Ecodesign and Energy Labelling of Air conditioners in the EU

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Ecodesign directive 2009/125/EC

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:285:0010:0035:EN:PDF

- *<u>key:</u> How energy efficent and environment friendly shall a product be to allow placing it on the European market?*
- More than 30 „energy related“ product groups:
  - **Electric appliances:** lamps, refrigerators, pumps, electric drives, stand-by, household appliances…
  - **Building technologies:** boilers, water heaters, air conditioners, ventilation units, circulators, windows(?)…
- Framework for EU regulations („laws“) with harmonized requirements throughout the EU („internal market“)
- Principle: CE declaration by manufacturers
- DE: Energieverbrauchsrelevante-Produkte-Gesetz

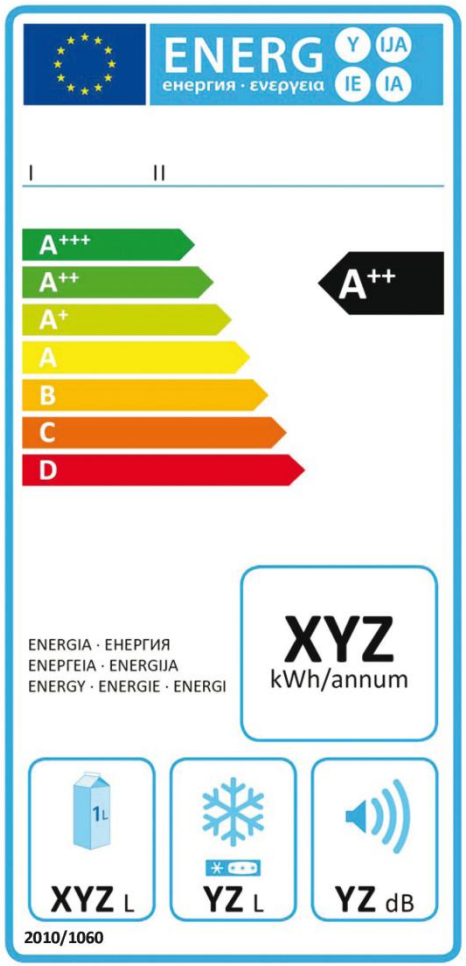
➔ **push the market** to more efficient and environment friendly products

CE

http://de.wikipedia.org/wiki/CE-Kennzeichnung

Energy labelling directive 2010/30/EU

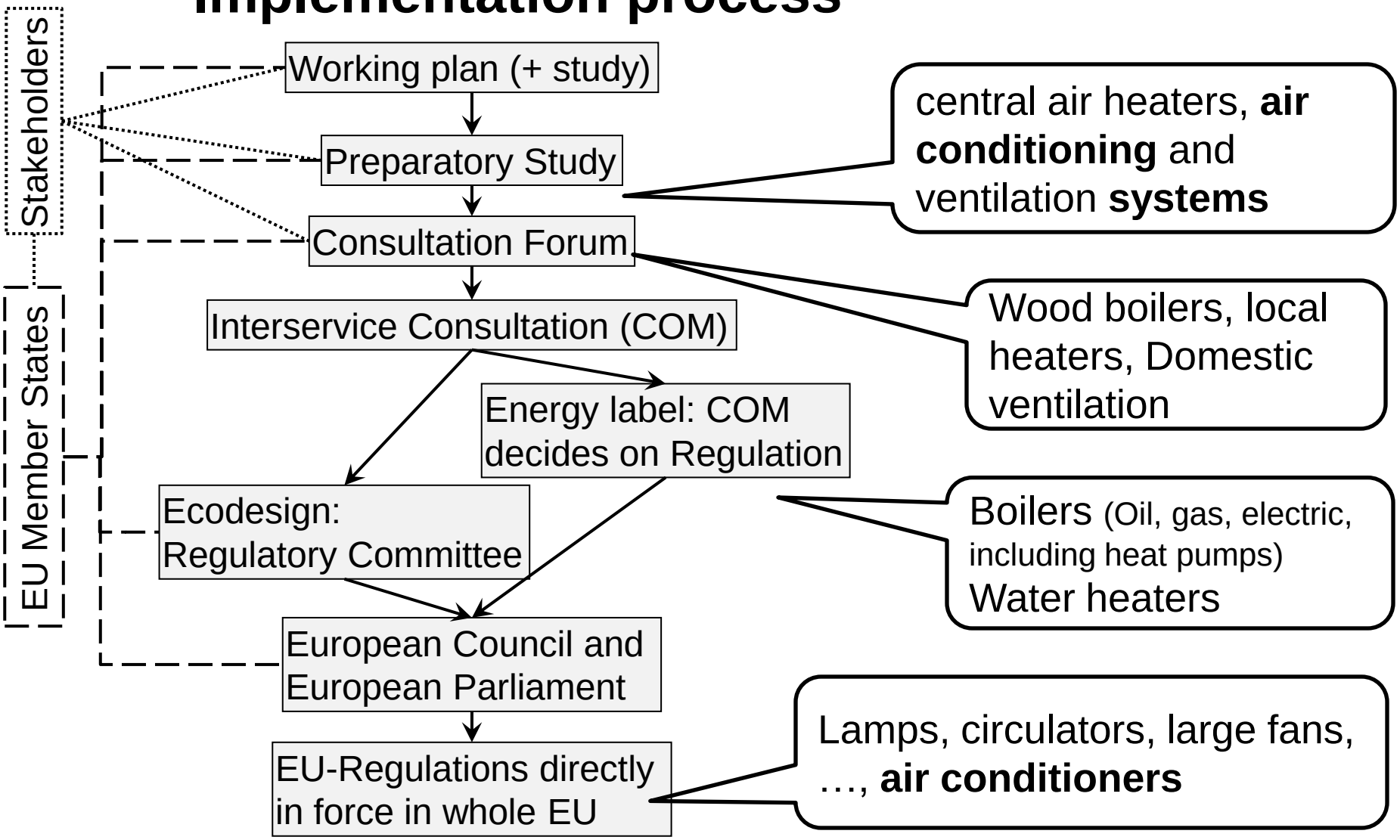
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:153:0001:0012:EN:PDF



- Origins in 1992
- same scope as ecodesign directive
- Framework for direct EU “delegated regulations”
- 7 efficiency classes: A…G ➔ A+++…D
- labelling in the shop, efficiency class to be indicated in advertisement and internet
- language-free design: symbols and icons
- Germany: Energieverbrauchs-kennzeichnungsgesetz

➔ **pull the demand** for energy efficient products

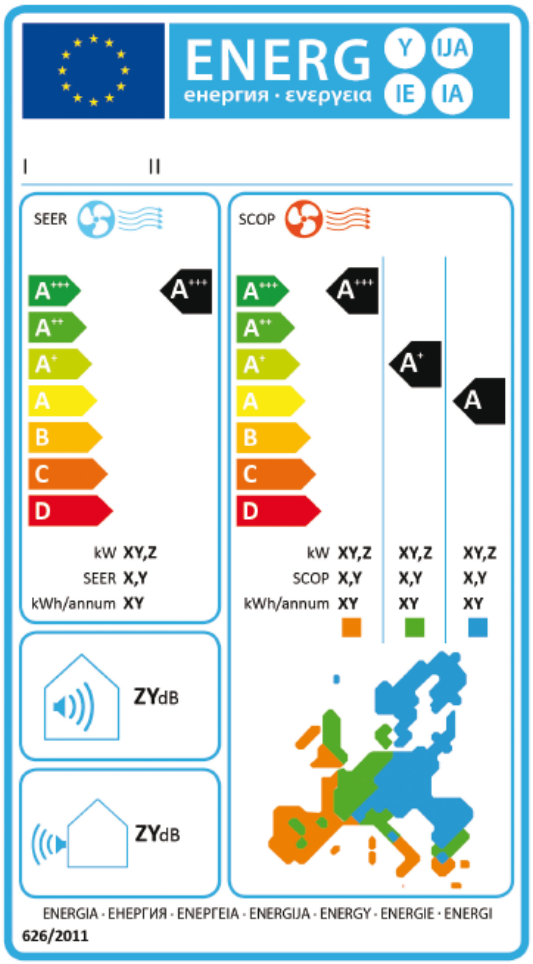
Implementation process



Ecodesign and Energy label for Air conditioners

- Energy labelling regulation 2011/626/EU (directive 2002/32/EC repealed)
  http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:178:0001:0072:EN:PDF
- Ecodesign regulation 2012/206/EU
  http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:072:0007:0027:EN:PDF
- Result: Inverter driven air conditioners on the market only (except ducted air conditioners)
- EU Electricity Consumption
  - 2005: 30 TWh
  - 2020 without measures: 74 TWh
  - 2020 with measures: 63 TWh

Energy label for (split) air conditioners



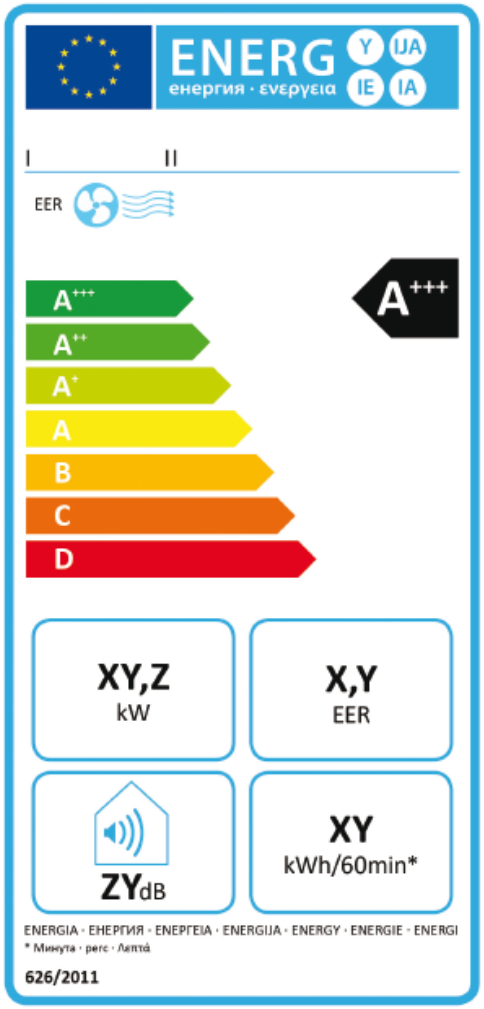
Introduced from 1.1.2013 (A…G), 1.1.2015, 1.1.2017, 1.1.2019 (A+++…D)

Table 1

Energy efficiency classes for air conditioners, except double ducts and single ducts

Energy Efficiency Class	SEER	SCOP
A+++	SEER ≥ 8,50	SCOP ≥ 5,10
A++	6,10 ≤ SEER < 8,50	4,60 ≤ SCOP < 5,10
A+	5,60 ≤ SEER < 6,10	4,00 ≤ SCOP < 4,60
A	5,10 ≤ SEER < 5,60	3,40 ≤ SCOP < 4,00
B	4,60 ≤ SEER < 5,10	3,10 ≤ SCOP < 3,40
C	4,10 ≤ SEER < 4,60	2,80 ≤ SCOP < 3,10
D	3,60 ≤ SEER < 4,10	2,50 ≤ SCOP < 2,80
E	3,10 ≤ SEER < 3,60	2,20 ≤ SCOP < 2,50
F	2,60 ≤ SEER < 3,10	1,90 ≤ SCOP < 2,20
G	SEER < 2,60	SCOP < 1,90

Energy label for ducted air conditioners



Introduced from 1.1.2013 (A+++…D)

Energy efficiency classes for double ducts and single ducts

Energy Efficiency Class	Double ducts		Single ducts	
	EER_{rated}	COP_{rated}	EER_{rated}	COP_{rated}
A+++	≥ 4,10	≥ 4,60	≥ 4,10	≥ 3,60
A++	3,60 ≤ EER < 4,10	4,10 ≤ COP < 4,60	3,60 ≤ EER < 4,10	3,10 ≤ COP < 3,60
A+	3,10 ≤ EER < 3,60	3,60 ≤ COP < 4,10	3,10 ≤ EER < 3,60	2,60 ≤ COP < 3,10
A	2,60 ≤ EER < 3,10	3,10 ≤ COP < 3,60	2,60 ≤ EER < 3,10	2,30 ≤ COP < 2,60
B	2,40 ≤ EER < 2,60	2,60 ≤ COP < 3,10	2,40 ≤ EER < 2,60	2,00 ≤ COP < 2,30
C	2,10 ≤ EER < 2,40	2,40 ≤ COP < 2,60	2,10 ≤ EER < 2,40	1,80 ≤ COP < 2,00
D	1,80 ≤ EER < 2,10	2,00 ≤ COP < 2,40	1,80 ≤ EER < 2,10	1,60 ≤ COP < 1,80
E	1,60 ≤ EER < 1,80	1,80 ≤ COP < 2,00	1,60 ≤ EER < 1,80	1,40 ≤ COP < 1,60
F	1,40 ≤ EER < 1,60	1,60 ≤ COP < 1,80	1,40 ≤ EER < 1,60	1,20 ≤ COP < 1,40
G	< 1,40	< 1,60	< 1,40	< 1,20

Ecodesign for air conditioners

- Minimum requirements:

From…	Refrigerant	Air conditioners		Single duct air conditioners		Double duct air conditioners	
		(SEER)	(SCOP)	(EER)	(COP)	(EER)	(COP)
1.1. 2013	GWP > 150	D (3.60)	A (3.40)	B (2.40)	C (1.80)	B (2.40)	C * (2.36)
	GWP ≤ 150	E (3.24)	B * (3.06)	C (2.16)	C (1.62)	C (2.16)	D (2.12)
1.1. 2014	GWP > 150	< 6 kW: B (4.60) ≥ 6 kW: C (4.30)	A (3.80)	A (2.60)	B (2.04)	A (2.60)	B (2.60)
	GWP ≤ 150	< 6 kW: C (4.14) ≥ 6 kW: D (3.87)	A (3.42)	B * (2.34)	C (1.84)	B * (2.34)	C * (2.34)

* These minimum requirements are about 0.06 points or less below the limit of an efficiency class. In those cases the better efficienccy class was indiacted. Single products of the lower efficiency class may be observed on the market.

GWP: Global Warming Potential of the refrigerant. SEER: Seasonal energy efficiency ratio in cooling mode. EER: energy efficiency ratio in cooling mode. SCOP: Seasonal coefficient of performance in heating mode. COP: coefficient of performance in heating mode.

Conclusions for Air Conditioners

- Energy efficiency:
  - Seasonal parameters instead of steady-state (except ducted units)
  - High share of inverter driven units to be expected
  - Visibility of energy efficiency through new energy label (probably) increased compared to old energy label
  - Beyond ecodesign and energy labelling: avoid cooling buildings by using passive measures

- Natural refrigerants:
  - Lower barriers to enter the market (bonus for low GWP refr.)
  - Hard competition with fluorinated refrigerants due to lack of support on energy label (➔ at revision: introduce TEWI?)

Further information in the internet

- http://www.umweltbundesamt.de/produkte/oekodesign/index.htm
- http://www.epbg.bam.de
- http://ec.europa.eu/energy/efficiency/ecodesign/eco_design_en.htm
- http://ec.europa.eu/energy/efficiency/labelling/labelling_en.htm
- http://ec.europa.eu/enterprise/policies/sustainable-business/ecodesign/
- http://www.eup-network.de/

Thank you for your attention!
Do you have questions?

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Quelle: ASUE