Getting started regionally:
The example of windows and tap water faucets

Energy rating and labelling of non-energy using products

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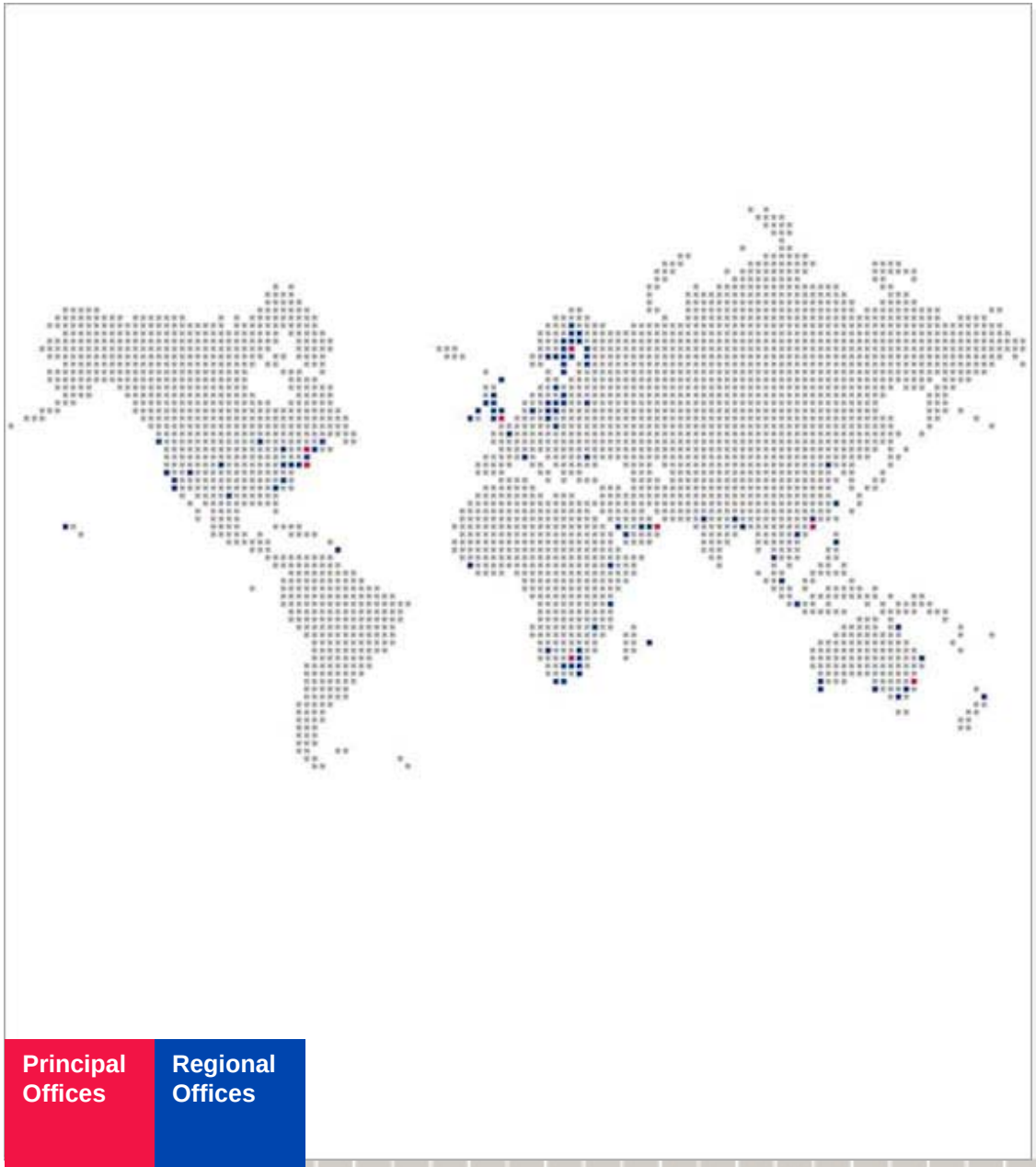
WSP OFFICE LOCATIONS



Principal Offices

Regional Offices

The combination of our global presence and services together with a strong local support on the markets is central for our operation

Number of staff:

Europe	6000
USA	1000
Australia, Asia & Middle East	2000
Africa	700

Of which

WSP Environmental	2000

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Energy efficient windows provide *Substantial energy savings*

In EU (15)* 1303 million windows single glazed

1300 million windows double glazed

Energy saving potential with todays' technology

300 – 500 TWh = 1080 – 1800 MGJ

- Figures from year 2000 for windows in residential buildings.
- Higher saving potential if all EU countries and all types of buildings were included.

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Substantial Energy Saving Potential

A reduction of 100 kWh/m2 window area in the existing housing stock in EU equals to 400 TWh energy saving per year

0,1 W/m2K in improved window insulation, equals to 10 kWh in energy saving per m2 window area (depending on climate zone)

Reduction from single glazing to double LE* = 430 kWh in energy saving**

Reduction from double glazing to double LE* = 180 kWh in energy saving**

*LE = Low emissivity glass + argon gas filled unit

** per square meter window area (or glass area if it is an upgrading of existing window)

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European Window Energy Rating - EWERS

Save project 2000 – 2003

COUNTRY	COMMENTS
Germany	Manufacturers were negative, afraid of transparency
Netherlands	No actual “window” industry: frames / glazing
Denmark	Pilot project 2004-2006. New system 2009
UK	A-G scale based on energy balance launched 2003
Italy	Possible interest by ENEA to introduce rating system
Norway	ENOVA interested in introductions. Recommends 1,0 as U-value.
Sweden	A-G scale based on U-value since 2006
Finland	A-G scale based on energy balance since 2005

Concerns

Windows believed to be climate specific

Window configuration dramatically affects the rating

Solar heat gain difficult to quantify due to uncertainties regarding external and internal shading

Manufacturers afraid of transparency – the label reveals the windows actual performance

Windows must control both heating and cooling demand

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The ambition to rate the window energy balance is the reason why EWERS failed – How do you explain the following to consumers:

- Rating = A*g⊥ – B*(U+L) (MJ/m2)
- qnet = the net heat load in MJ (per m2 window)
- ηg = utilisation factor for solar heat gain [-] for a reference building,
- g⊥ = solar energy transmittance for radiation perpendicular to the glazing
- Qsol = total amount of solar radiation on vertical surface for an average orientation in the heating period in MJ per m2 window (includes correction for time-averaged solar transmittance, i.e. Fw = 0.9).
- Ti,setpoint = is the average setpoint temperature of the room at the inside of the window in °C
- Te- = is the average outdoor temperature in the heating season in °C
- t = time of heating season in Ms

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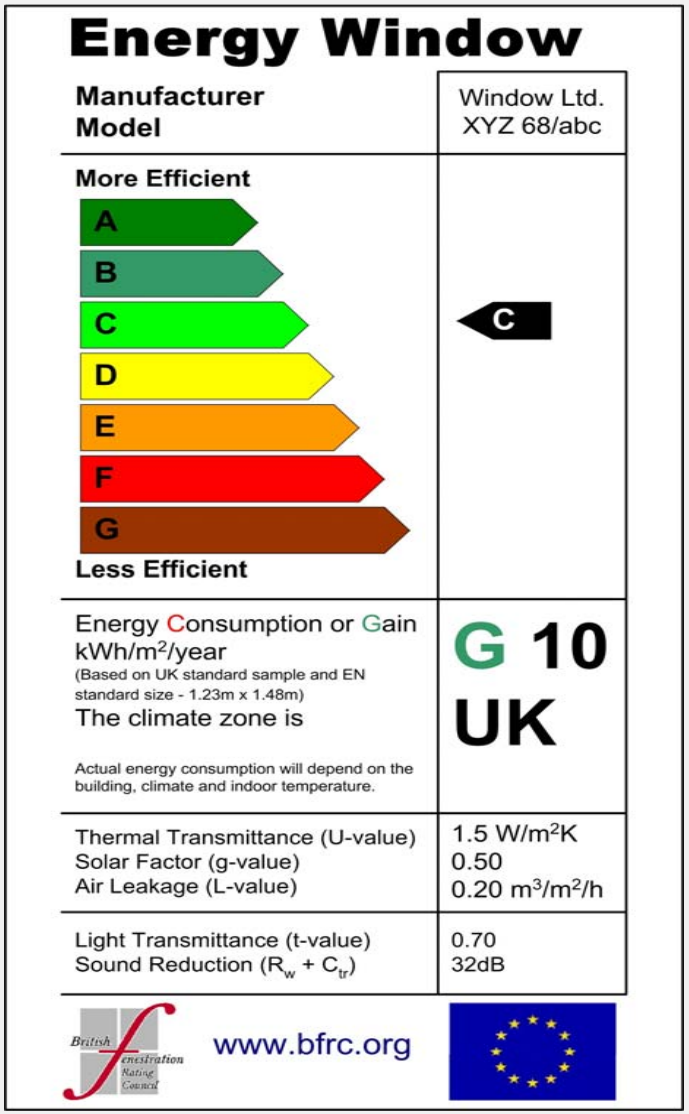
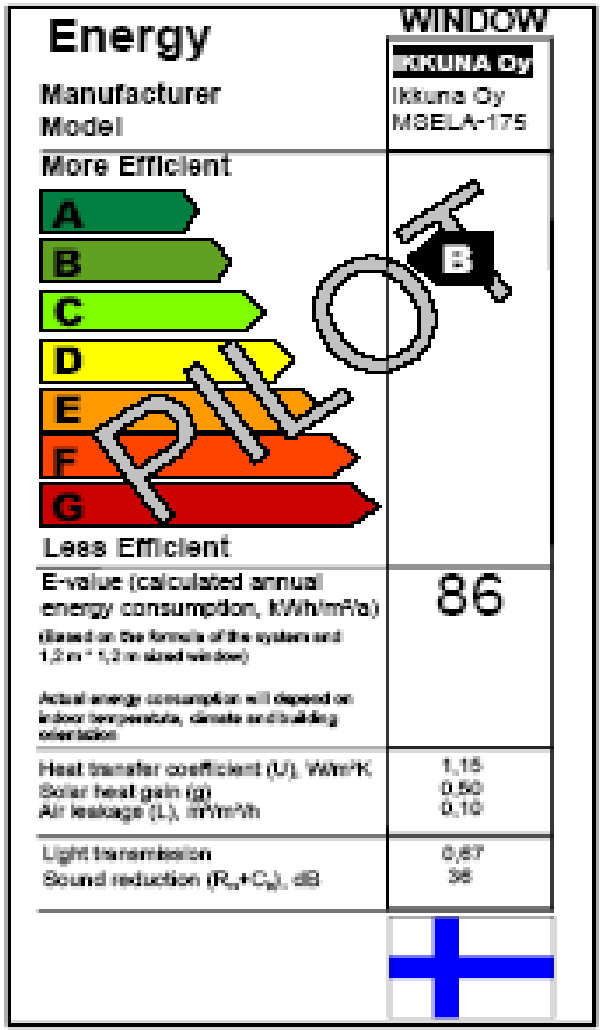
UK Label



Finnish label



The role of the energy label is:

”to communicate products energy performance to normal consumers in an *easy- to- understand* way”

It is not:

”for professional buyers / designers that can simulate buildings’ energy balance with various computer models”

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Pilot Project - Sweden

- January 2004 invitation to all manufacturers
- Window manufacturers Association against
- Start up January 2006 with 10 manufacturers (35% of the market)
- Agreed method U-value = heat losses through window
- Rating levels 0,9 W/m2K = A and 1,5 = G
- January 2007 Swedens´ biggest window manufacturer joined
- Home page in swedish www.energifonster.nu
- Joint marketing activities with manufacturers
- Press information

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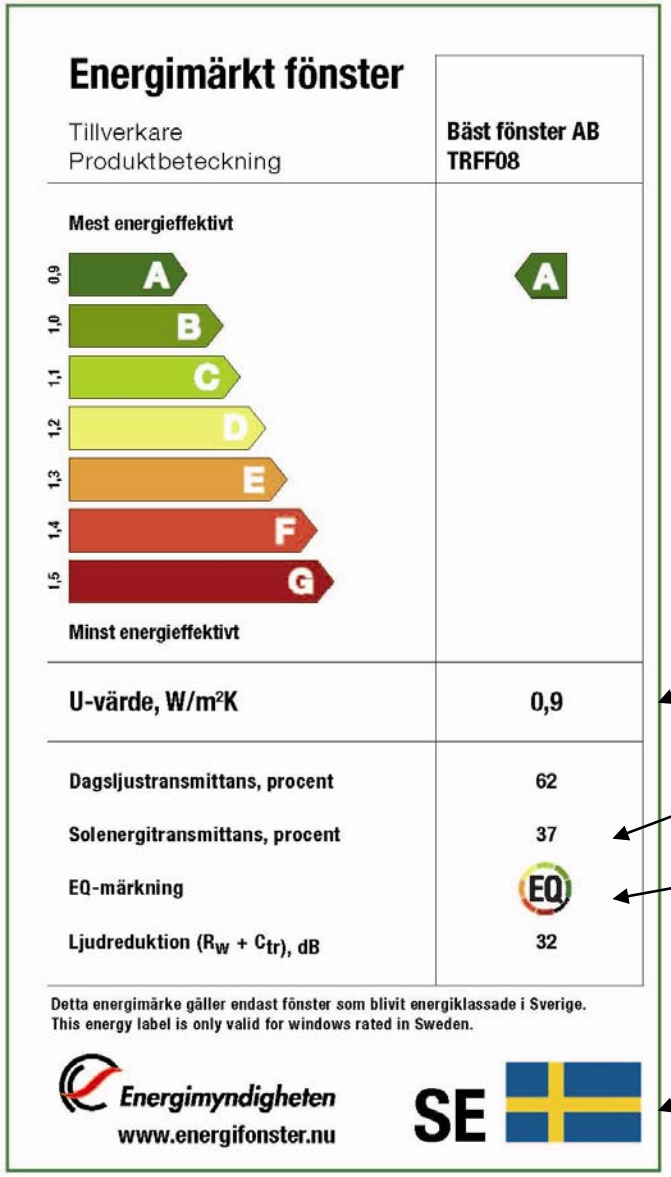
Sweden 2008

- Window manufacturers representing more than 85 % of the Swedish window market from four Nordic countries signed a Voluntary Agreement with the Swedish Energy Agency
- The project is financed mainly by the manufacturers themselves. The project leader is financed by the Swedish Energy Agency.
- The energy rating has been extended to include also other window properties than energy efficiency: Air tightness, manoeuvrability, weather proof etc.
- Ethic council deals with complaints. Project leader responsible for quality control
- Marketing activities towards all groups: Press, consumers, professional buyers, politicians etc.
- Home page www.energifonster.nu which also is the official name of the umbrella organisation for this project.



New Swedish Energy label 2008

U-value

Solar heat transmittance

Energy and Quality mark for windows that fulfil all quality requirements

The energy rating only valid in Sweden. Imported rated windows must obtain a Swedish rating

Measured results prove that with Energy rated windows

- Heating energy can be reduced by 80 % or more
- High efficiency becomes affordable because heat distribution system is no longer necessary

and with Solar control glass

- Cooling systems can be reduced to a minimum – if needed at all.
- Better indoor comfort at lower energy bills
- Required know-how and calculation procedures are available and reliable

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		Energy losses through 1 m2 window	Energy savings through 1 m2 window	
U-value W/m2K		1 m2	Upgrading from single	Upgrading from double
Single glazed	4,0	400		
Double	3,0	300	100	
Triple	2,0	200	200 *	100 *
Triple with Low E coating+argon	1,2	120	280 *	180 *

*another 5-12 % of heating costs can be reduced because possible lowering of indoor temperature thanks to improved indoor comfort, no downdraught etc.

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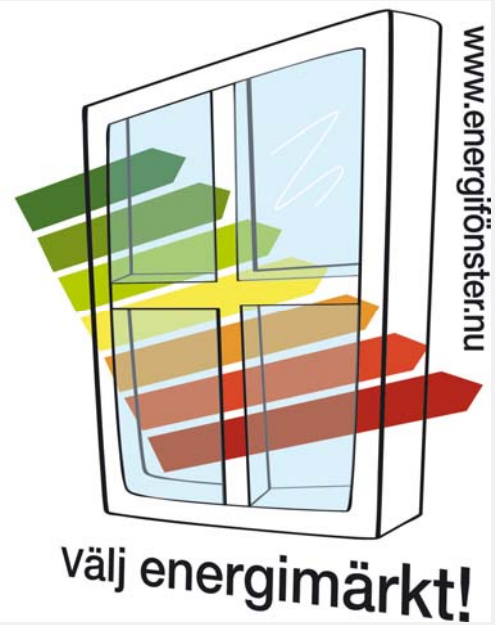
Energy rated windows in Sweden provide

- reliable information
- quick and simple comparison
- energy savings
- better indoor comfort
- better economy
- reduced emissions
- lower house building costs
- and from 2008 better quality



It’s simple…….

…..Creep before you run

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Energy, water and money down the drain

Problems:

Water is ”cheap”

Water heating costs hidden in overall energy bill

Users not prepared to sacrifice comfort

New trends with BIG showerheads

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Domestic water consumption in kitchen and bathroom

Swedish Energy Agency study from October 2008 shows:

39 – 41 % shower

39 – 43 % kitchen

18 – 21 % bathroom taps

60-62 % of all water is hot water

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Affordable solutions:

- Replace showerheads with handheld showers
- Install water saving showers and shower hoses
- Keep your existing faucets but upgrade them
- with water saving aerators
- Install water saving ”walls” in water closets
- In new buildings install water saving mixers, taps and water closets

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Results from Seattle City Light study

75 single-family residences

Showerhead and faucet aerator measurements

Methodology: Hot and Cold temperature water flow controls opened max.

Graduated bucket capture method used to measure water

Water volume divided by seconds X 60 sec =

Litres per minute

Findings

Energy saving potential by replacing

1 showerhead	172 kWh/year
1 additional showerhead	88 kWh/year
1 aerator in bathroom sink	50 kWh/year

Result: Seattle City Light, in partnership with area water utilities, completed design of a cost-effective single family bathroom fixture retrofit program.

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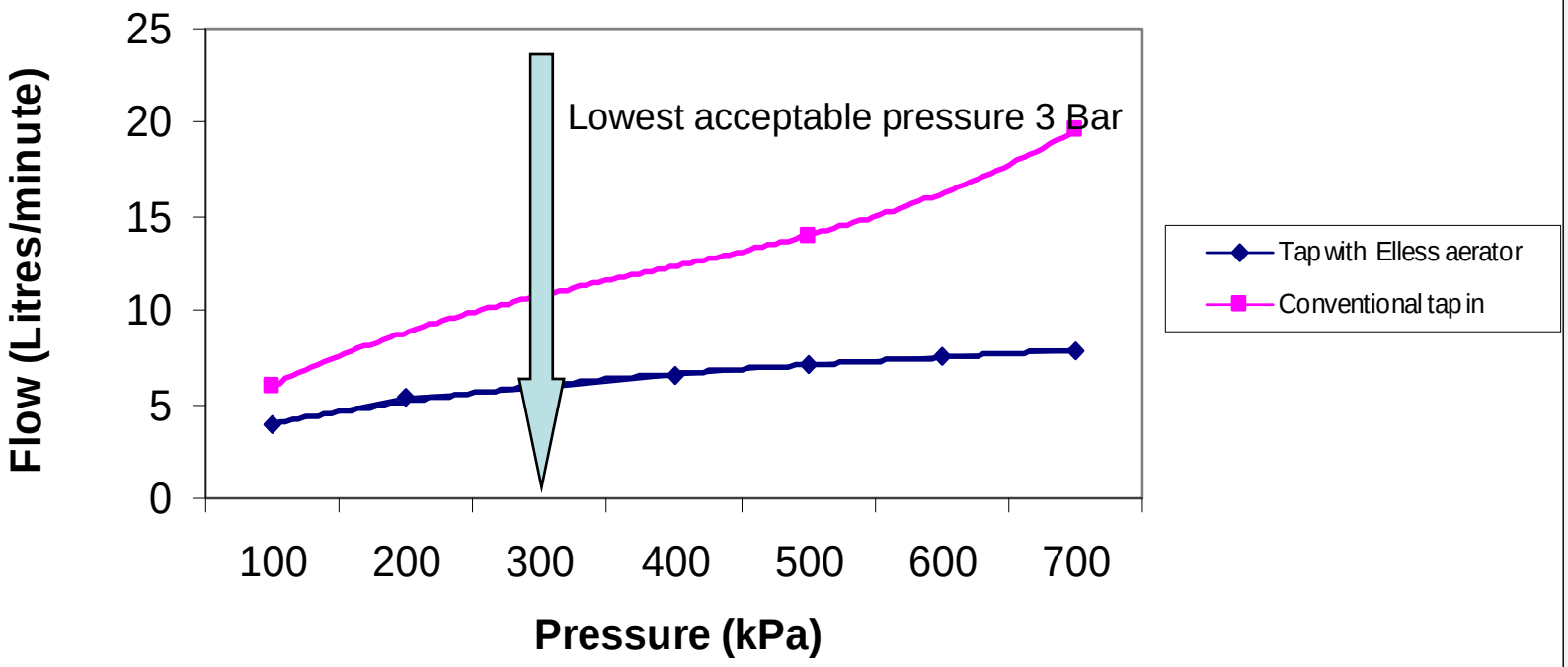
Water saving aerators save 50 % or more

Tests by the Technical Research Institute of Sweden, SP



Replacing existing equipment with efficient water saving products with good washing comfort

Measured unit	Saving M3/year	Saving kWh/year	Cost saving Euros
Shower	20	899	
Kitchen	33	1483	
Washbasin	11	494	
Total	64*	2876	480 / person

- based on studies in European residential buildings and hotels. Average water reduction from 39 litres/minute to 20 litres/minute = 51 %.

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Energy and water saving potential

A. Most of the water saving potential is within the existing building stock.

2900 kWh/household can be saved by installing water saving products such as aerators and showerheads .

If 1 million households in residential buildings per member country save 2900 kWh each =

78,3 TWh energy and 192 million m3 water saved per year.

Other benefits of a water saving program are improved family economy releasing money to cover other costs or reduce the public costs for subsidies.

B. Hotels are big water consumers

Measured savings approx. 1570 kWh and 35 m3 per hotel room per year show the enormous water and energy saving potential in this sector.

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Good example from Hotell in Brussels

In January 2007 214 rooms were equipped with water saving aerators and handheld water saving showers. The water consumption and gas consumption were measured during one year.

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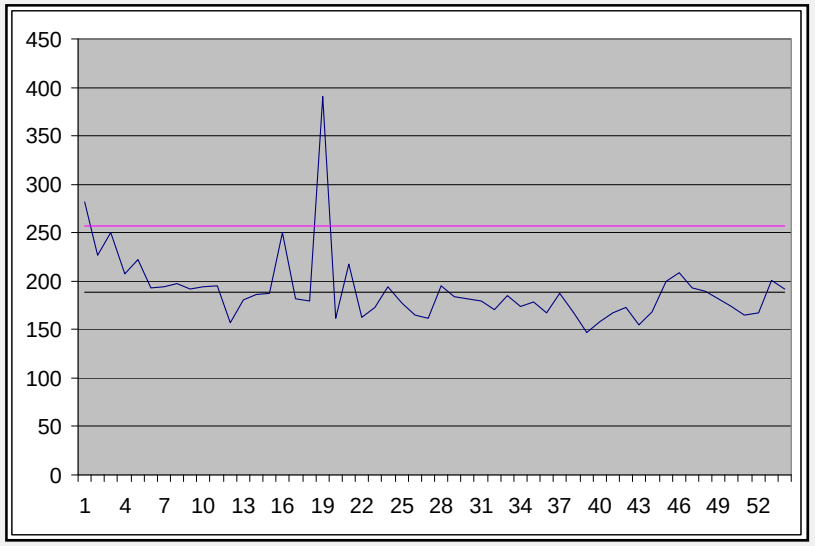
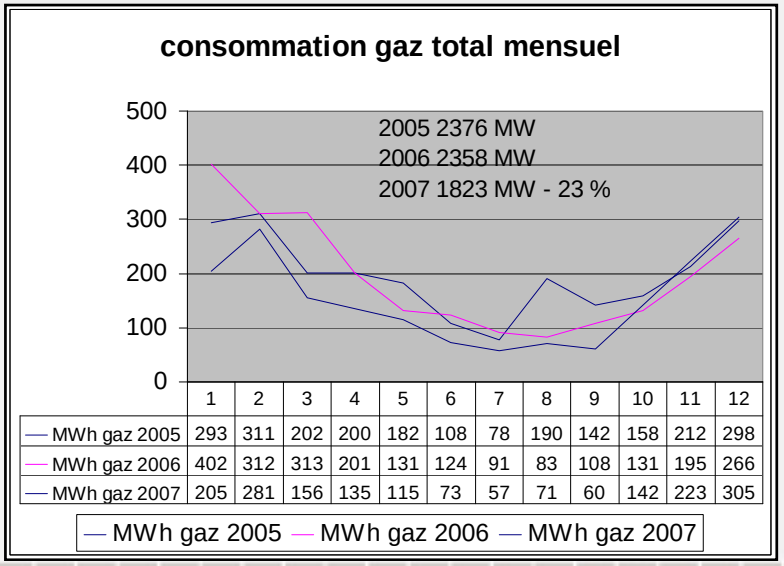


Hotel in Brussels

214 rooms 1 shower + 1 aerator*

Swedish water saving products

Water savings -29% of total hotel consumption

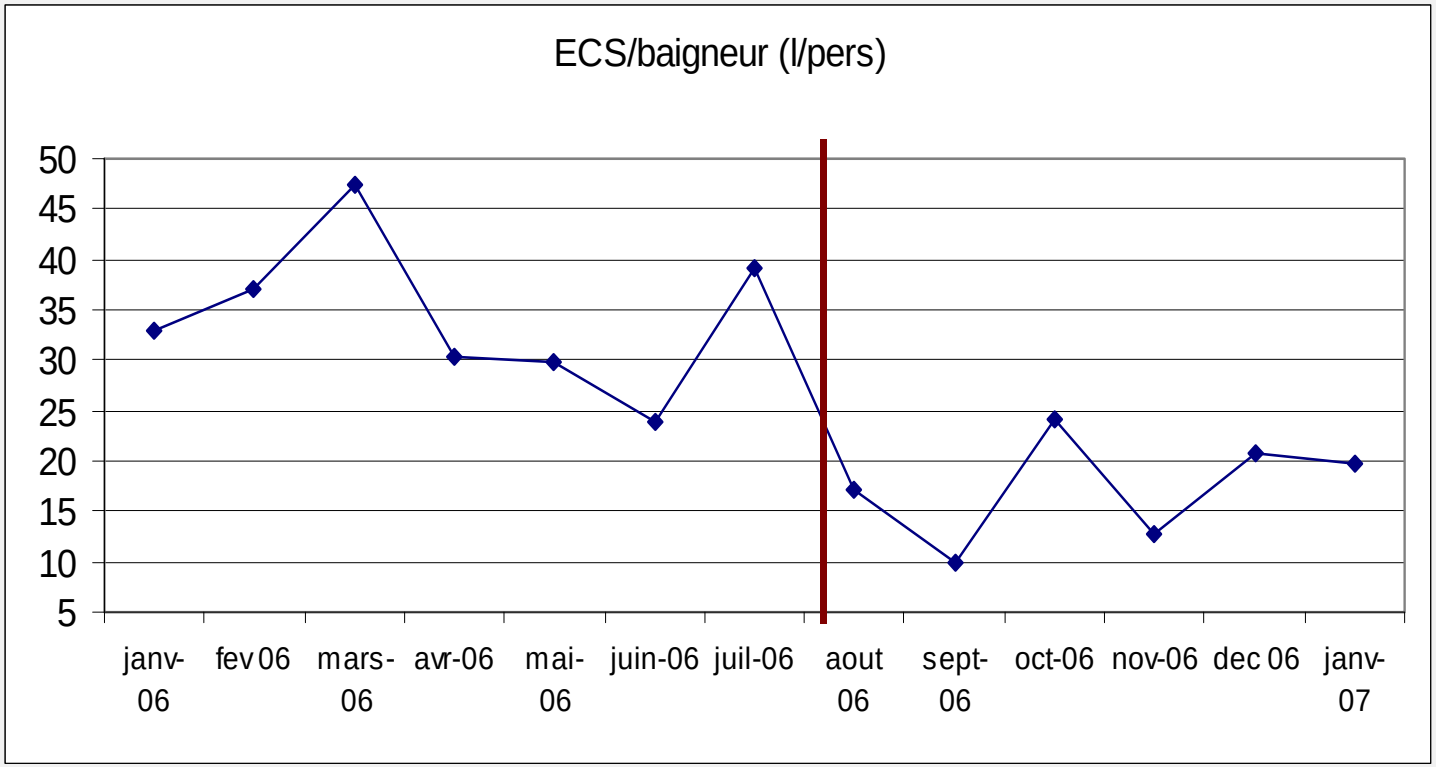


- 23 % of total hotel gas consumption (incl gas for heating)

Navy Base, Toulon tested water saving showerheads*

Average water saving per person 17 litres = 51 %

20500 kWh energy = 1464 kWh per showerhead



Environmental savings apart from energy: 33 kgs special salt and 3,8 litres chemicals for the pipes per installed showerhead

* from Sweden

Obstacles:

- Many complicated measuring methods are suggested
- New European standard EN 817:2009 for new mixing valves only
- Many water saving devices not efficient enough
- Most efficient devices not sold to the public (high quality costs more and consumers find them expensive)
- Little knowledge regarding water distribution system in households and in non-residential buildings, hotels etc. Too low flow rates risk to disturb the system or even increase hot water consumption.
- Manufacturers of new tapware fight against upgrading of existing faucets
- Various dimensions of the existing aerators restrict installation of water saving aerators. Introduce a worldwide standard based on the most common dimensions M24 and M22

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Energy rating of water saving devices

- The rating must only cover the taps and showers and not the mixer itself
- Measurements should be done at tapping point
- Measurement should be made at a water pressure of 3 Bar
- The mixer (without aerator) must have a water flow of minimum 12 litres/minute or preferably 15 litres per minute in order to provide good comfort.
- The aerator / shower should be the water reducing element and not the mixer itself. Otherwise the user comfort may be bad.
- The water pelar must have good pressure to ensure quick and efficient washing
- **Important:** The water flow must be measured when shower or taps are open at ”comfort” level and not when fully opened. A good performing aerator or shower, provides good water pressure already when it is open little and therefore it’s performance can only be measured when the tap is not fully opened.

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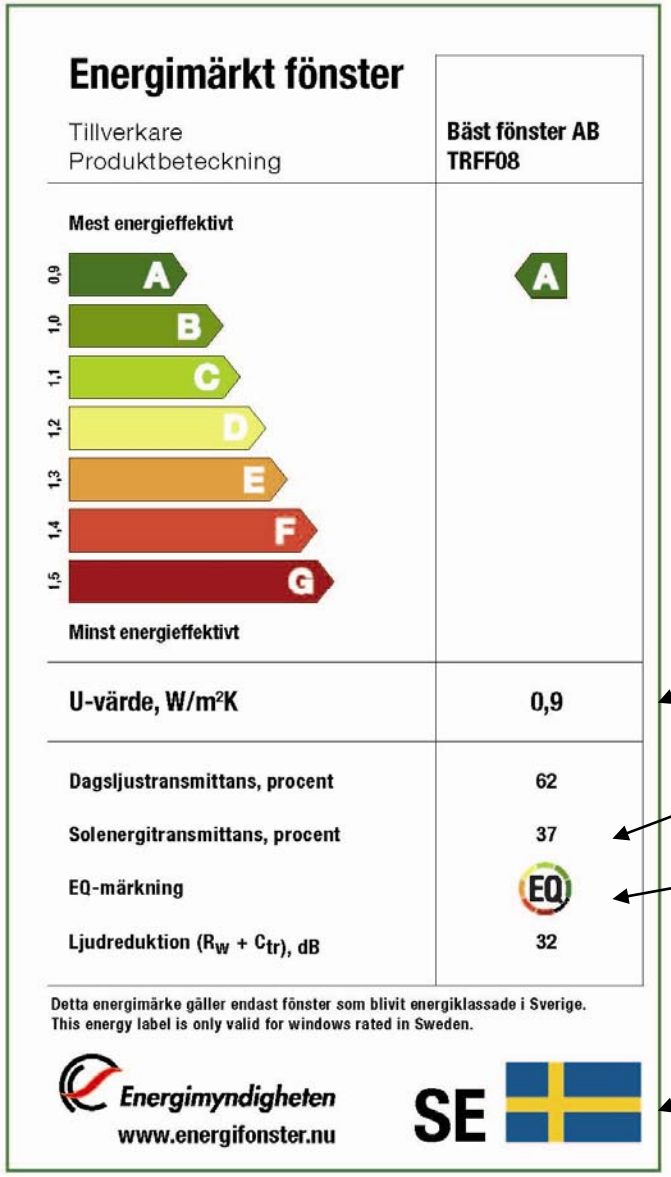


Use this within Europe well known label

Water flow measured at 3 Bar

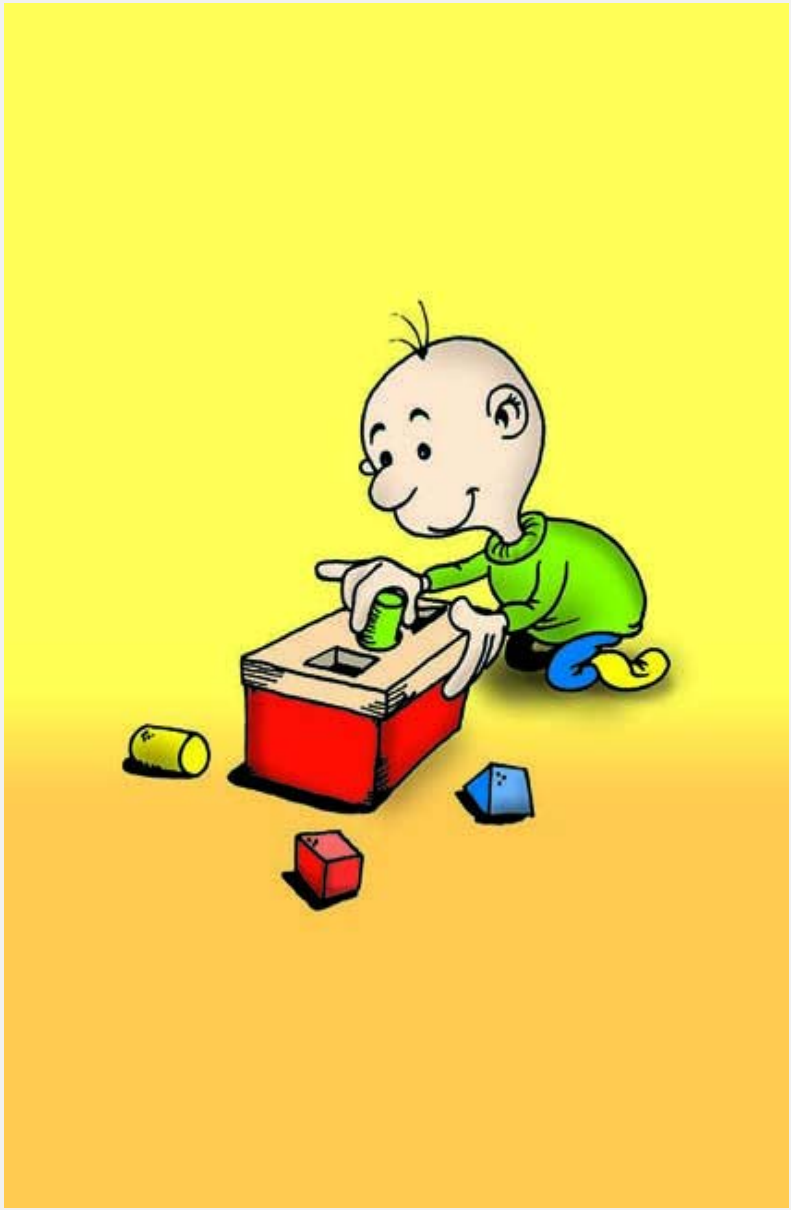
Water flow at comfort level

Environmental friendly and healthy materials

(WRAS approval or similar)

Test results from national, independent and ackredited bodies

(Notified Bodies not accepted)



K I S S

Keep

It

Simple

Silly

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