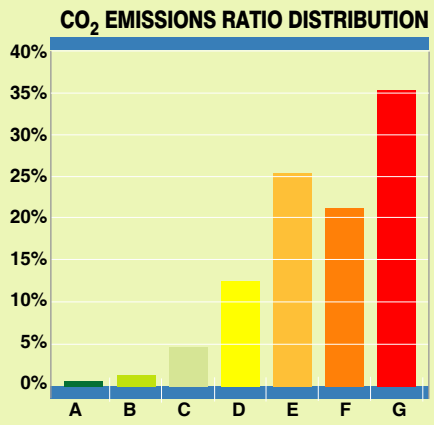
How Display® contributes to the Municipal Energy Action Plan

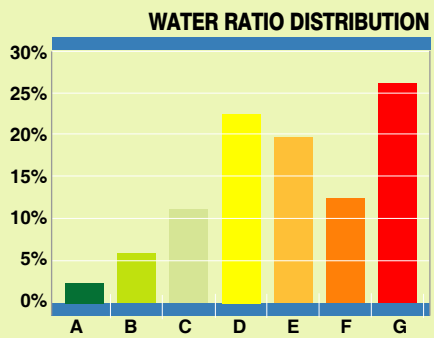
- It provides a list of municipal buildings and their Display® ratings
- These ratings are used to prioritise buildings in need of improvement
- A schedule is developed for building refurbishment and fund-raising
- Public support for an energy-saving programme is accumulated
- The process of implementing measures is formalised - e.g. hiring consultants, tenders, etc.
- The Display® Poster allows monitoring of the building after the refurbishment **(see section VII "We can do better! Monitoring and evaluation").**

EXAMPLE of implementing an action plan: County Durham's "Away from Class G" approach

Durham County in the north of England provides an outstanding example of using Display® which is integral to the County's approach to sustainable development. In 2003, the County Council made a public commitment to reduce carbon dioxide emissions and water consumption in its buildings by 10% within five years. Addressing Climate Change is now a corporate Council priority, as is a target to have ***no*** *buildings in the energy, CO_2, or water class "G" by April 2008. In Durham County* ***all*** *public buildings have the Display® Poster visible. Elected members like the simplicity of the Poster and they have been given a list of questions to ask when visiting buildings, for example: "Is it necessary to have the heating on and the windows open?"*
See www.durham.gov.uk/sustainability







2004

UNITED KINGDOM - DURHAM COUNTY

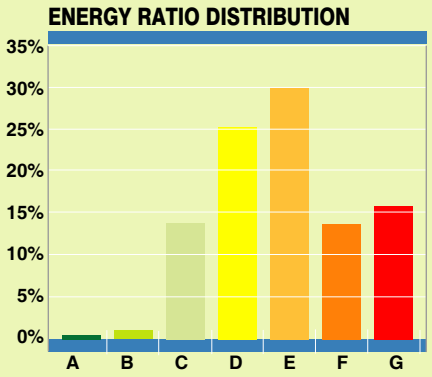
Building types - All 417 in total - mostly primary schools.

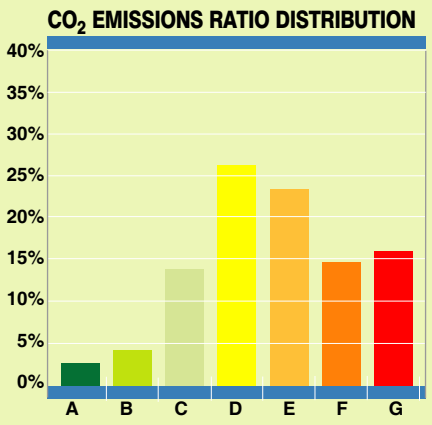
All 300 schools have delegated energy budgets and they "bank" savings from their own initiatives.

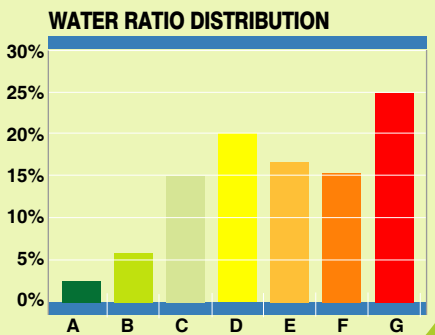
Display® Posters visible in all public buildings with councillors encouraged to visit buildings and ask questions!

Results

Average Energy 2004 - 403 kWh/m²
Average Energy 2005 - 378 kWh/m²
Improvement - 6.3%
CO_2 2004 - 88 kg/m²
CO_2 2005 - 72 kg/m²
Improvement 18.5%
Average water 2004 - 1,166 l/m²
Average water 2005 - 1,100 l/m²
Improvement ~5%







2005

VII. We can do better!

Monitoring and evaluation

Since the Display® calculation tool offers the option of entering several years' data for the same building, Display® should be used as a monitoring and evaluation tool - which can form part of a complete energy management system encompassing the entire municipal building stock.

• Because a new Poster/label should be generated every year, new consumption data must be entered, and a repository of historical consumption data is created: analyse this data for individual buildings and for the building stock as a whole, to identify progress "Towards Class A" **(see the example of Durham in section VI above)** and measure this against stated objectives

• All actions and technical solutions appearing on the Poster need to be reviewed and communication campaigns evaluated as a basis for further improvement. Explanations of progress (or lack thereof) should be visible in "before" and "after" Posters, with clear reference to specific actions taken

• This continuous, transparent measurement of actual performance against stated objectives and historical performance will map out and create traction for a journey, with the ultimate destination being the entire public building stock moving towards "Class A"

Conclusion

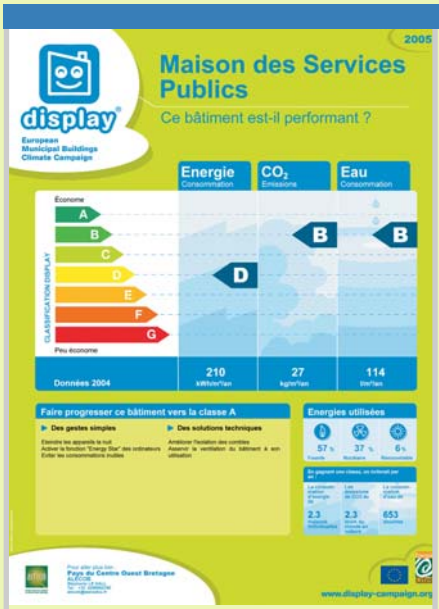
The building sector (construction, operation and demolition of built facilities) accounts for approximately 40% of all energy end use. The potential for reducing greenhouse gas emissions in existing and new buildings is greater than that of any other sector. Through Display®, local governments can significantly contribute to combating climate change by improving the energy performance of their buildings. Additionally, by displaying and communicating the CO_2 emissions and energy and water consumption of their buildings to the public, local governments not only demonstrate their environmental responsibility, but they also encourage everyone to take action.

Display® is a uniquely European product, which can be used in every part of Europe, whether an EU or non-EU country.

Examples
of using the Simple Building Performance Check

Below are examples from seven European cities, which illustrate how different energy and water efficient measures can improve a building's performance. Where possible, comparison of Display® Posters before and after the water and/or energy efficiency measures were installed show how the buildings' classifications progressed. The Simple Building Performance Check can be used to help select appropriate measures to improve a building's performance. For more information visit - www.display-campaign.org - Shining Examples.

Carhaix-Plouguer - (FR): a few euros are sufficient for advancing one class



Before: 2004

Carhaix-Plouguer - France

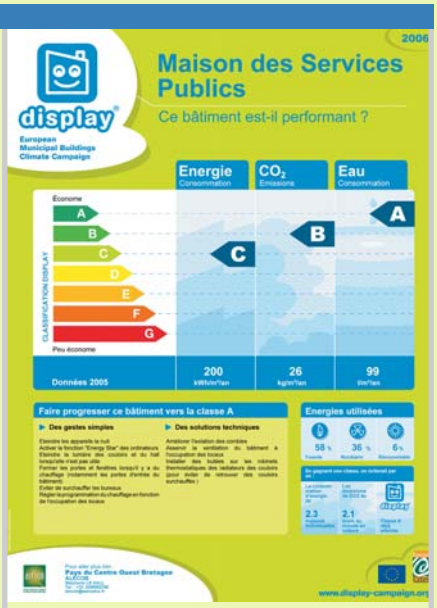
Building type: administrative
Year of construction: 2003

Changes made

- Water: flow reducing devices installed, toilet flushing systems adjusted and water flow durations on push-button taps reduced
- Energy: over-heating boiler adjusted and maintained
- Communication: Large communication campaign with the building users

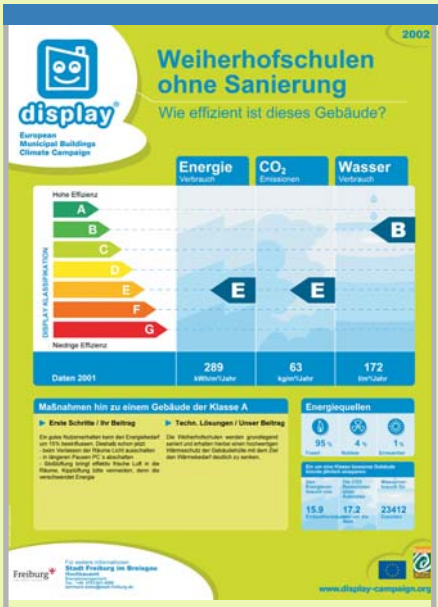
Investment cost:
€ 204

Results
Water saved: 13% (€ 60/year)
Energy saved: 5% (€ 573/year)



After: 2005

Freiburg - (DE): from E to A through a large investment



Before: 1999

Freiburg - Germany

Building type: general school with gymnasium and auditorium

Changes made

- All windows renewed (U-value 1.1)
- Building envelope insulation (walls 12 cm, roof 14 cm)
- New heating system (wood pellets boiler and gas boiler)
- PV cells
- New lighting system
- New toilets and showers with water saving fittings

Investment cost:

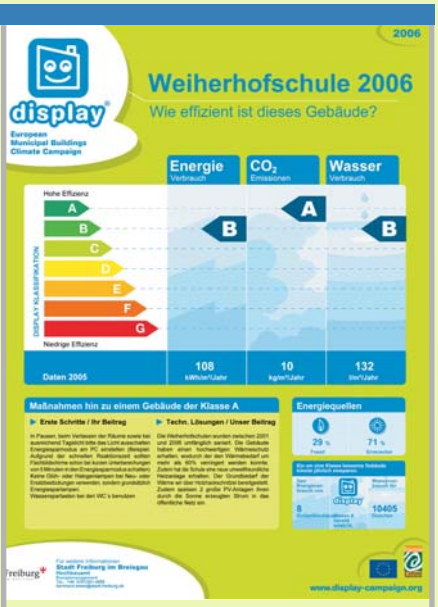
€ 8.4 million, incl. extensive refurbishment (between 1999 and 2005), no evaluation of the costs specifically related to energy saving measures

Results

Water saved: 20% (339 m^3)

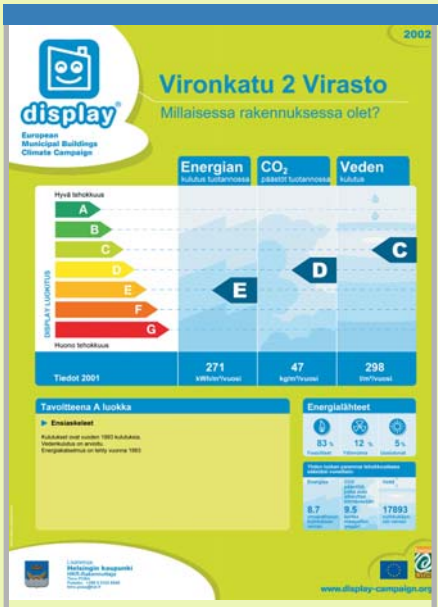
Energy saved: 65%, resulting in a jump from class E to B

CO_2 emissions avoided: 517 t/year



After: 2005

Helsinki - (FI): improving the envelope can save more than 25% in energy



Before: 1993

Helsinki - Finland

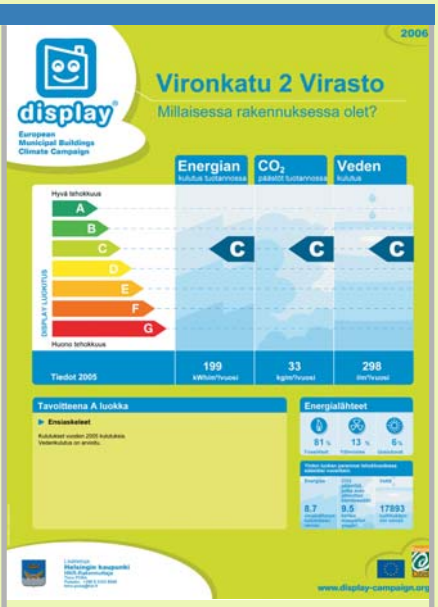
Building type: administrative

Changes made

- All windows renovated (sealed and secured) thus indoor temperature reduced
- Ventilation operating hours reduced to conform to occupancy and incoming air pressure
- Sensors installed in corridors
- Heating and electricity were switched to cheaper tariffs (cost saving only)

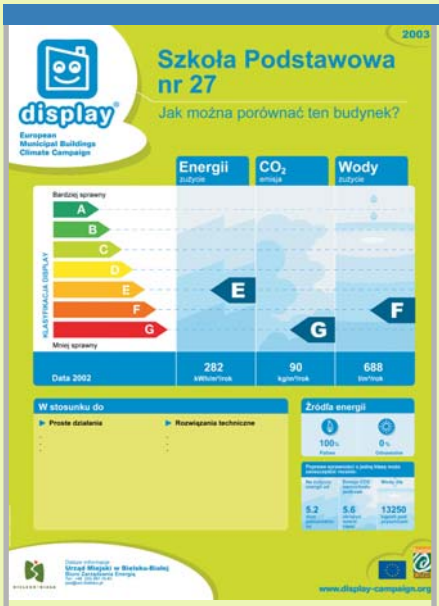
Results

Energy saved: 26%, resulting in a jump from class E to C



After: 2005

Bielsko Biala - (PL): separating the heating system for caretaker's apartment pays back in less than six months



Before: 2003

Bielsko-Biala - Poland

Building type: general school

Changes made

- Separation of on-site apartment's heating system from that of the school (the entire school was heated long after the children and staff had left, in order to keep the apartment warm)

Investment cost:

€ 4000, financed by the City Council

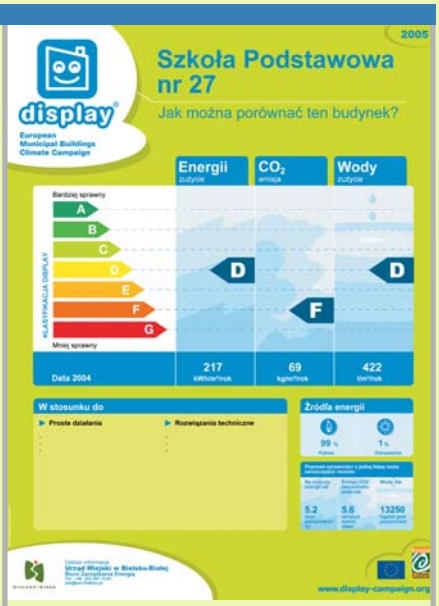
Pay-back time: 6 months

Results

Energy saved: 23% or 197,000 kWh/year, resulting a jump from class E to D

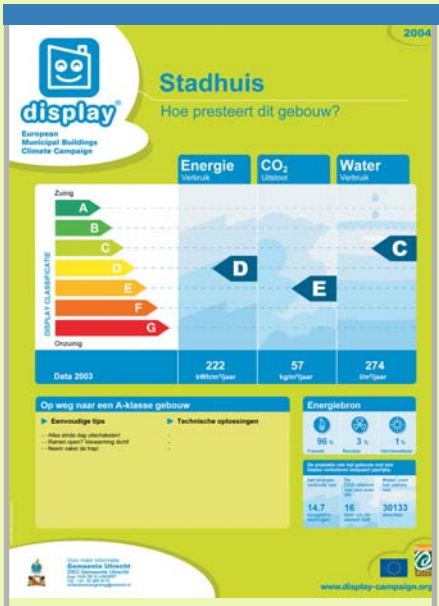
Money saved: circa € 8,500pa

CO_2 emissions avoided: 20 kg/m²/year



After: 2005

Utrecht - (NL): renovation of a historical administrative building



Before: 2004

Utrecht - Netherlands

Building type: administrative

Year of construction: 16th century

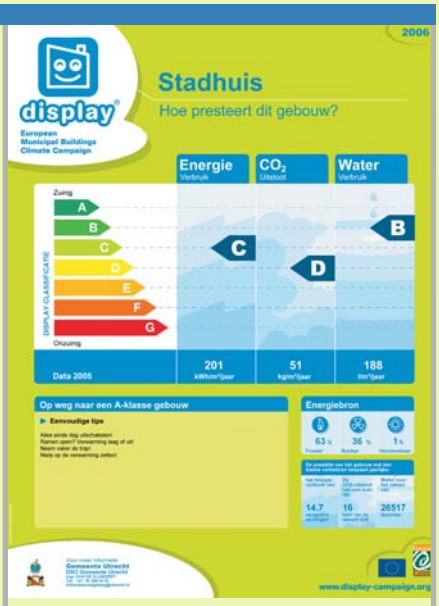
Changes made

- New heating and cooling system installed
- Motion detectors installed in toilets to control lighting
- Impossible to improve insulation of windows or roof (legal restrictions)
- Communication and good housekeeping

Results

Water saved: 31%

Energy saved: 10%



After: 2006

Lisbon - (PT): social housing in a warm climate

Lisbon - Portugal

Building type: social housing apartments

Changes made

- Solar shading devices including moveable shading devices on all windows, white PVC exterior shutters (which also provide night insulation during the heating season), fixed shades (projecting horizontally or vertically from the building) designed in view of the seasonal path of the sun and orientation of the building openings and horizontal louvers
- Energy saving measures including high levels of thermal insulation to exterior walls and roofs, double-glazed low-e windows that minimise the effects of solar heat gain without obstructing views and daylight unduly and optimisation of daylight
- A time-controlled thermo-mechanical ventilation system providing permanent ventilation to dwellings that guarantees good levels of indoor air quality

Investment cost:

The total building cost was € 2.19 million, of which the low-e glazing cost € 3,400 and the ventilation cost € 900

Results

Energy saved: for heating and lighting this was estimated at a theoretical 50 kWh/m²/year

Carlow - (IE): heat pumps installed in swimming pool

Carlow - Ireland

Building type: swimming pool

Changes made

- Installed 30kW output water-to-water heat-pump to heat the pool water
- Installed 1.8kW output air-to-water heat-pump along with a 500 litre factory insulated hot water tank to heat the shower water

Investment cost:

€ 22,000

Results

Energy saved: reduced from 83MWh/year LPG to 12MWh/year electricity, with over a 50% saving in heating costs

CO_2 emissions avoided: 11 t/year

Examples
of successful communication campaigns

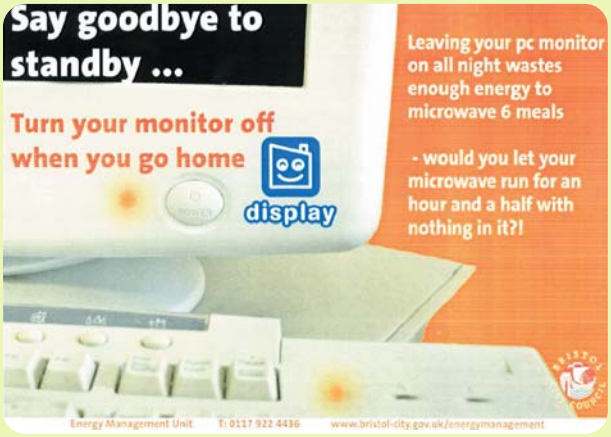
The following practical examples from active Display® cities illustrate how communication has been successfully implemented on the ground. Please note that this is only a selection of a much larger range of Display® cities' activities and measures. All of the cities presented have directed major efforts to communicate with building users to achieve a change in their attitude towards energy issues. Did you know that a change of habits can reduce energy consumption by 10-15%? For more information visit - www.display-campaign.org - Shining Examples.

Bristol - (UK): empowering building-users

From September 2004 to March 2006, the Bristol City Council produced a total of 14 Display® Posters for municipal buildings such as schools and libraries, as well as for council buildings. Since the city joined the Display® Campaign, the Council's Energy Management Unit has developed a creative communication concept targeting on the one hand the broader public, and on the other hand, the council staff.

Inspired by the tools proposed in the Display® Communication Handbook, Bristol developed and used a number of their own innovative materials such as:

- A huge Display® poster of 6 m², which was hung on the outer wall of the CREATE Environment Centre
- A weekly poll (multiple-choice questions) in the City Council intranet on a topical subject to evaluate the public response to the Posters
- An internal e-mail and two different types of Display® postcards, which were sent to each employee in the Council buildings after the Posters were put up, drawing attention to them
- Four types of awareness-raising posters on energy saving at the workplace, including a poster on "say goodbye to stand-by"
- Print media in which Display® featured: "Energy Echo" (the Energy Management Units newsletter), the "Bristol News"



The Energy Management Unit has promoted Display® during energy and environmental events, such as the Climate Change Fair, the Schools Environment Conference at University in 2005 and the "Eco-Living" Event in 2006.

In Bristol, building users have been empowered to be active participants in the Campaign. Environmental Awareness Representatives (EARs) and Site Energy Officers (SEOs) were designated to help in reading gas and electricity meters, distribute energy awareness material and promote good practise in energy and water saving to their colleagues. They are all volunteer members of staff who serve as contacts in the council buildings.

For their exceptional municipal communication activities, Bristol City Council received the first prize in the Display® "Towards Class A" Award in 2006.

Lausanne - (CH): Display® junior

The city of Lausanne has 160 public buildings participating in Display®, of which 34 are school buildings. As schools are places where future generations can be prepared for the energy challenges of today and tomorrow, Lausanne involved 2,240 children from elementary, junior high and some high schools in the first phase of its Display® communication campaign.

The concept: an interactive one-hour lesson is given by the Display® presenter and coordinator, employed by the Industrial Services of Lausanne. The presentation begins with a DVD movie called "Living with Energy" produced by the Polytechnical School of Zurich. Additional posters present the energy situation in Lausanne and in the particular school buildings. They are complemented by a display explaining the greenhouse effect and the official Display® Poster. Demonstrations with solar panels connected to a light bulb and an electric motor, a demonstration of water aerator taps and a portable photovoltaic panel give the pupils an exciting hands on experience. In addition, all the children of a class have to sign a charter indicating their commitment to save energy.

Each week, another pupil becomes responsible for energy: it is that pupil's task to make sure that the charter is respected by the whole class.

But grownups are not left out either. Lausanne is also publicising the Campaign on buses and at exhibitions devoted to energy efficiency, especially those held within the historical building of the District Court.

The communication campaign is starting to pay-off. In six high schools where only communication activities have occurred (with no technical intervention), such as interactive lessons given to the students, the primary energy performance of the buildings has improved by almost 8% and water savings by 8.3% over two years.

Brasov - (RO): creating special events

The city of Brasov has recognised that schools play an important role in changing the behaviour of energy consumers. The local energy management and environment protection agency (ABMEE) of Brasov launched Display® in three schools, two high schools and one elementary school. The activities focused on pupils, but were also made known to the general public. In that way, many citizens were given useful information and advice on energy efficiency issues and were made aware of simple actions for reducing consumption.

In October 2005, at the launch of Display®, ABMEE organised an energy efficiency week. In each of the schools the pupils prepared a special event according to their school profile. The pupils of the sports high school carried out a handball match, while those from the arts-oriented school were involved in street painting focusing on energy efficiency. Pupils from the elementary school held a presentation on what energy is and how everyone can contribute to improve energy efficiency. The pupils were motivated and rewarded for their effort with little gifts.

With numerous awareness-raising activities involving sport and art events in local schools, the municipality demonstrated great creativity by introducing its own ideas and approaches in the promotion of the efficient use of energy. The international jury appreciated these efforts and the city of Brasov received second prize in the Display® "Towards Class A" Award in 2006.

Helsinki - (FI): utilising the media

The city of Helsinki in Finland staged an extremely successful information day based on the Display® Campaign. The event had a public relations focus and used Display® as a powerful, colourful device to raise awareness and demonstrate that Helsinki takes environmental issues seriously, and is taking action to raise awareness and to reduce its impacts. Planning for the event began at least six months before it was staged and involved careful consideration of the nature and format of the day, the key messages, the target audience, an appropriate speaker, the venue, timing, and budgetary constraints.

Existing relationships and networks were invaluable for attracting the attendance of the media and high-level officials in key government ministries, energy agencies and other bodies. The Deputy Mayor of Helsinki, Pekka Sauri, well-known throughout the country, delivered the keynote address on the day and unveiled a large, framed Display® Poster. The city also announced that it had set a target to hang Display® Posters in 50 buildings by the end of 2006. The information day was an enormous success, attracting 40 visitors including TV, radio, and several reporters. Feedback from those attending the event was very enthusiastic; people readily understood the intention of the Poster and commented on its eye-catching appeal.

Bedford - (UK): nominating "Energy Champions"

Bedford Borough Council in the United Kingdom wanted to tackle the high base load energy consumption in one of their administrative office buildings during weekends and nights. To achieve this goal they embarked on a programme to encourage energy efficiency by using a team of "Energy Champions" to spread the word on energy efficiency and encourage behavioural change amongst building users.

The Champions organised a week-long campaign that consisted of daily emails to staff giving energy efficiency facts and information, daily inspections of electrical equipment to record what had been left on and placing reminder stickers on those pieces of equipment. Feedback was provided to staff in

the form of departmental performance highlighting good or poor results. A prize was awarded to the department that showed the greatest improvement. During this week, there was a 10-15% decrease in electrical energy consumption and savings of approximately € 135 and 15,000 kWh of energy, with 6 tonnes of CO_2 emissions avoided. This equates to an annual saving of € 7020, 780,000kWh of energy and 335 tonnes of CO_2. The only cost for this project was staff time.

Bratislava-Vrakuna - (SK): reducing living costs

In 2004 the municipality of Vrakuna started an ambitious new development programme called the "New Face of Vrakuna". In a practical step to achieve their concept of "satisfied living" the council set up a municipal building management company - Spokojne byvanie Ltd. (SB). In line with this strong drive for their clients' wellbeing, SB strives to improve the energy performance of their buildings and reduce the living expenses of occupants through both modern technical improvements and active efforts to achieve behavioural change.

The Display® message has been fully integrated into the publicity campaign on energy efficiency issues run by SB. The company is trying to reach out to their clients using a range of innovative media channels, including:

- Free energy efficiency advice to clients
- Publicity campaigns in the media (newspaper articles, TV shots)
- Publication of Vrakunske listy - magazine on building and energy management, including articles on Display®
- Website with information on energy e.g. the generation and supply of heat, price comparisons etc. The website will also show comparisons of energy efficiency of buildings and lots of other related information, as well information on the Campaign
- Promotion events and other public events
- Satisfaction questionnaires

Display® has already appeared on National TV in Slovakia and thanks to the work of SB there is now an increased general interest in the issues of energy efficiency in Vrakuna.

- Thanks to Towards Class A partners:

- Thanks to Towards Class A associated partners: