



Brussels, XXX
[...] (2013) XXX draft

COMMISSION STAFF WORKING DOCUMENT
EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT

Accompanying the document

Commission Regulations

**implementing Directive 2009/125/EC of the European Parliament and of the Council
with regard to ecodesign requirements for water heaters and hot water storage tanks**

and

**supplementing Directive 2010/30/EU of the European Parliament and of the Council
with regard to the energy labelling of water heaters, hot water storage tanks and
packages of water heater and solar device**

COMMISSION STAFF WORKING DOCUMENT

EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT

Accompanying the document

Commission Regulations

implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for water heaters and hot water storage tanks

and

supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of water heaters, hot water storage tanks and packages of water heater and solar device

Lead DG: DG ENER

Associated DG: DG ENTR

Other involved services: SG, SJ, DG CLIMA, DG ENV, DG COMP, DG ECFIN, DG INFSO, DG MARKT, DG SANCO, DG TRADE, DG EMPL

Agenda planning or WP reference: 2009/ENER+/022 and 2009/ENER/027

Executive summary

EU leaders are aware of the significant benefits that energy efficiency and savings can have for the EU's social, economic and environmental agendas. They are committed to meeting a target of cutting primary energy consumption by 20%, by the year 2020. This means saving 368 million tons of oil equivalent (Mtoe) of primary energy (gross inland consumption minus non-energy uses) by 2020. The projected consumption for that year currently stands at 1 842 Mtoe.

The target is thus expressed in terms of energy savings (i.e. an absolute decrease of energy consumption). However, most of the savings can be achieved through energy efficiency improvements (i.e. using less energy input for an equivalent level of economic activity or service). Achieving this potential is the focus of EU action. Meeting the 20% energy savings objective would also help to achieve the EU's 2050 vision of a resource-efficient, low-carbon economy, as set out in the Low Carbon Roadmap 2050¹.

The Ecodesign Framework Directive 2009/125/EC lists products which the Council and European Parliament have identified as priorities for the Commission to address. The list is based on the European Climate Change Programme which identified products with a high potential for cost-effective improvements in energy performance and reductions of CO₂ emissions, including water heating equipment (Article 16).

¹ COM(2011) 112 final.

The Energy Labelling Directive 2010/30/EU² requires products with significant potential for energy saving and wide disparity in performance levels for equivalent functionality to be covered by an energy labelling implementing measure.

The Energy Efficiency Action Plan (EEAP) of 2006³, endorsed at the Spring 2007 European Council, was important as a first step towards reaching the 20% objective⁴. The Plan comprised 85 policy measures, which taken together would enable a reduction of about 14% by 2020. The Spring Council 2007 called for thorough and rapid implementation of the five priorities⁵ the Energy Council set on 23 November 2006⁶, based on the Commission's Action Plan on Energy Efficiency. The priorities include action to 'dynamically and regularly improve and expand the scope of minimum efficiency requirements for energy-using products' [...], by 'fully utilising the Eco-Design Directive'. The European Parliament welcomed the strategy of adopting minimum energy performance standards for equipment and appliances⁷.

Much work has been done to implement the EEAP, including implementation of the Energy Services Directive of 2006 and the Co-generation Directive of 2004 (the CHP⁸ Directive)⁹; revision of the Ecodesign Directive, the Energy Performance of Buildings Directive and the Energy Labelling Directive (adopted in 2009-2010)¹⁰; and the development of the Energy Efficiency Plan 2011 (adopted in 2011).

The Energy Efficiency Plan includes measures that need to be implemented through new legislative proposals. These include setting clear political objectives; developing the energy services market; increasing the role of the public sector; improving consumers' awareness of their energy consumption; and increased efficiency in energy supply.

The Plan also identifies policy initiatives to be achieved by other means, including financial instruments, and implementation measures under the existing Ecodesign, Energy Labelling and Energy Performance of Buildings Directives.

Regarding water heaters and hot water storage tanks, the problem is that consumers have been slow to switch to water heaters with better environmental performance. This impact assessment investigates which policy option would do most to remedy this, taking into account that measures for ecodesign requirements and energy labelling for dedicated water heaters would fit well in the context described above.

The approach for developing the proposed ecodesign implementing regulation for water heaters and this impact assessment was structured in four steps:

Step 1: assessment of the criteria for ecodesign and energy labelling implementing measure as laid out in Article 15(2)(a) to 15(2)(c) of the Ecodesign Directive and Article 10(2)(a) to 10(2)(c) of the Energy Labelling Directive, taking into account the ecodesign parameters identified in Annex I of the Ecodesign Directive;

Step 2: consideration of relevant Union initiatives, market forces and environmental performance disparities of the equipment on the market with equivalent functionality as laid

² OJ L 153, 18.6.2010, p. 1.

³ COM(2006) 545.

⁴ SEC(2006) 1174.

⁵ Brussels European Council 8/9 March 2007, Presidency Conclusions, 7224/07.

⁶ TTE (Energy) Council on 23 November 2006, 15210/06.

⁷ European Parliament resolution of 31 January 2008 on an Action Plan for Energy Efficiency.

⁸ The terms co-generation and CHP (combined heat and power) are used interchangeably in this IA.

⁹ Directive 2006/32/EC and Directive 2004/8/EC, respectively.

¹⁰ Directives 2009/125/EC, 2010/30/EU and 2010/31/EU respectively.

out in Article 15(2) of the Ecodesign Directive and Article 10(2) of the Energy Labelling Directive;

Step 3: setting policy objectives, including the desirable level of ambition, the policy options to achieve them, and the key elements of the ecodesign and energy labelling implementing measure as required by Annex VII of the Ecodesign Directive and Article 10(4) of the Energy Labelling Directive;

Step 4: environmental, economic and social assessment of the impacts on environment and consumers, with a view to the criteria on implementing measures set out in Article 15(5) of the Ecodesign Directive and Article 10(3) of the Energy Labelling Directive.

Step 1: Assessment of the criteria for ecodesign and energy labelling implementing measures

To assess the criteria for ecodesign and energy labelling implementing measures as laid out in Article 15(2) of the Ecodesign Directive and Article 10(2) of the Energy Labelling Directive, the Commission has carried out a technical, environmental and economic study for water heaters ('preparatory study') according to the provisions of Article 15(4)(a) and Annex II of the Ecodesign Directive.

With regard to the criteria set in Article 15(2) of the Ecodesign Directive and Article 10(2) of the Energy Labelling Directive, the preparatory study concludes for the EU-25¹¹:

Article 15(2)(a) Ecodesign Directive and Article 10(2)(a) Energy Labelling Directive:	Annual sales volume in the Union:	approx. 11 million
Article 15(2)(b) Ecodesign Directive:	Most significant environmental impact, the energy consumption of installed base (2005):	2 156 PJ (49 Mtoe)
Article 15(2)(c) and Article 10(2)(b) Energy Labelling Directive:	Improvement potential (at complete stock change):	35%/60% compared to average ('base case') product without/with renewable energy input

The volume of sales for water heaters and storage tanks, about 11 million units per year, is above the indicative 200 000 units provided for in the Ecodesign Directive. Electric and fossil fuel-fired water heaters, including heat pump and solar water heater, account for about 84%/16% of water heaters installed, respectively.

Their annual energy consumption corresponds to about 2,8% of the total gross energy consumption of the EU-25 in 2005. That is more than the annual gross energy consumption of the Czech Republic. Reducing consumption by 35% would mean saving energy amounting to about half the annual gross energy consumption of Austria or Finland.

Energy savings are possible because there are technical solutions which cut the gas or electricity consumption of water heaters, and reduce the standing losses of hot water storage tanks, compared to the market average, implying a wide disparity in the performance of products available on the market.

¹¹ Figures for EU-27 are somewhat higher and can be corrected on the basis of GDP.

There is considerable scope for improvements that do not rely on the input of renewable sources of energy. Such improvements could lead to reduced costs over the life cycle of better appliances without significantly raising the purchase price of water heaters and hot water storage tanks. This is because improvements incorporate technical modifications that do not involve significant additional costs. For water heaters with load profiles ‘M’ and above, improvements implying the input of renewable energy sources are also becoming cost-effective, at least for warmer and average climate conditions. For the largest load profiles, the input of renewable energy sources is also cost-effective also under colder climate conditions.

Step 2: Analysis of relevant initiatives at Union and Member State level

Further to Articles 15(2) and 15(4)(c) of the Ecodesign Directive and to Article 10(2)(c) of the Energy Labelling Directive, relevant Union and national environmental legislation is considered. Related (voluntary) initiatives both at Union and Member State levels are taken into account, and barriers to market take-up of technologies with improved environmental performance are analysed.

Several market failures have been identified, accounting for a situation in which market forces alone are not directing consumers towards decisively preferring cost-effective technologies offering energy efficiency improvements.

The energy consumption of water heaters and the standing losses of hot water storage tanks are not decisive factors accounting for consumers’ purchasing decisions. Information on the savings from which they could benefit as regards running costs/energy savings is not easily accessible and understandable. Consumers have little awareness of energy consumption and associated costs (asymmetric information). Furthermore, not all environmental costs are included in gas and electricity prices. Builders and developers do not pay the operating costs for energy, so they have little incentive to endow buildings with energy-efficient installations, including water heaters.

As a result, consumers’, builders’ and manufacturers’ purchasing and product design choices are made largely on the basis of production and purchasing costs, not reflecting environmental costs for the society (negative externality), so the opportunity to achieve cost-effective improvements is often missed.

Several initiatives at Union level and Member State level aim or have aimed to improve the energy efficiency of water heaters. In particular, Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings¹² requires Member States to set requirements for the energy performance of new buildings, and buildings subject to major renovations, and to provide for a system for the energy certification of buildings. It also requires Member States to set energy efficiency requirements for technical building systems, including hot water systems.

A ‘Voluntary commitment on reducing standing losses of domestic electric storage water heaters’ by the European Committee of Manufacturers of Domestic Equipment (CECED), introduced in 1999, was discontinued in 2007, and CECED called instead for legislative measures to ‘ensure future performance standards’.

These initiatives have gone some way towards improving the energy efficiency of water heaters and hot water storage tanks, though not nearly enough. That is why further legislative action pursuant to the Ecodesign Directive and to the Energy Labelling Directive should be taken at EU level, and Member States expect a harmonised legislative framework to be set up.

¹² OJ L 153, 18.6.2010, p. 13.

Conclusion of Steps 1 and 2

The analysis carried out in Steps 1 and 2 shows that:

- a significant number of water heaters and hot water storage tanks are sold in the EU;
- the appliances have a significant environmental impact, mainly due to their energy consumption;
- their energy consumption could be significantly improved in a cost-effective manner, given the wide disparity in the energy performance of appliances with similar or identical functionality;
- current initiatives at EU and Member State level and consumer behaviour alone are not capturing the full potential to reduce energy consumption.

The conclusion is that the criteria for ecodesign implementing measures as set out in Article 15(2) of the Ecodesign Directive and in Article 10(2) of the Energy Labelling Directive are met, and water heaters and hot water storage tanks should be covered by an ecodesign implementing measure pursuant to Article 15(1) of the Ecodesign Directive, and by an energy labelling measure pursuant to Article 10(2) of the Energy Labelling Directive.

Step 3: Policy objectives and options

Further to Annex II of the Ecodesign Directive, the level of ambition for improving the energy consumption/efficiency should aim at the lowest possible cost to the user over the life of the appliance, while taking into account requirements on ecodesign implementing measures regarding functionality, affordability and other aspects, as set out in Article 15(5). Furthermore, benchmarks for technologies yielding best performance, as developed in the preparatory study with additional input from the Consultation Forum, are considered. The results are reflected in the objectives set for the proposed ecodesign regulation and energy labelling regulation.

Several policy options for making a positive impact on the market while achieving the appropriate level of ambition are considered. These include the ‘business-as-usual’ scenario, self-regulation, energy labelling alone, ecodesign regulation alone, a combination of the latter two, and requirements on hot water systems set under the Energy Performance of Buildings Directive (EPBD) alone.

However, because the Legislator has a clear mandate to set ecodesign requirements and energy labelling for water heaters and hot water storage tanks, the extent of the analysis for other options set out below is limited. The focus is on the assessment of the proposed implementing regulations.

Step 4: Impact assessment

An impact assessment of possible policy measures is carried out, taking into account the criteria set out in Article 15(5) of the Ecodesign Directive, and the impacts on manufacturers, including SMEs.

Sub-options for the timing of ecodesign requirements for the energy efficiency of water heaters and standing losses of hot water storage tanks have been taken into account, but because of delay in the consultation procedure, alternatives in timing have become irrelevant. As a result, only a two-stage implementation of minimum requirements was taken into account.

The second stage of the ecodesign requirements would improve the energy performance of water heaters by 20% to 30% over the average at present, and could be achieved without the input of renewable energy sources. The ecodesign requirements for hot water storage tanks would reduce standing losses by about half the average recorded in 2005. Section 5 of the Impact Assessment gives more details.

The assessment is based on stock models developed as part of the preparatory study for heaters and water heaters. The stock models have been revised for new data and the scenarios updated in line with the specifications for the impact assessment. Four different scenarios have been modelled, including a reference 'business-as-usual' scenario showing what would occur in the absence of policy measures.

The other scenarios are: minimum energy efficiency performance standards (Min Only); minimum energy efficiency performance standards with product labelling (Min+Lbl); and minimum energy efficiency performance standards with product labelling, combined with the EPBD (Min+Lbl+EPBD).

Finally, three sub-scenarios (NO_x scenarios) based on the Min+Lbl+EPBD scenario were modelled, evaluating the impact of varying legislative limits on NO_x emissions. The key findings of this assessment are summarised in the table below.

MAIN IMPACTS			Scenarios 2020						
			1	2	3	4	5a*	5b*	5c*
Impacts (as Article 15(4)(e) of 2009/125/EC)			BAU	Min Only	Min+Lbl	Min+Lbl +EPBD	Min+Lbl +EPBD+NO _x		
Environment									
EU totals	ENERGY (primary)	PJ/annum	2243	1 969	1 840	1 802	1 790		
	GHG	Mt CO ₂ eq/annum	129	114	106	104	103		
	AP	kt SO _x eq/annum	603	603	482	482	476	475	473
Consumer									
EU totals	Expenditure	€ bn/annum	51	47	46	46	46		
	Purchase costs	€ bn/annum	4,5	5,8	7,0	7,8	7,9		
	Running costs	€ bn/annum	46	41	39	39	38		
Per product	Product price	€	265	340	411	459	464		
	Installation cost	€	133	170	205	229	232		
	Energy costs	€/annum	297	246	213	194	193		
	Payback	years	reference	1,5	2,1	2,6	2,9		
Business									
EU turnover	Manufacturers	€ bn/annum	1,6	2,1	2,5	2,8	2,8		
	Wholesalers	€ bn/annum	0,5	0,6	0,8	0,8	0,8		
	Installers	€ bn/annum	8,0	8,4	8,9	9,2	9,2		
Employment									
Employ- ment (jobs)	Industry EU (incl OEM)	'000	15	19	23	25	26		
	Industry non-EU	'000	7	9	11	13	13		
	Wholesalers	'000	2	2	3	3	3		
	Installers	'000	80	84	89	92	92		
	TOTAL	'000	103	115	125	133	134		
	Of which EU	'000	96	105	114	120	121		
	EXTRA EU jobs	'000	reference	9	18	24	25		
	Of which SME		reference	6	12	16	16		

* 5a = NO_x scenario at 90 mg/kWh, 5b = NO_x scenario at 70 mg/kWh, 5c = NO_x scenario at 35 mg/kWh.

Boundary conditions ('should be no negative impacts')	Scenarios 2020/ 2025						
	1	2	3	4	5a	5b	5c
Impacts 'No negative impacts' following Article 15(5) of 2009/125/EC	BAU	Min Only	Min+Lbl	Min+Lbl +EPBD	Min+Lbl +EPBD+NO _x		
Functionality of product	+	+	+	+	+	+	+
Health, safety and environment	+	+	+	+	+	+	+
Affordability and life cycle costs	+	+	+	+	+	0	-
Industry competitiveness	+	+	+	+	+	+	+
No proprietary technology	+	+	+	+	+	+	+
No excessive administrative burden	+	+	+	+	+	+	+

Conclusion on Step 3 and Step 4

Based on assessment of costs and benefits, Scenario 5b is the preferred option. It would be the best way to encourage the uptake of water heaters that are more energy-efficient, as it optimally fulfils the requirements of the Ecodesign and Energy Labelling Directives. Ecodesign requirements on energy efficiency for water heaters should be set in two stages, becoming effective two/four years after the regulation enters into force, and ecodesign requirements on standing losses of hot water storage tanks should be timed to become effective four years after entry into force of the regulation.

A complementary energy labelling scheme should set mid-term benchmarks for more energy-efficient water heaters (promoting the use of renewables) and standing losses for hot water storage tanks.

This combination of ecodesign requirements and energy labelling implies the following:

- ecodesign requirements achieve cost-effective improvement potential for the energy efficiency of water heaters and the standing losses of hot water storage tanks;
- the labelling scheme creates market transparency for consumers and provides incentives for manufacturers to make innovations/investments in energy efficiency and renewables;
- the combined effects influence the market, yielding significant annual energy savings of 19 TWh annually by 2020, comparable to the annual final electricity consumption of Slovenia and Latvia combined;
- taking into account the lifetime of the product and the replacement of stock, annual savings of about 126 TWh would be achieved compared to 'business-as-usual' within 15 years of ecodesign and energy labelling measures coming into force. That is comparable to Poland's annual final electricity consumption;
- the consumer would have to pay more for a new dedicated water heater and its installation, but would benefit from considerable savings in energy, resulting in a pay-back time of roughly three years for an appliance with an estimated lifetime of 15-17 years;
- a clear legal framework is created which ensures fair competition;

- requirements for marketing more energy-efficient water heaters and hot water storage tanks would be harmonised, thus limiting administrative burdens and costs to businesses;
- manufacturers are spared extra administration due to transition periods, as these duly take into account re-design cycles, speed of innovation and return on investments.

Member State authorities will carry out monitoring of impacts, ensuring that the requirements for ecodesign and energy labelling of water heaters and hot water storage tanks are met, while the appropriateness of scope, definitions and concepts will be monitored in on-going dialogue with stakeholders and Member States.