

Energy policies turning around Europe

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NIBE Energy Systems



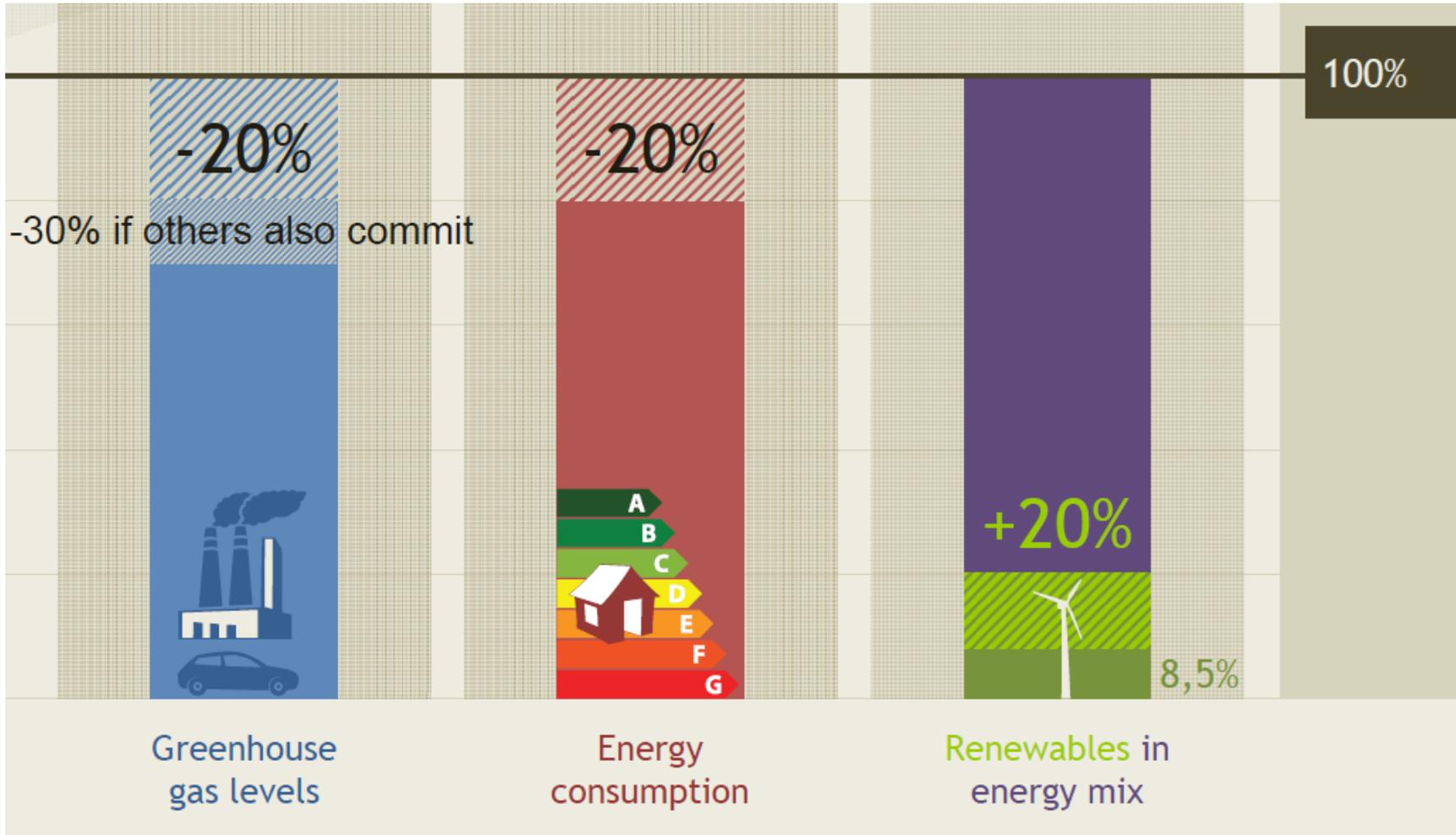
Energy markets in transformation

Governing forces

- “ Energy price development
- “ Policies
- “ Technological development



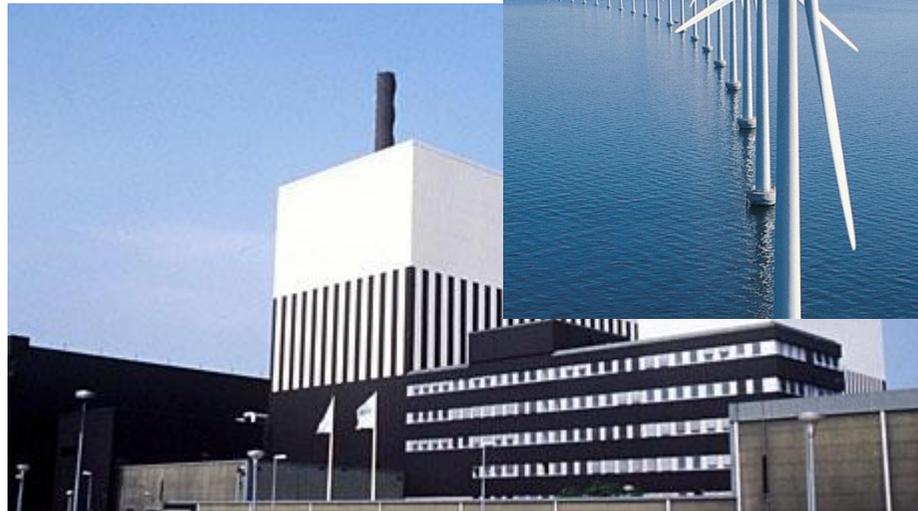
20-20-20 by 2020



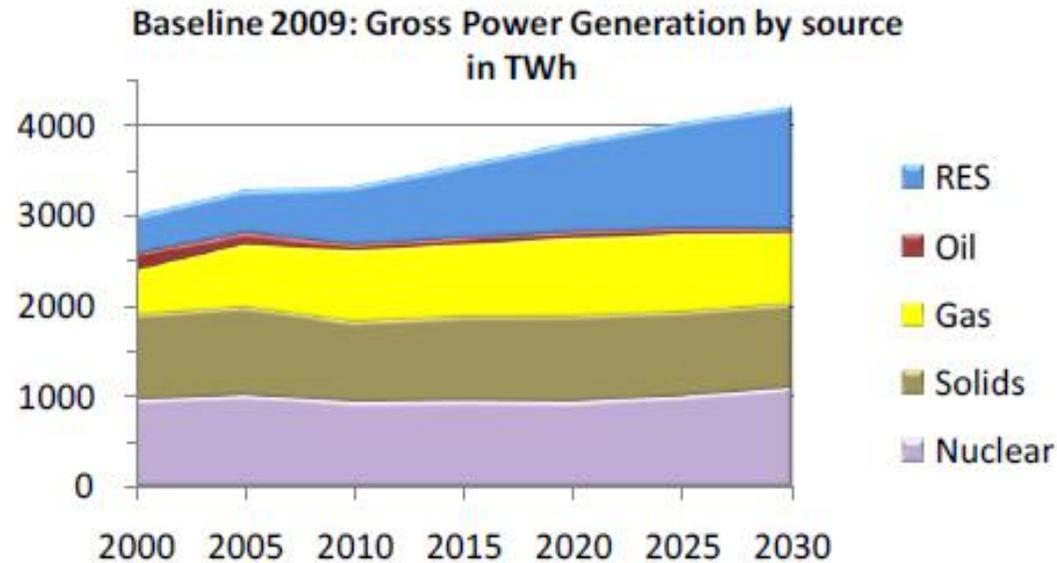
Challenges

Security of supply

- “ Generation of electricity with low carbon footprint
- “ Renewable electricity Wind- and hydro power, PV
- “ Nuclear and Carbon capture and storage (CCS)

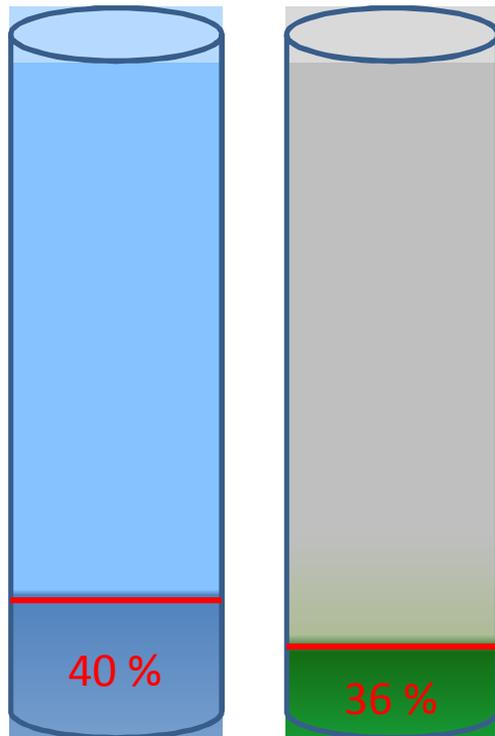


20-20-20 by 2020



Source: European Commission, EU energy trends to 2030 – Update 2009

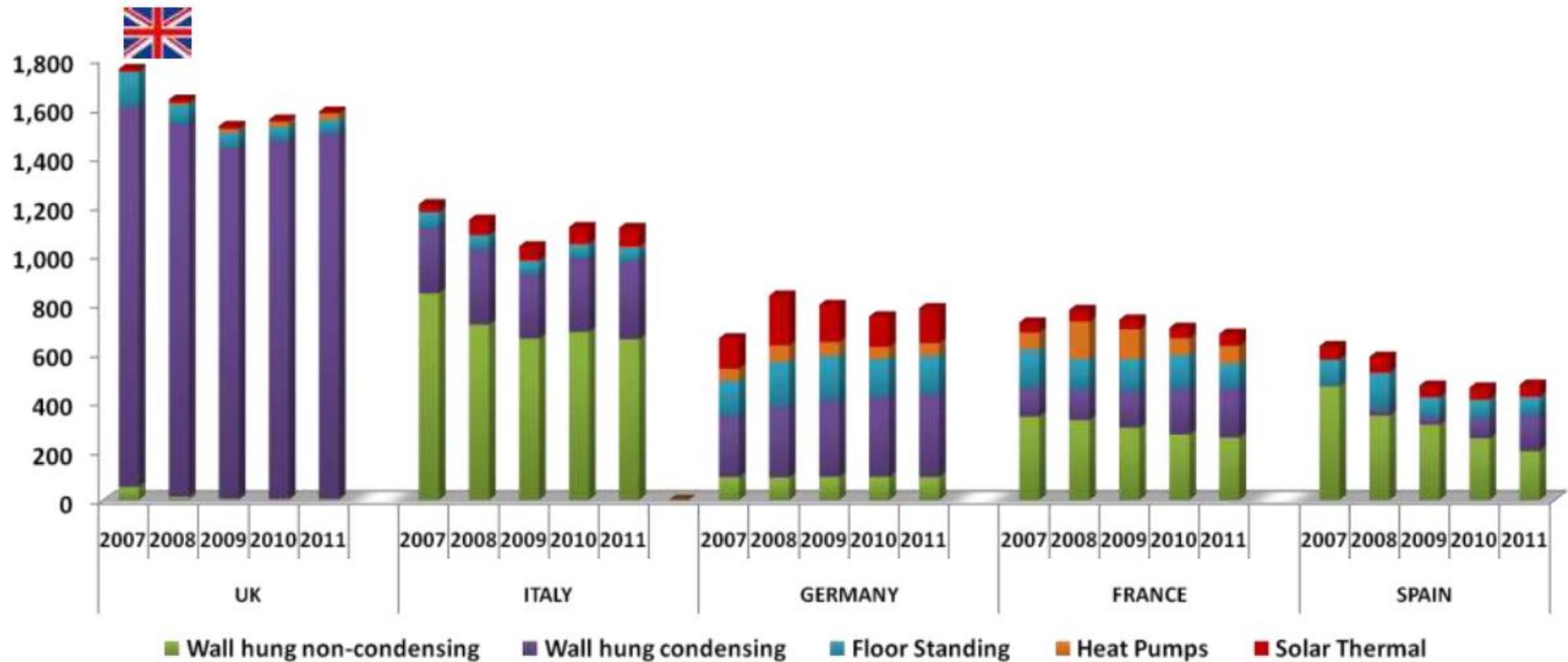
European building sector



“ 40 % Final energy use

“ 36 % CO₂ emissions

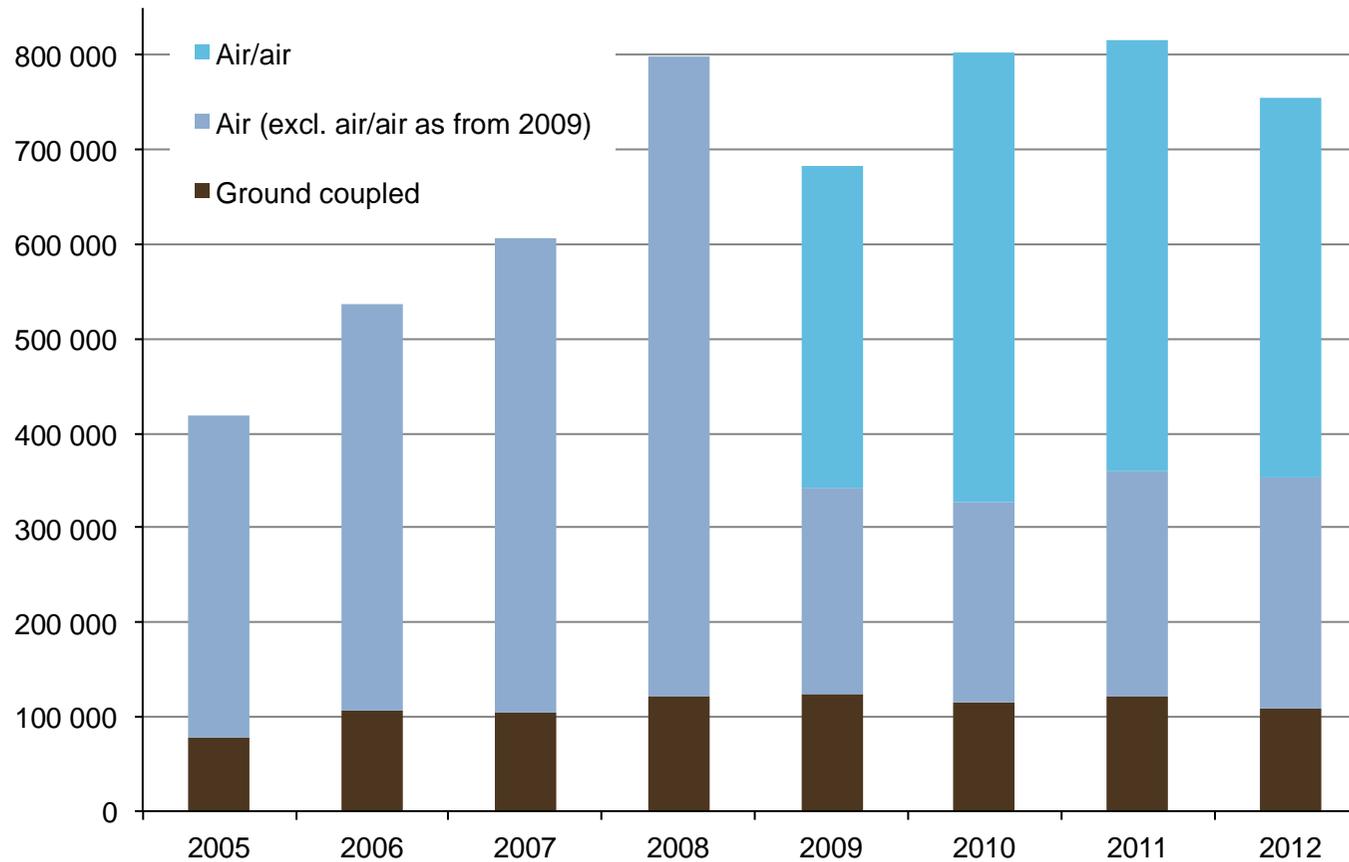
European heating markets



Source: BSRIA

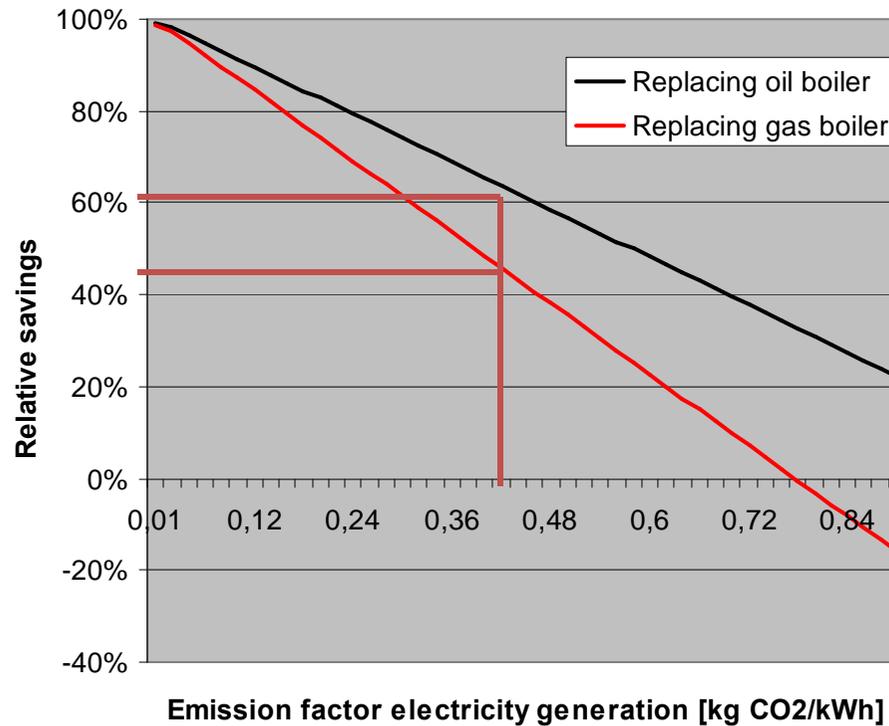
Heat pump sales in Europe

Trend: air source



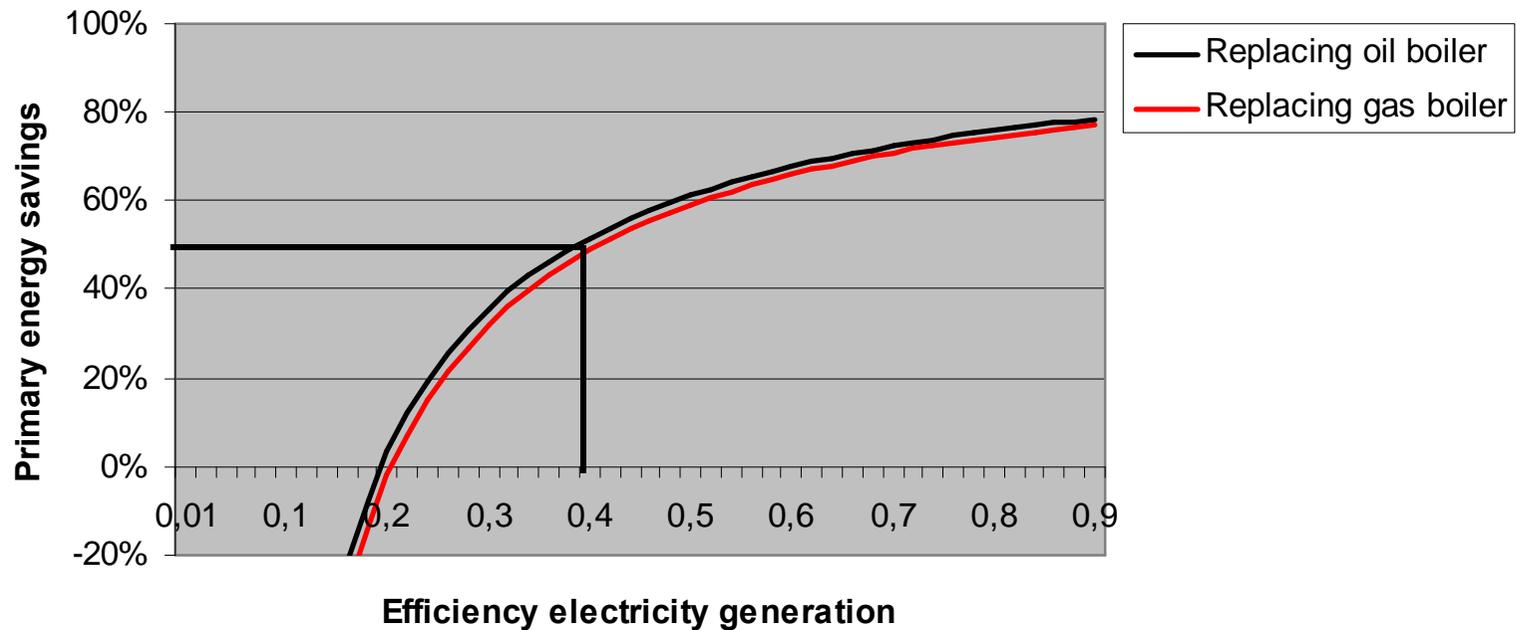
Source: EHPA European Heat Pump Outlook 2013

Relative emission savings gained by heat pump retrofit



Conditions used for the example
gas boiler efficiency 95%, oil boiler efficiency 90%,
monovalent heat pump operating with SPF 4.

Primary energy savings



Conditions used for the example
gas boiler efficiency 95%, oil boiler efficiency 90%,
monovalent heat pump operating with SPF 4.

Political tools available

“ Addressing the use of renewable energy
RES-Directive

“ Addressing energy efficiency
Energy performance of buildings Directive
Energy labelling Directive
ECO-Design Directive
ECO-labelling Directive (under revision)
Energy efficiency Directive

“ Addressing GHG-emissions
Kyoto (Doha amendment)
EU Emissions trading system



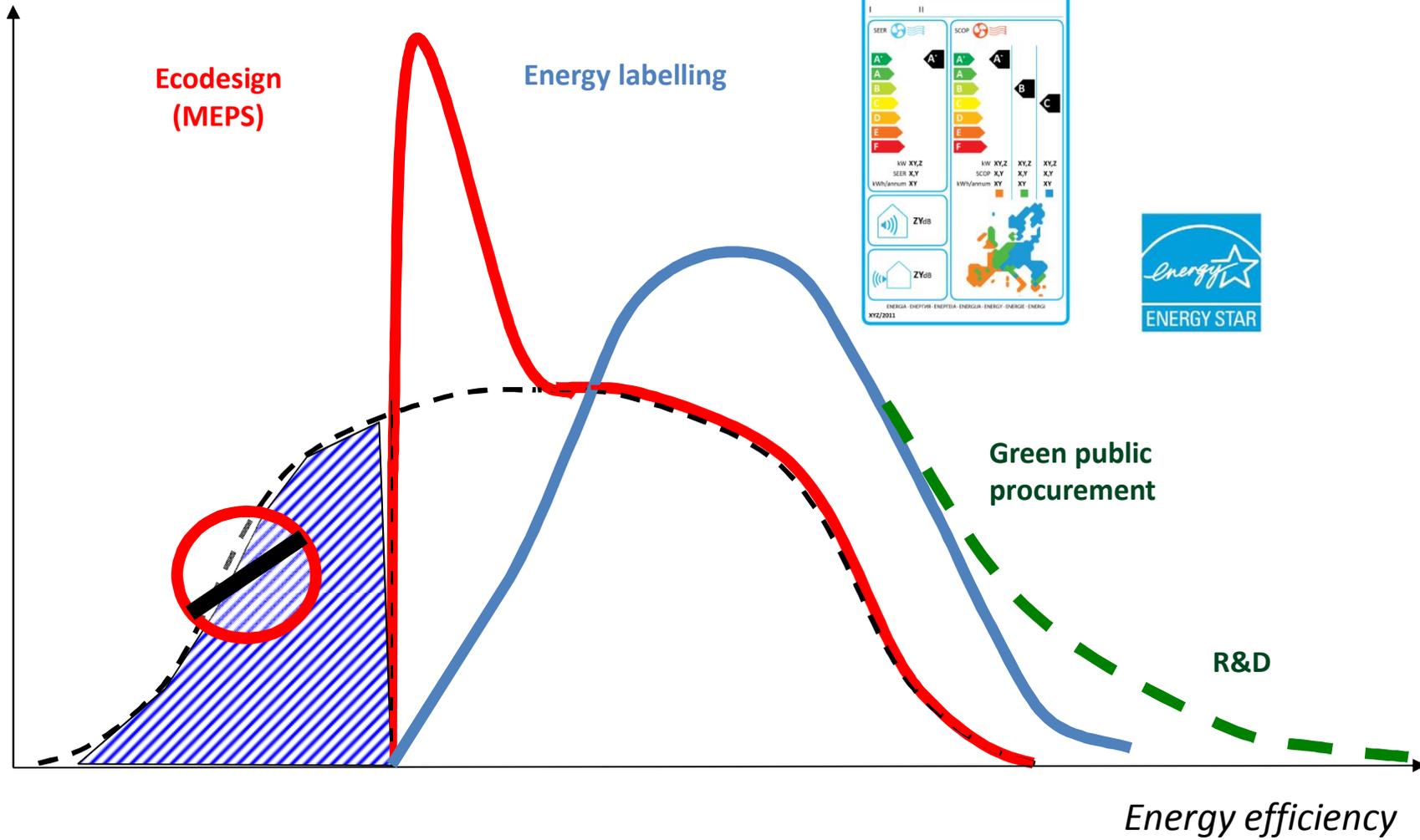
Overall aim - Ecodesign

- ” Impose more energy efficient products
- ” Extend energy labelling scheme
- ” Improve customer information
- ” **Ban inefficient products from the European market**



Ecodesign

No Units



Energy related products Directive

Framework Directive for setting of energy efficiency criteria requirements

Examples of prioritised product groups

Boilers

Water heaters

Computers

Imaging equipment

Televisions

Stand-by

Battery charges

Residential room conditioners

Domestic freezers

Dishwashers/washing machines

Laundry dryers

Vacuum cleaners

Energy related products Directive

“ Lot 1 boilers

Oil-, gas- and electric boilers, heat pumps, solar thermal and combinations thereof

“ ~~Lot 2 Water heaters~~

“ Lot 10

Room air-conditioners (RAC), Local air-conditioners (LAC),
Comfort fans

http://ec.europa.eu/energy/efficiency/ecodesign/eco_design_en.htm

Implications of a cross technology label

” Improved consumer information

Enables straight forward performance comparisons

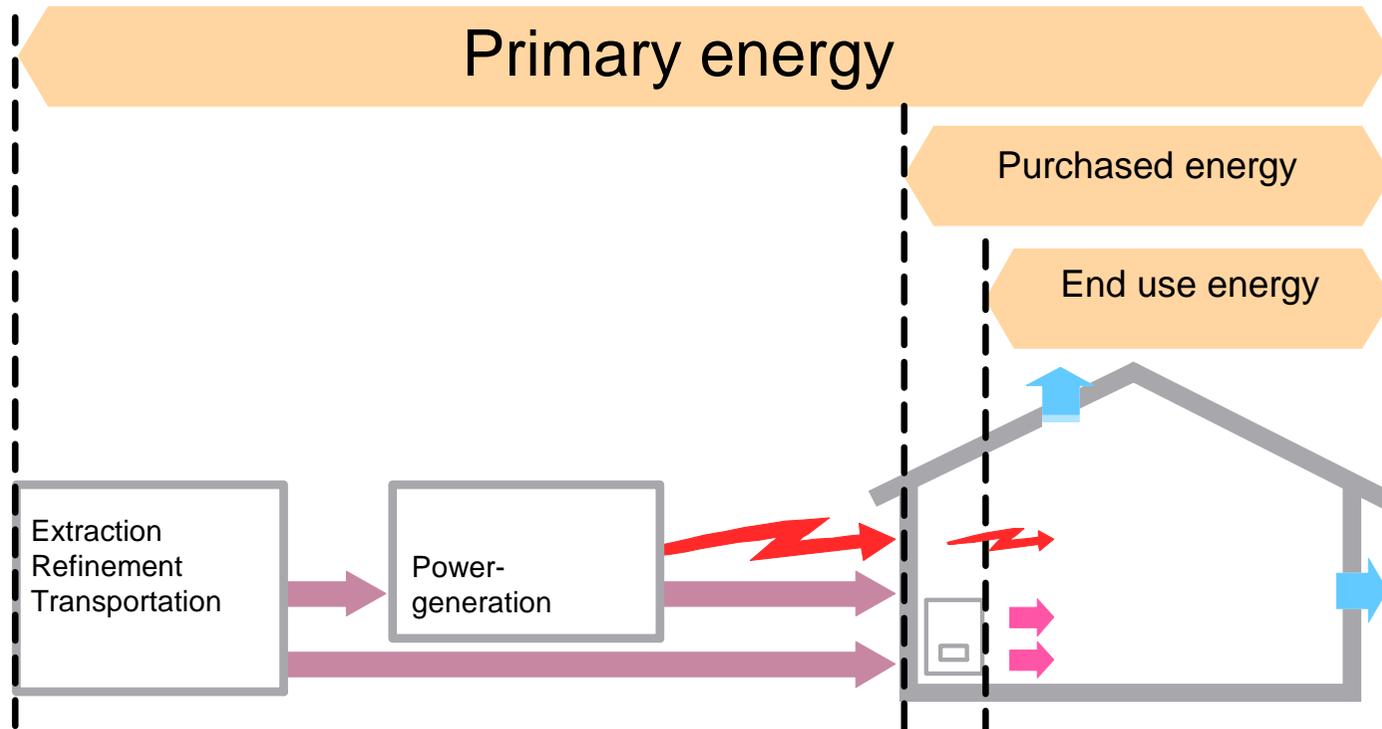
” Systems approach necessary

Definition of system boundaries

” Primary energy efficiency

” Annual performance rating

Primary energy efficiency . System boundaries



Main parameters considered for performance calculation

- “ Primary energy factor (electricity)
- “ Three climate zones
- “ COP at various operating conditions
- “ Two heat distribution systems (radiators, underfloor heating)
- “ Does not address green house gas emissions

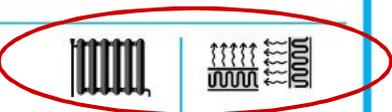
Three climate zones

Warm	Athens
Average	Strasbourg
Cold	Helsinki

Calculations are based on a temperature bin method

Proposed layout of the label for heat pumps

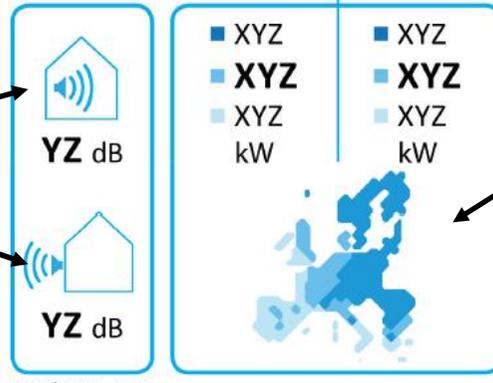
Different temperature levels



Achieved rating for high and low temperature level



Sound power level



Climate zones in Europe

XYZ/2012 - 2014

Energy efficiency requirements

Table 1: Seasonal space heating energy efficiency classes of heaters, with the exception of low-temperature heat pumps and heat pump space heaters for low-temperature application

Seasonal space heating energy efficiency class	Seasonal space heating energy efficiency η_s in %
A ⁺⁺⁺	$\eta_s \geq 150$
A ⁺⁺	$125 \leq \eta_s < 150$
A ⁺	$98 \leq \eta_s < 125$
A	$90 \leq \eta_s < 98$
B	$82 \leq \eta_s < 90$
C	$75 \leq \eta_s < 82$
D	$36 \leq \eta_s < 75$
E	$34 \leq \eta_s < 36$
F	$30 \leq \eta_s < 34$
G	$\eta_s < 30$

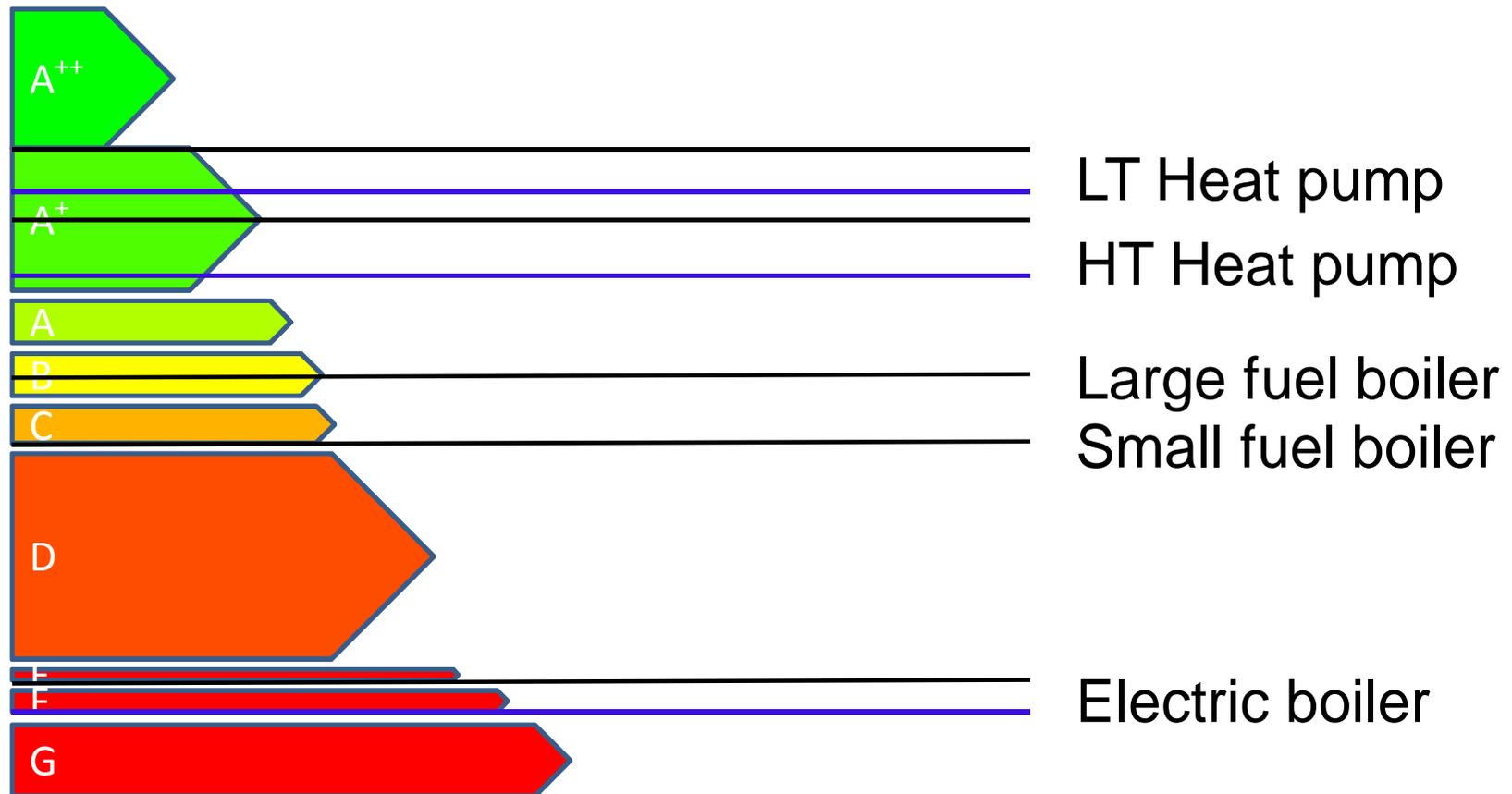
Ecodesign minimum efficiency requirements

Commission final proposal

Type of boiler	2 years after into force	4 years after into force
Large fuel boiler (>10 kW)	86 %	86 %
Small fuel boiler (<10 kW)	75 %	75 %
Electric boiler	30 %	36 %
High temp heat pump	100 % (SCOP=2,5)	110 % (SCOP=2,75)
Low temp heat pump	115 % (SCOP=2,875)	125 % (SCOP=3,125)

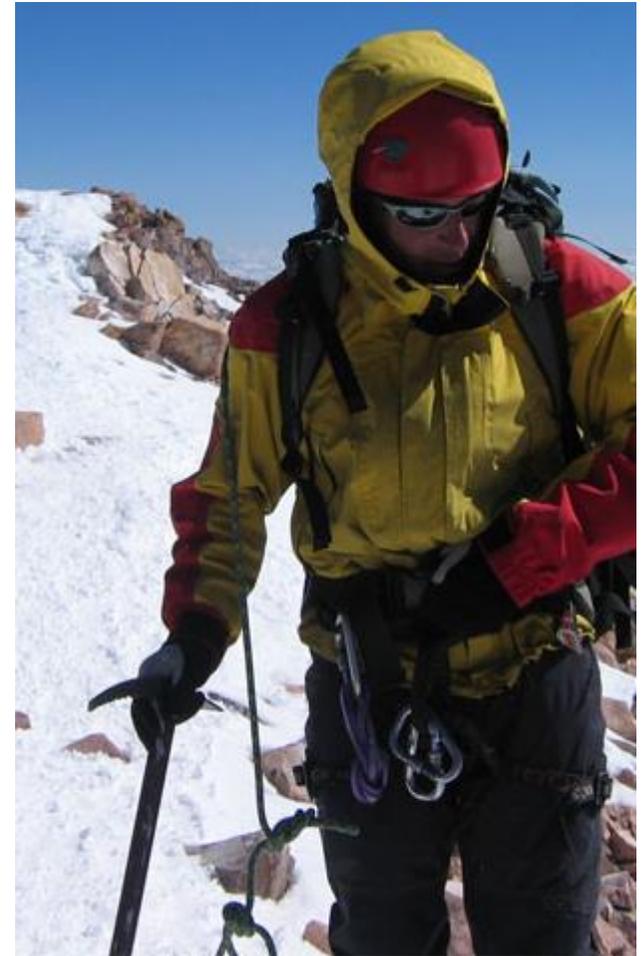
Ecodesign minimum efficiency requirements

2 years after into force 4 years after into force



Challenges

- “ Refrigerants
- “ Quality assurance
- “ Smart grid ready
- “ Efficiency requirements



R & D



Refrigerants

HFO 1234YF

CO₂, Hydrocarbons, NH₃

Heat exchangers

Assymetric plates

Micro channel

Low energy circulators

Compressors

Improved performance

Inverter control

Permanent magnet electric motors

New+compressor types



R & D



SMART GRID
ready



Electronics
Control
Monitoring

Threefold benefits with heat pumps

- “ Renewable energy
- “ Reduction of green house gas emissions
- “ Improve energy efficiency

**Heat pumps are a key for
a sustainable energy system!**