

Country:	Austria
Technology:	Domestic Lighting
Sub Category:	All domestic lamps

Introduction

[NOTE: This analysis updates a mapping report first published in June 2011¹. That report presented data representing 55% of all sales in the market. Data for new years has a greater market coverage and so all data is scaled to estimate 100% of market sales so that different years are comparable. Consequently, sales results shown here are higher than those shown in the 2011 report.]

The first stage in the Mapping and Benchmarking process is the definition of the products, i.e. clearly setting the boundaries that define the products for use in data collection and analysis. The definition ensures that comparisons between the participating countries are performed against a specific and consistent set of products/criteria.

The summary definition for this product is:

“Lighting products that perform the vast majority of illumination applications within the domestic (household) sector²”

Hence data was sought (where possible) for the following lighting product types (subdivided by wattage buckets):

- Mains Voltage Incandescent
- Mains Voltage Halogens (Single and Double Ended)
- Low Voltage (12V) Halogen
- Pin Based and Self Ballasted CFLs
- Linear Tubes (T12, T8 and T5)³
- Retrofit LEDs
- Dedicated LEDs

A full product definition is provided at the annex website⁴.

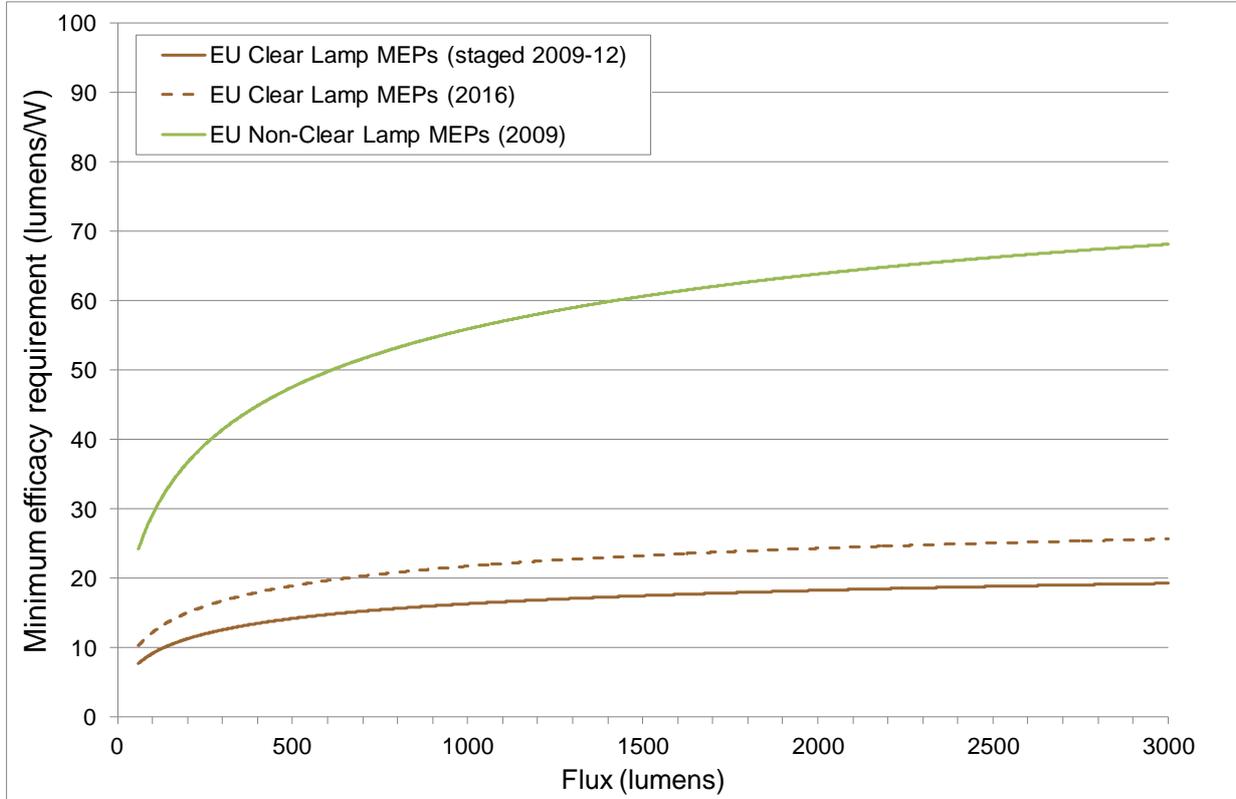
¹ see <http://mappingandbenchmarking.iea-4e.org/matrix?type=product&id=5>

² Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.

³ The subsequent analysis in the associated benchmarking report excludes linear fluorescent tubes as, for those countries submitting data, these lamps constituted a small proportion of use in the domestic sector.

⁴ see <http://mappingandbenchmarking.iea-4e.org>

Phase out regulations for non-directional lamps – EU



Key notes on Graph (see notes section 1)

National regulations of non-directional lamps based on pan EU requirement as follows:

- Each Ecodesign requirement shall apply in accordance with the following stages (with some exceptions)⁵. Implementation of stage 6 was under review at the time of publication.

	Stage	Date	Range (<12000lm)	Equivalent to lamps below EU Energy Class
Clear Lamps	1	01. Sept. 2009	>950lm (~80W GLS) <950lm (Energy Class F&G)	C F&G
	2	01. Sept 2010	>725lm (~65W GLS)	C
	3	01. Sept 2011	>450lm (~45W GLS)	C
	4	01. Sept 2012	>60lm (~7W GLS)	C
	5	01. Sept 2013	2013 Increased quality requirements ⁶	C
	Anticipated Review 2014			
	6	01. Sept. 2016	>60lm	B ⁷
Non clear (frosted) lamps ⁸		01. Sept. 2009	>60lm	A

⁵ Table derived from Commission Regulation (EC) No 1194/2012:

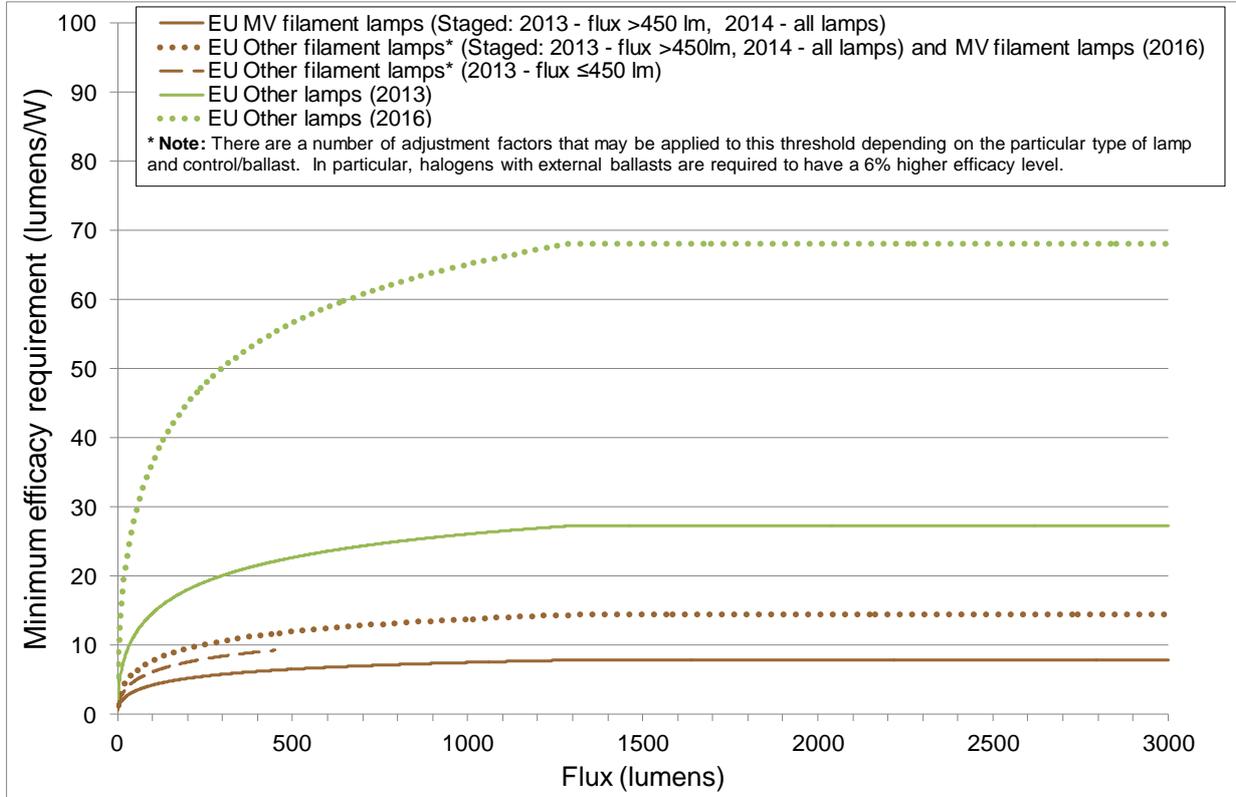
(<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:076:0003:0016:en:PDF>)

⁶ Incandescent lamps with S14, S15 or S19 caps are included in stage 5 & 6

⁷ Except for clear lamps with G9/R7s caps: EEL C

⁸ The curve shown is for non-clear lamps. Lamps with a second envelope, eg covered CFLs, have an efficacy requirements 5% lower than this general non-clear requirement. Section 2c of Regulation 244/2009 formally defines second envelope lamps as: "Second lamp envelope" is a second outer lamp envelope which is not required for the production of light, such as an external sleeve for preventing mercury and glass release into the environment in case of lamp breakage, for protecting from ultraviolet radiation or for serving as a light diffuser".

Phase out regulations for directional and LED lamps – EU



Key notes on Graph⁹ (see notes section 1)

National regulations of non-directional lamps based on pan EU requirement as follows:

- Regulations for directional lamps and LEDs are based on an Energy Efficiency Index but have been converted to an efficacy requirement for clarity¹⁰.
- Each Ecodesign requirement shall apply in accordance with the following stages (with some exceptions)¹¹:

Type:	Stage	Date	Range	Equivalent to lamps below EU Energy Class
Mains-voltage filament lamps	1	01. Sept. 2013	If Φ use > 450 lm: EEI: 1.75	D
	2	01. Sept 2014	Lamps of all Φ use: EEI: 1.75	D
	Anticipated Review 2014 (mains voltage only)			
Other filament lamps	3	01. Sept 2016	Lamps of all Φ use: EEI: 0.95	B
	1	01. Sept. 2013	If Φ use ≤ 450 lm: EEI: 1.20 If Φ use > 450 lm: EEI: 0.95	C
	2	01. Sept 2014	Lamps of all Φ use: EEI: 0.95	B
Other lamps	3	01. Sept 2016	Lamps of all Φ use: EEI: 0.95	B
	1	01. Sept. 2013	All lamps: EEI: 0.5	B
	3	01. Sept 2016	All lamps: EEI: 0.2	A

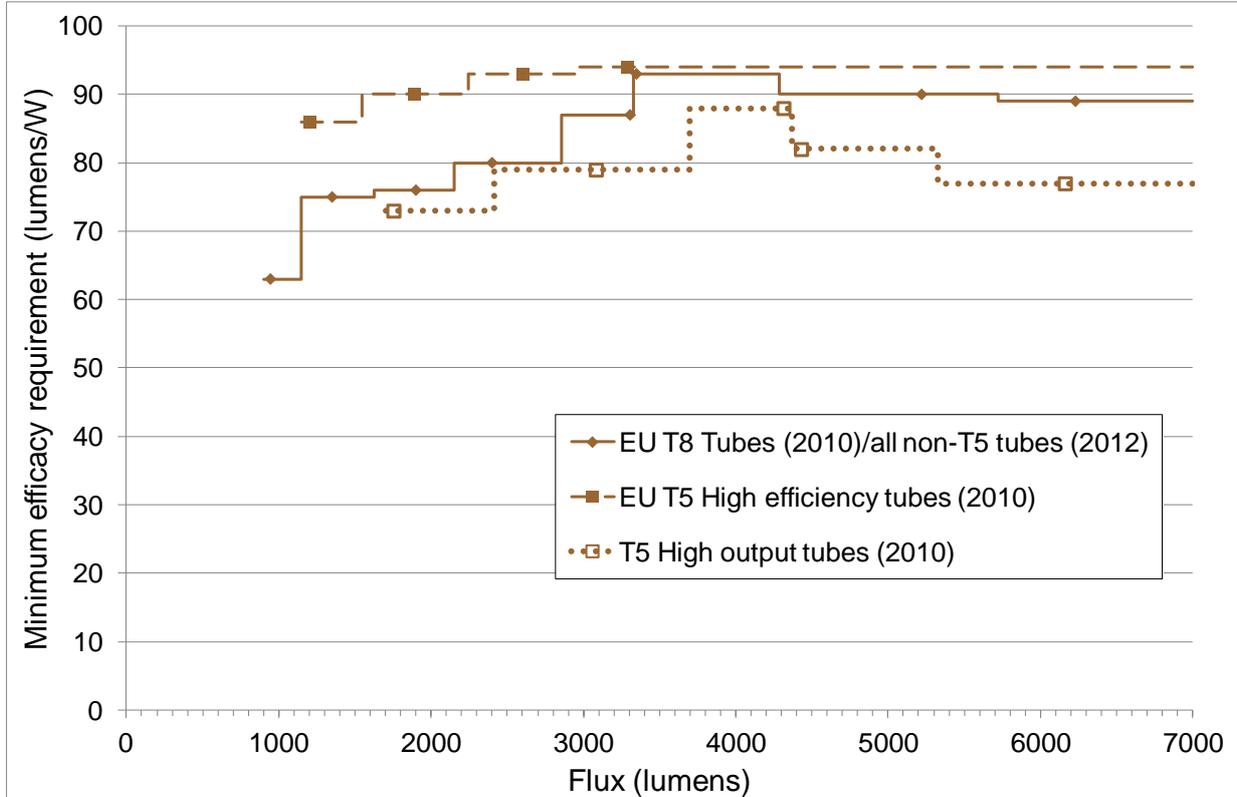
⁹ For EU definitions of *Mains-voltage filament*, *Other filament* and *Other*, please refer to European Commission regulation (EU) No 1194/2012.

(<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:076:0003:0016:en:PDF>)

¹⁰ Conversion based on the "general lamps" and does not adjust for allowances.

¹¹ Table derived from European Commission regulation (EU) No 1194/2012

Phase out regulations for fluorescent lamps – EU



Key notes on Graph (see notes section 1)

National regulations of fluorescent lamps based on pan EU requirement as follows:

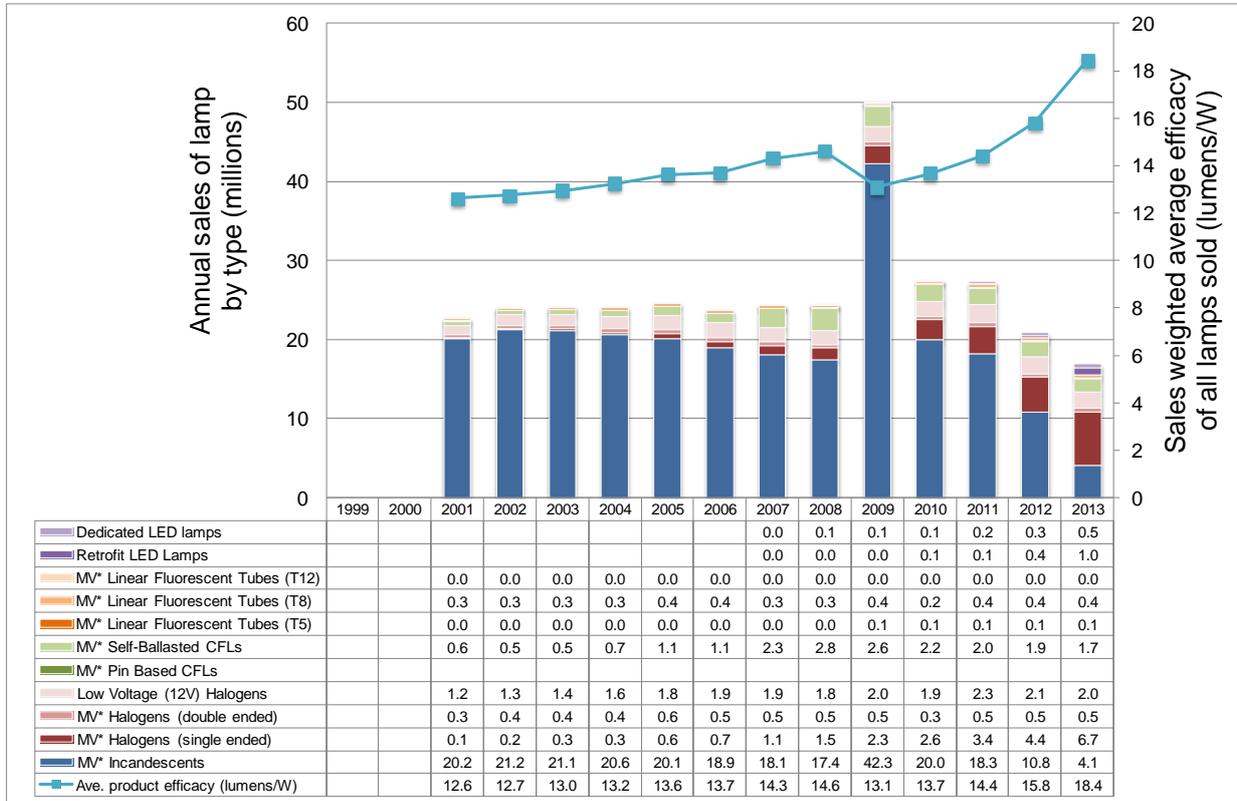
- Stage 1: From 7 April 2010, Stage 1 of the Ecodesign requirement applied as follows (with some notes and exceptions¹²):

T8 (26 mm Ø)		T5 (16 mm Ø) High Efficiency		T5 (16 mm Ø) High Output	
Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value	Nominal wattage (W)	Rated luminous efficacy (lm/W), 100 h initial value
15	63	14	86	24	73
18	75	21	90	39	79
25	76	28	93	49	88
30	80	35	94	54	82
36	93			80	77
38	87				
58	90				
70	89				

- Stage 2: From 7 April 2012, all fluorescent lamps not listed in the table (except those smaller than T2) must comply with the T8 regulations.

¹² The requirements for pin-based CFLs are too complex to show (refer to European Commission regulation (EU) No 245/2009 Annex III for details). Anything above the highest wattage must comply with the highest wattage requirement. T5 lamps below 13W or above 80W are exempt. Table sourced from same regulation.

Sales and average efficacy of all domestic lamps - Austria



* Mains Voltage

Key notes on Graph (See notes section 2)

- Data shown is based on data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps¹³.
- Annual market average efficacies calculated on a sales weighted basis, using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.

¹³ Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.

Total instantaneous light output¹⁴ of all domestic lamps sales - Austria



* Mains Voltage

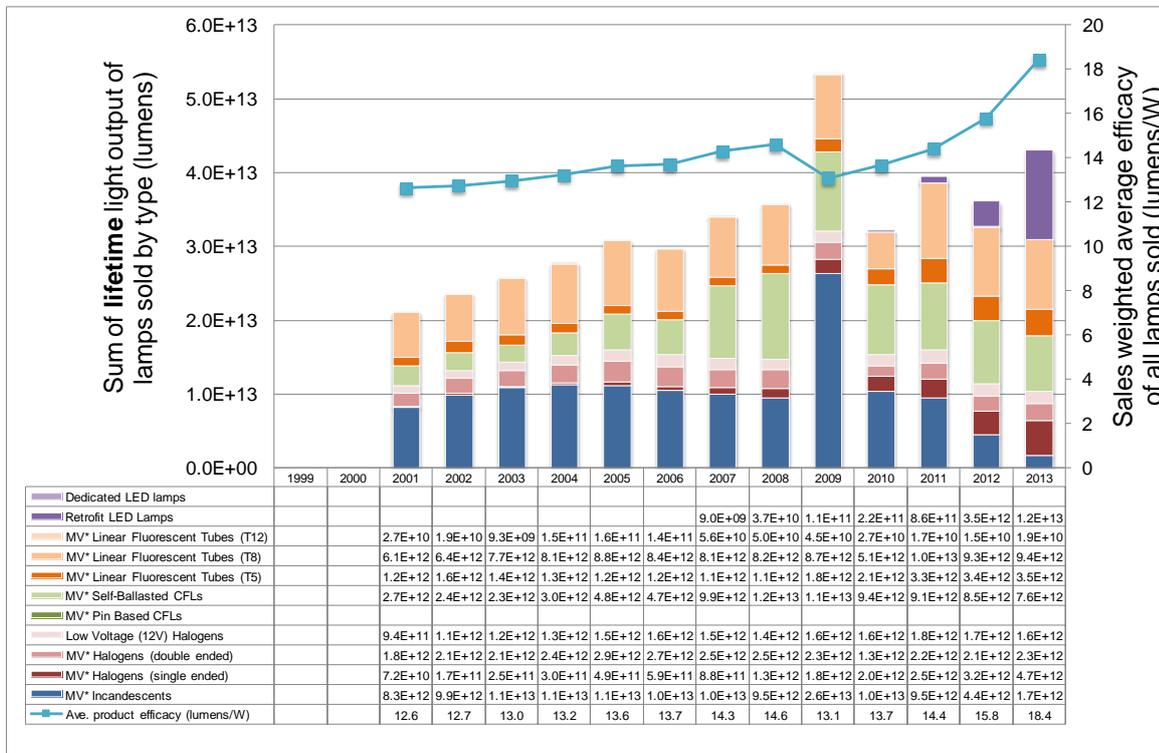
Key notes on Graph (See notes section 2)

- Data shown is derived from data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps¹⁵.
- Annual market average efficacies calculated on a sales weighted basis using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.
- Instantaneous light output calculated on a sales weighted basis using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.
- Instantaneous light output is for lamps sold in each year only, *not* the installed stock.

¹⁴ Due to the variations of lifetime, the variations in wattages, etc., of the differing lamp types, it is very difficult to have a qualitative or quantitative measure of what the market is *likely* to look like during the transition between lamp types, and hence evaluate the quality of data received. However, on a simple basis, in the short term we can assume lumens purchased should be relatively fixed (although there is a slow increase over time in the "total lumens" consumed by individual households as more lamps are installed in a given space; there is an increase in household numbers, and there is some confusion among consumers in the transition between lamp types and their relative lumen output which may result in consumers not buying lumen neutral replacements). Thus, if there are very large variations in the instantaneous light output, there is a likelihood there may be some issues with the base data (eg changing coverage of the market/sampling methodology over time).

¹⁵ Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.

Total lifetime light output¹⁶ of all domestic lamps sales - Austria



* Mains Voltage

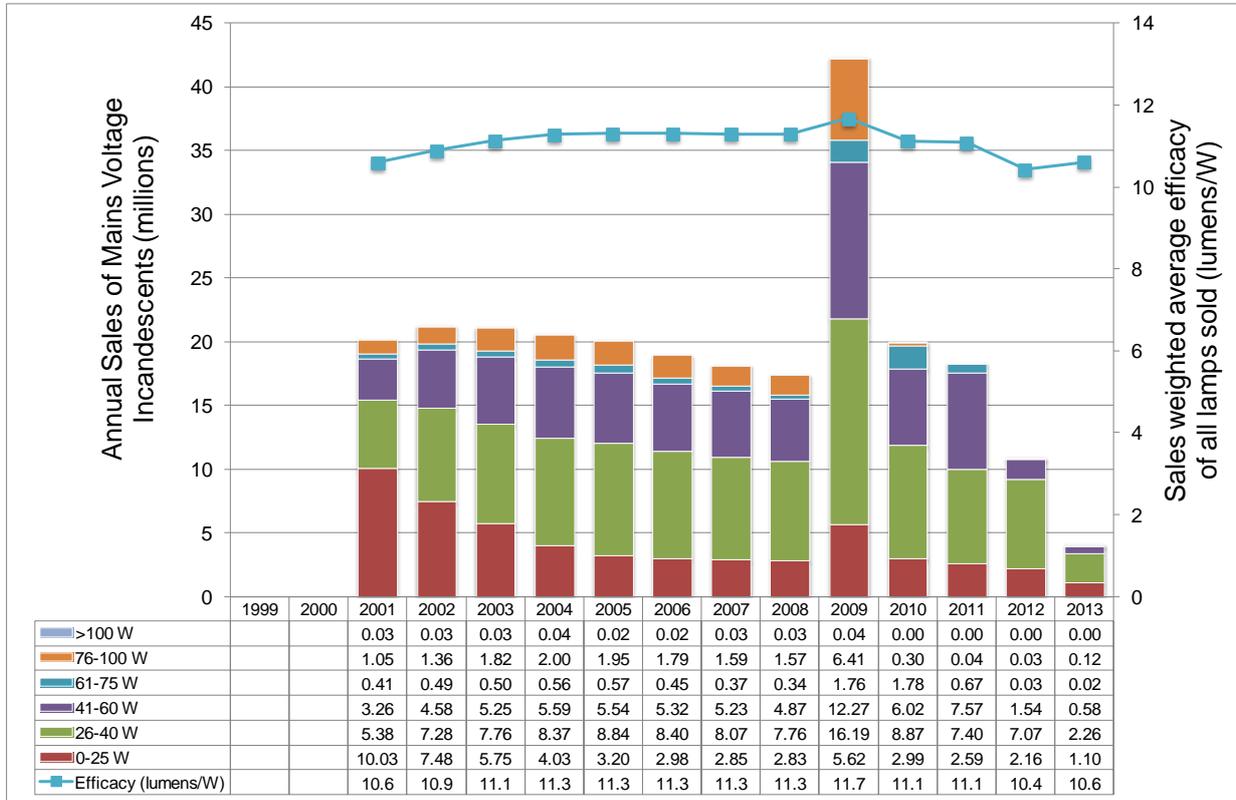
Key notes on Graph (See notes section 2)

- Data shown is derived from data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps¹⁷.
- Annual market average efficacies calculated on a sales weighted basis using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.
- Lifetime light output calculated on a sales weighted basis using estimated average global efficacies and lifetimes for each lamp type and associated wattage range for 230V lamps.
- Lifetime light output is for lamps sold in each year only, not all installed stock.

¹⁶ In a stable market where consumers purchase a straight replacement lamp (eg incandescent for incandescent), and other variables remain fixed (eg the lifetime of each lamp type), then the lifetime lumen output over the lifetime of the lamps purchased in each year should be the same. However, as the lighting market is currently transitioning to longer lifetime lamps, the total number of lamp purchases should reduce over time (replacement is required less often). The changes in lifetime lumen output gives a soft measure of how fast this reduction in lamp sales will occur; if there is a sudden very rapid increase in lifetime light output, it means there are a high proportion of long lifetime lamps being purchase, so lamp sales will fall quickly; and vice versa.

¹⁷ Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.

Sales of Mains Voltage Incandescent lamps by wattage range – Austria



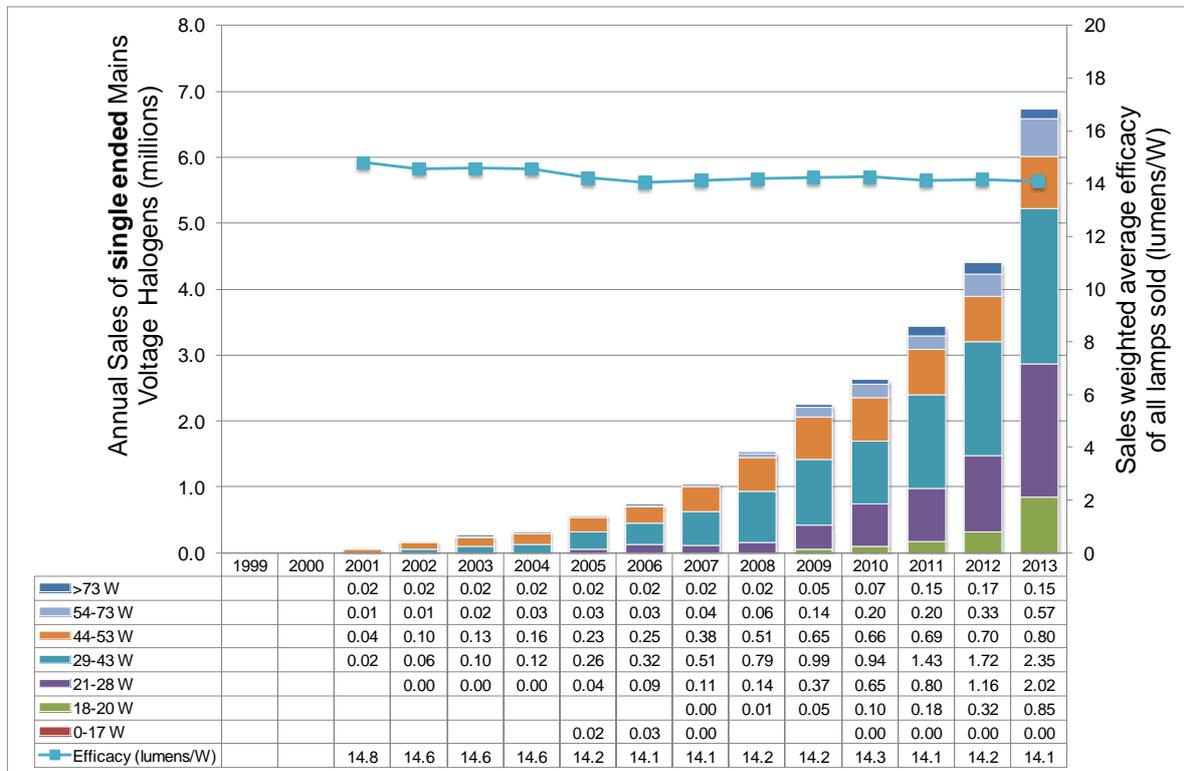
* Mains Voltage

Key notes on Graph (See notes section 2)

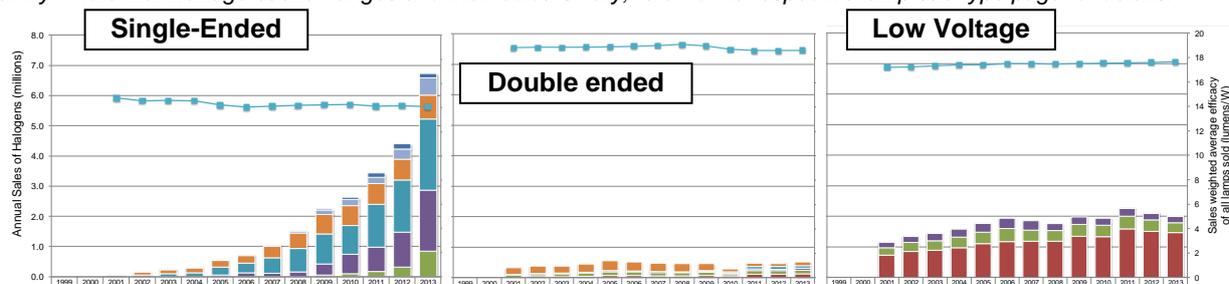
- Data shown is based on data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps¹⁸.
- Annual market average efficacies calculated on a sales weighted basis using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.

¹⁸ Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.

Sales of Single Ended Mains Voltage Halogen lamps by wattage range - Austria



The graphs below are shown only for context; they show the share of sales of each lamp sub-type within the overall lamp family. Note that wattage bucket ranges and their colours vary; refer to the respective lamp sub-type page for details.

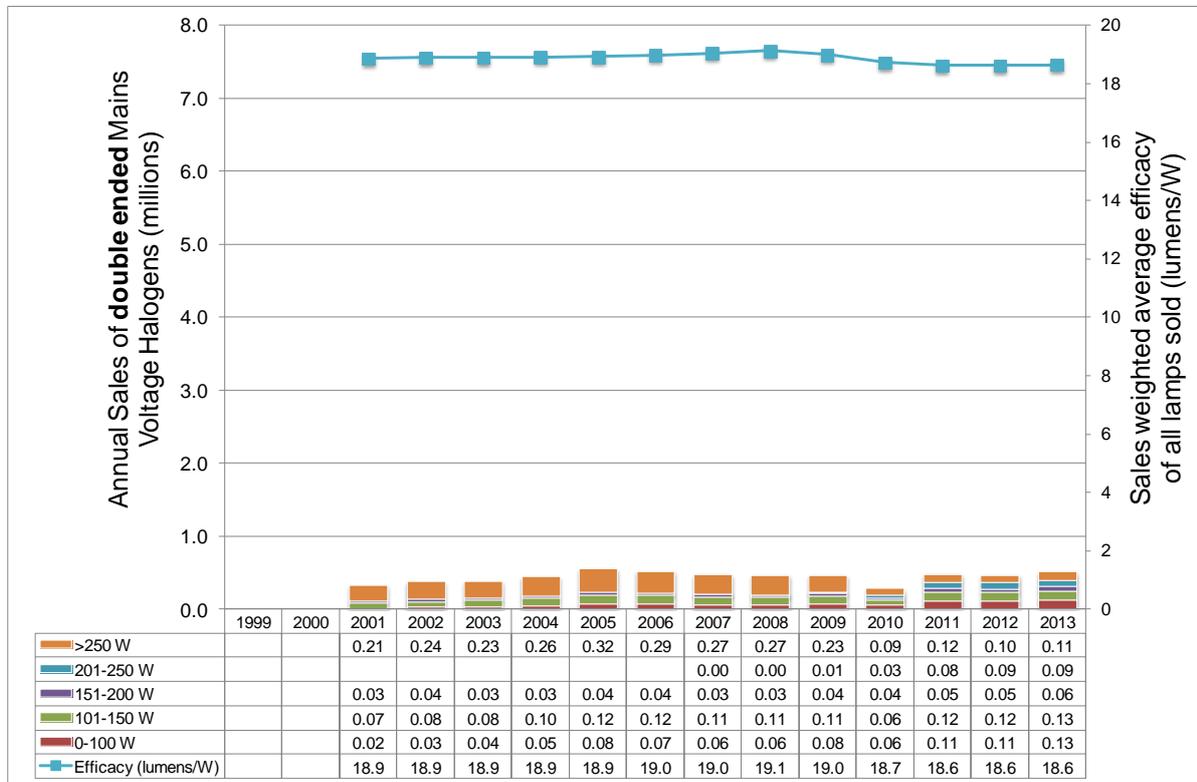


Key notes on Graph (See notes section 2)

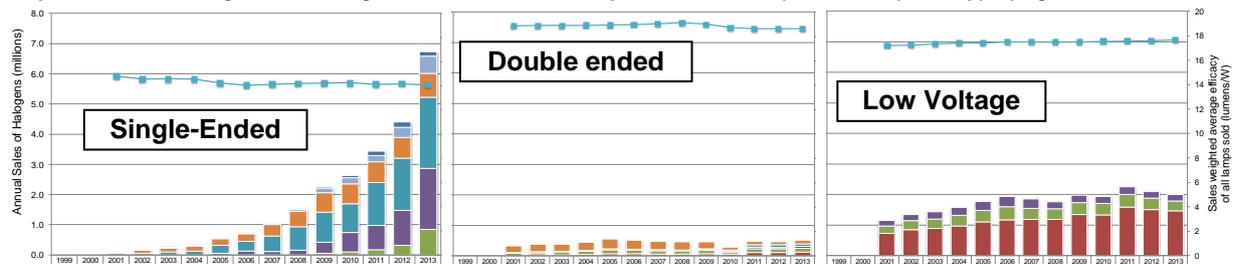
- Data shown is based on data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps¹⁹.
- Annual market average efficacies calculated on a sales weighted basis using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.

¹⁹ Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.

Sales of Double Ended Mains Voltage Halogen lamps by wattage range - Austria



The graphs below are shown only for context; they show the share of sales of each lamp sub-type within the overall lamp family. Note that wattage bucket ranges and their colours vary; refer to the respective lamp sub-type page for details.

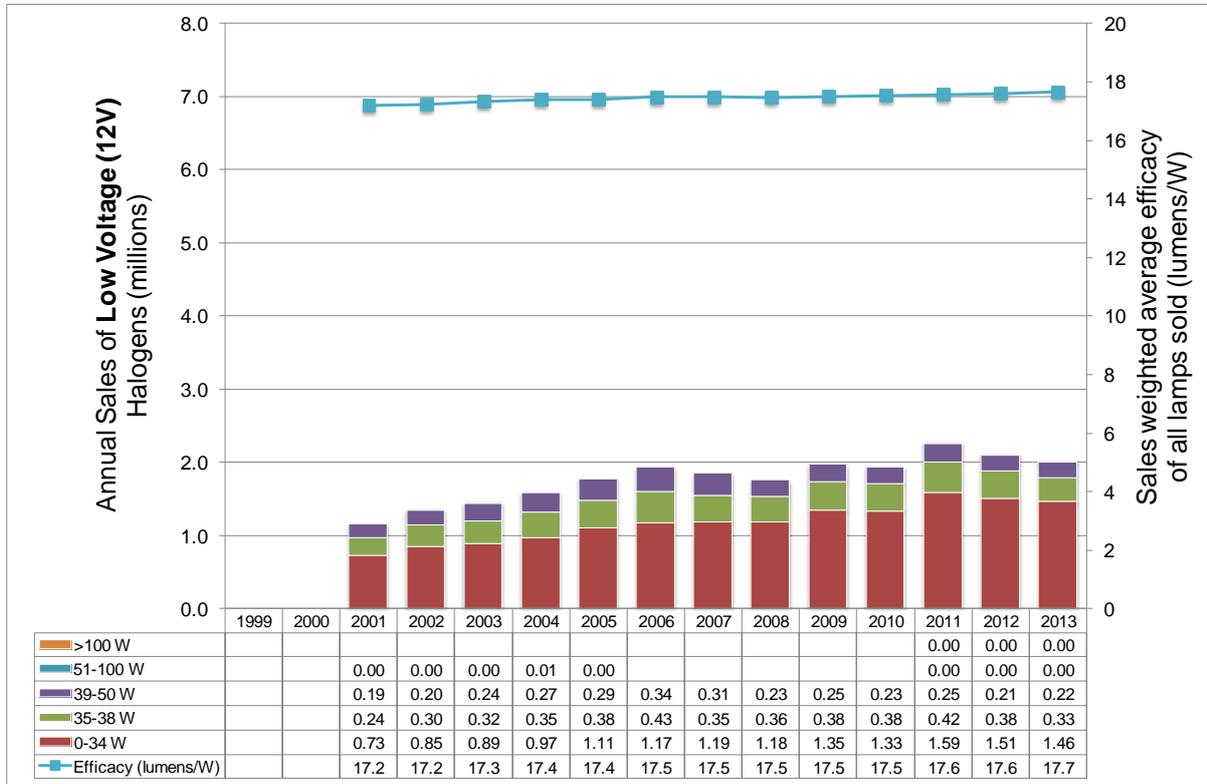


Key notes on Graph (See notes section 2)

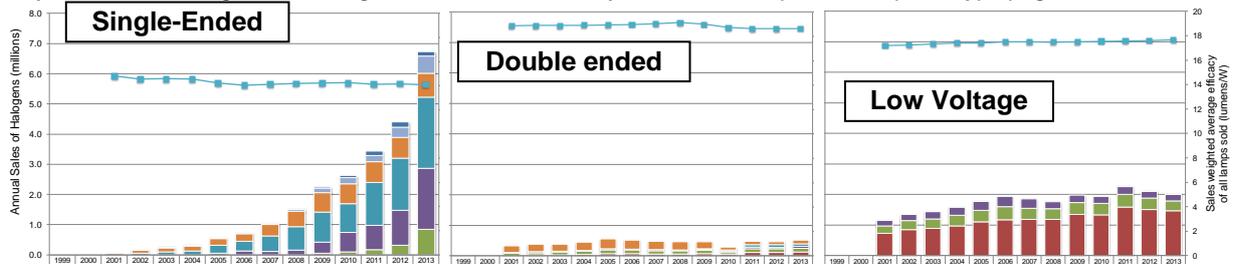
- Data shown is based on from data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps²⁰.
- Annual market average efficacies calculated on a sales weighted basis using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.

²⁰ Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.

Sales of Low Voltage (12V) Halogen lamps by wattage range - Austria



The graphs below are shown only for context; they show the share of sales of each lamp sub-type within the overall lamp family. Note that wattage bucket ranges and their colours vary; refer to the respective lamp sub-type page for details.



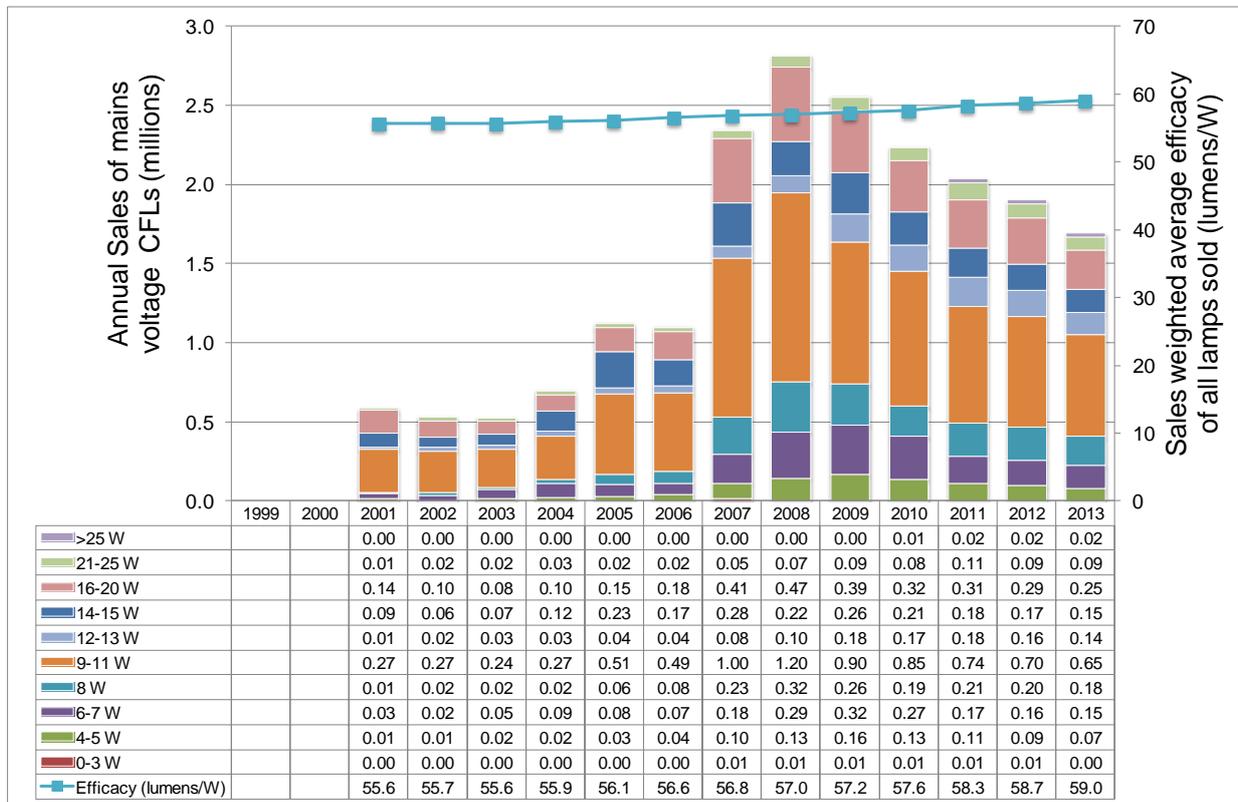
Key notes on Graph (See notes section 2)

- Data shown is based on from data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps²¹.
- Annual market average efficacies calculated on a sales weighted basis using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.

²¹ Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.



Sales of mains Voltage CFL lamps by wattage range Austria



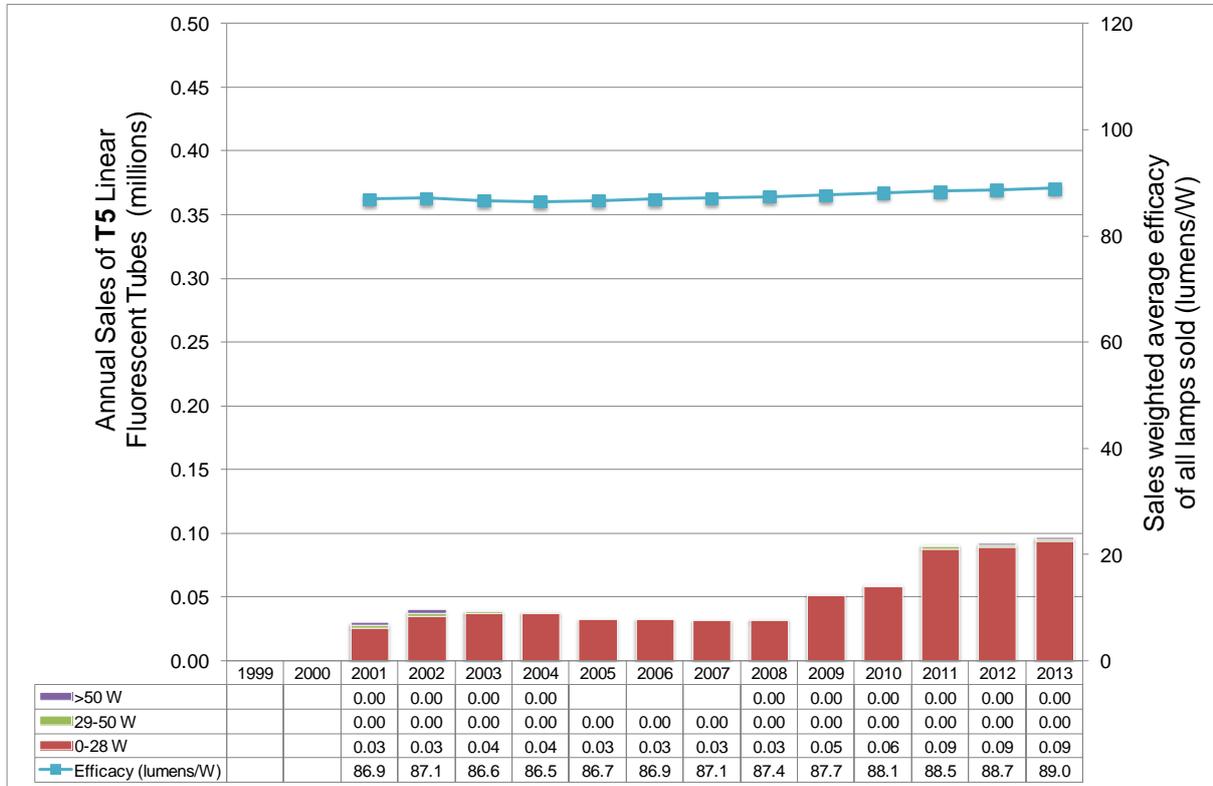
Key notes on Graph (See notes section 2)

- Data shown is based on from data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps²².
- Annual market average efficacies calculated on a sales weighted basis using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.
- No details of the breakdown of CFL sales between self-ballasted and pin-based lamps was available to the Annex at the time of publication. All lamps were assumed to be self-ballasted for the purpose of the analysis.

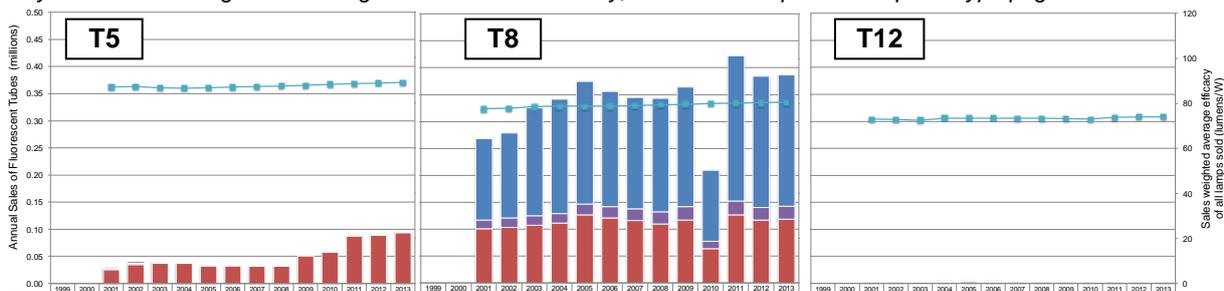
²² Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.



Sales of T5 Linear Fluorescent Tubes by wattage range Austria



The graphs below are shown only for context; they show the share of sales of each lamp sub-type within the overall lamp family. Note that wattage bucket ranges and their colours vary; refer to the respective lamp sub-type page for details.

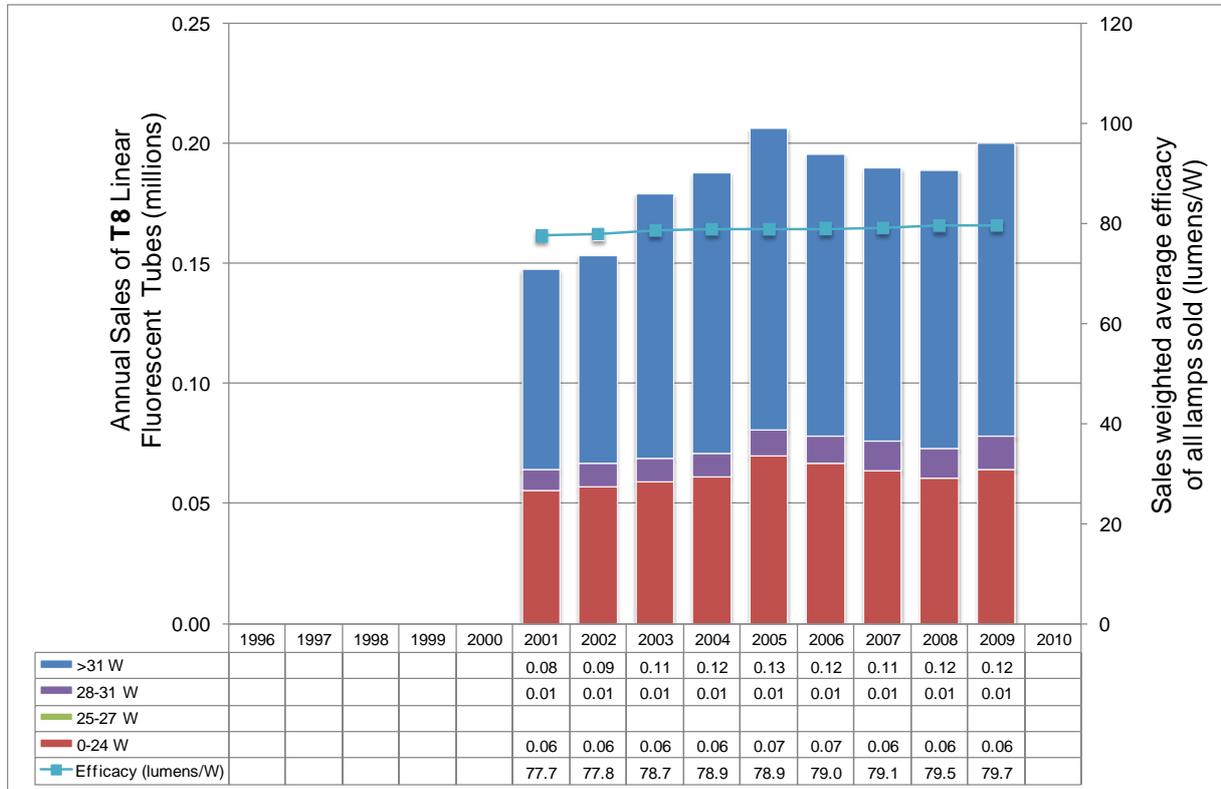


Key notes on Graph (See notes section 2)

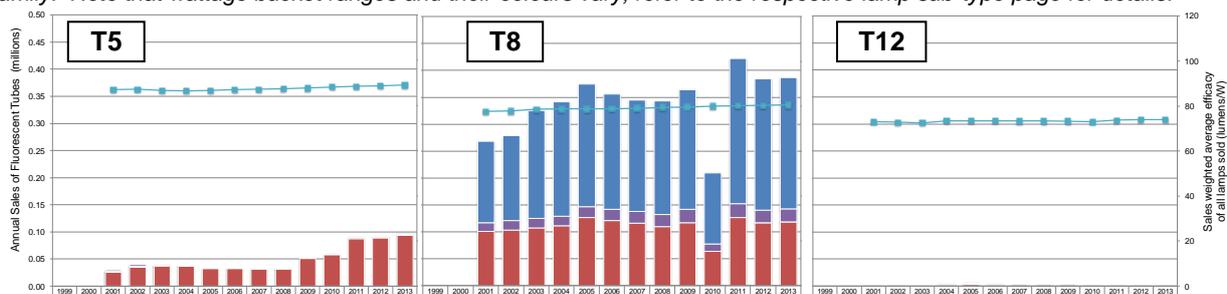
- Data shown is based on from data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps²³.
- Annual market average efficacies calculated on a sales weighted basis using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.

²³ Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.

Sales of T8 Linear Fluorescent Tubes by wattage range Austria



The graphs below are shown only for context; they show the share of sales of each lamp sub-type within the overall lamp family. Note that wattage bucket ranges and their colours vary; refer to the respective lamp sub-type page for details.

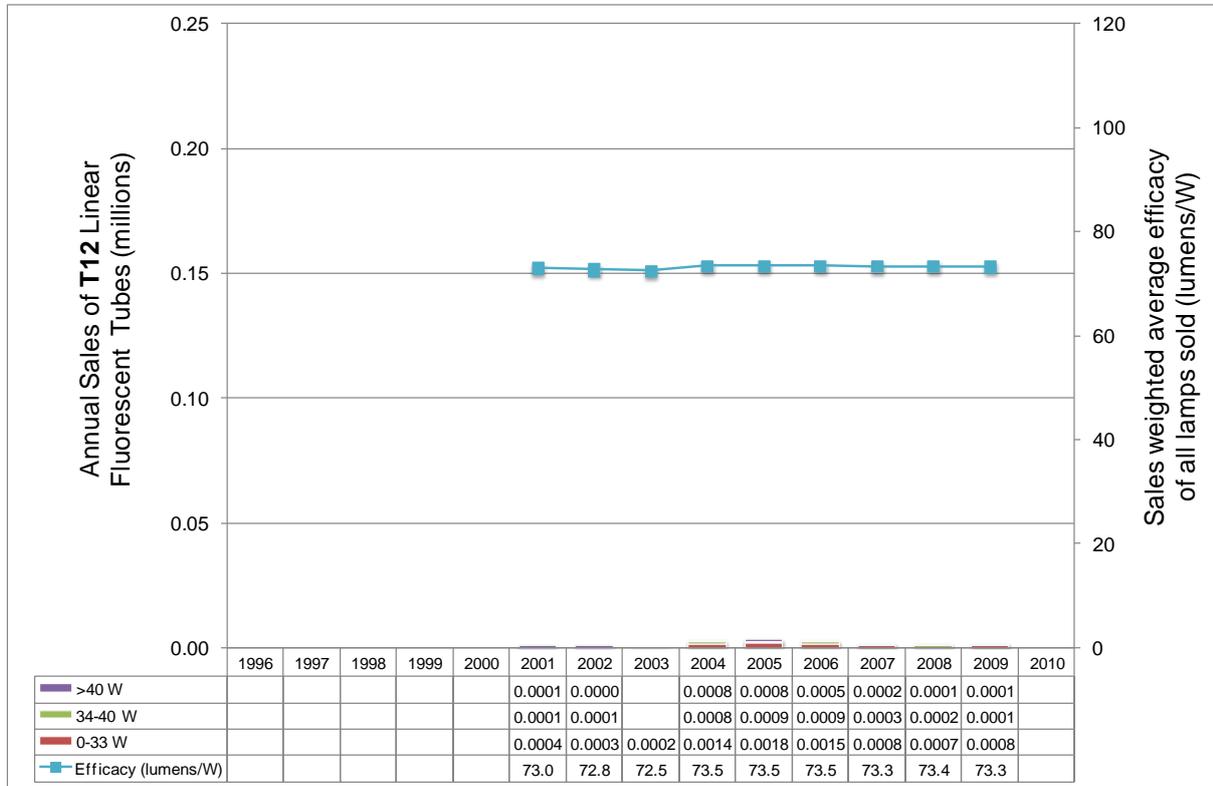


Key notes on Graph (See notes section 2)

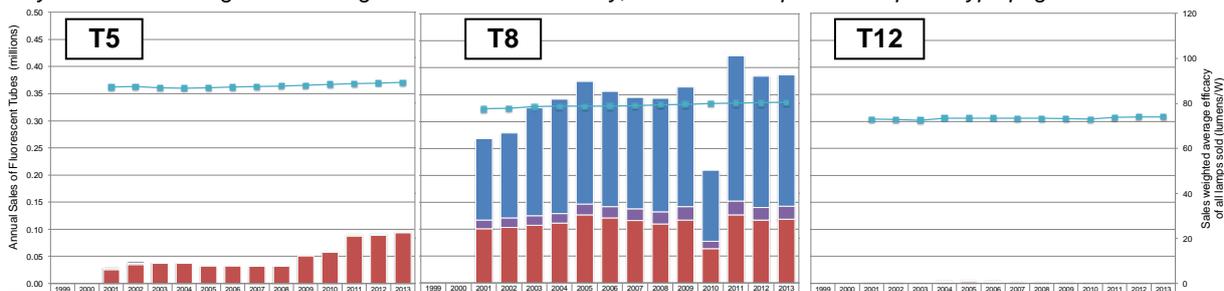
- Data shown is based on from data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps²⁴.
- Annual market average efficacies calculated on a sales weighted basis using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.

²⁴ Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.

Sales of T12 Linear Fluorescent Tubes by wattage range Austria



The graphs below are shown only for context; they show the share of sales of each lamp sub-type within the overall lamp family. Note that wattage bucket ranges and their colours vary; refer to the respective lamp sub-type page for details.

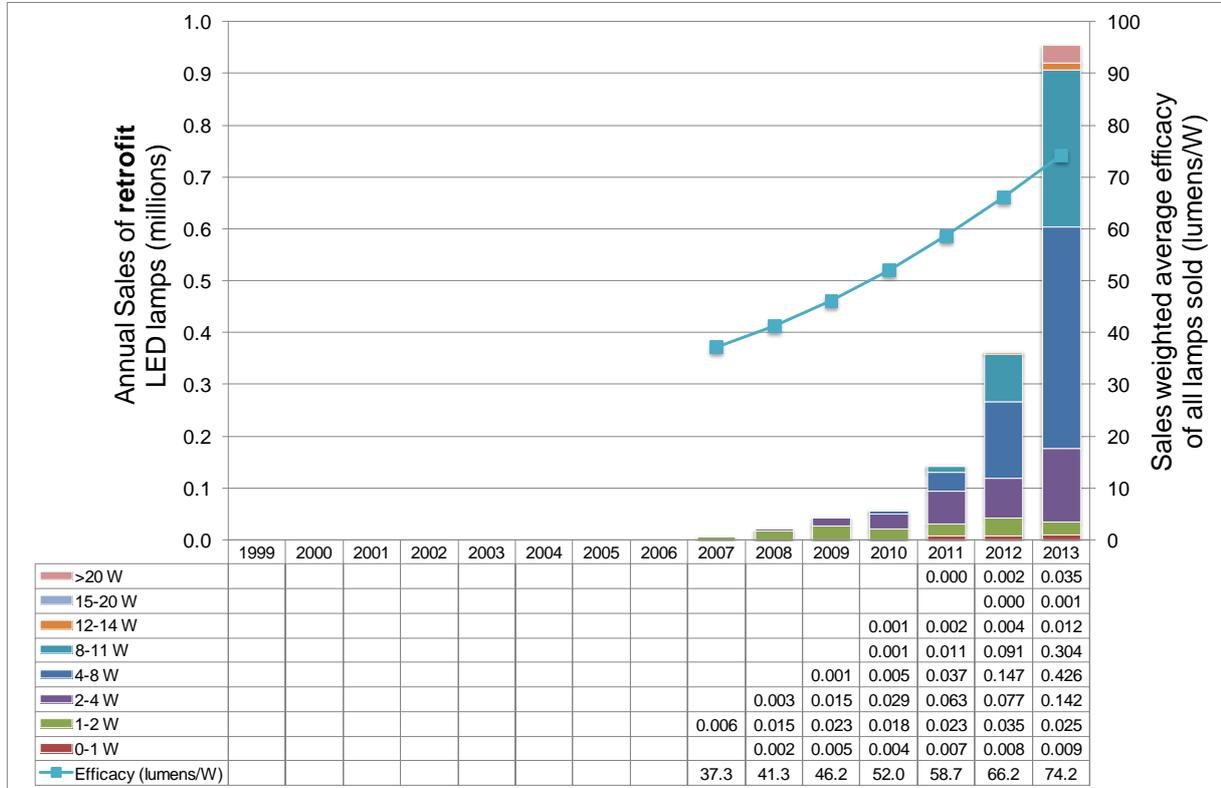


Key notes on Graph (See notes section 2)

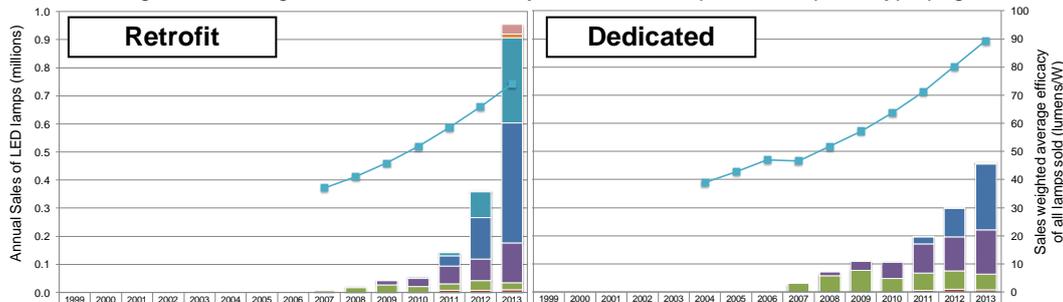
- Data shown is based on from data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps²⁵.
- Annual market average efficacies calculated on a sales weighted basis using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.

²⁵ Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.

Sales of retrofit LED lamps by wattage range - Austria



The graphs below are shown only for context; they show the share of sales of each lamp sub-type within the overall lamp family. Note that wattage bucket ranges and their colours vary; refer to the respective lamp sub-type page for details.

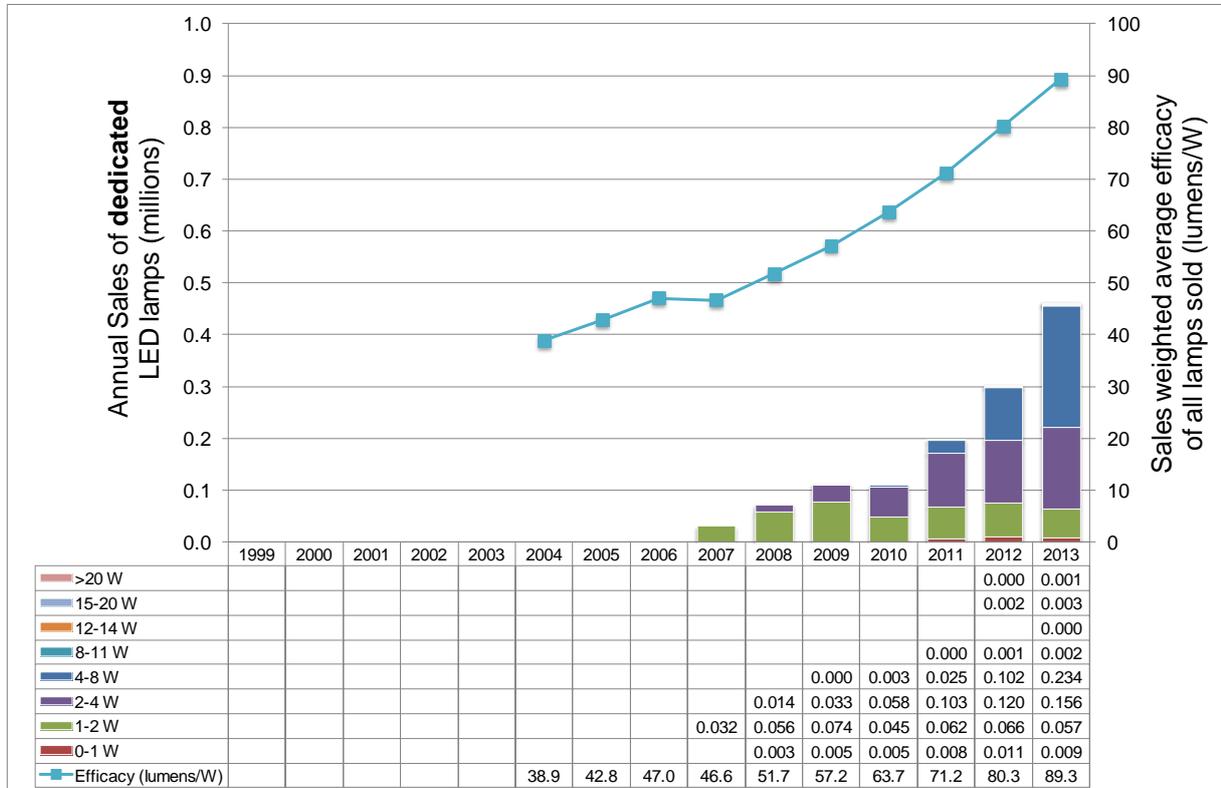


Key notes on Graph (See notes section 2)

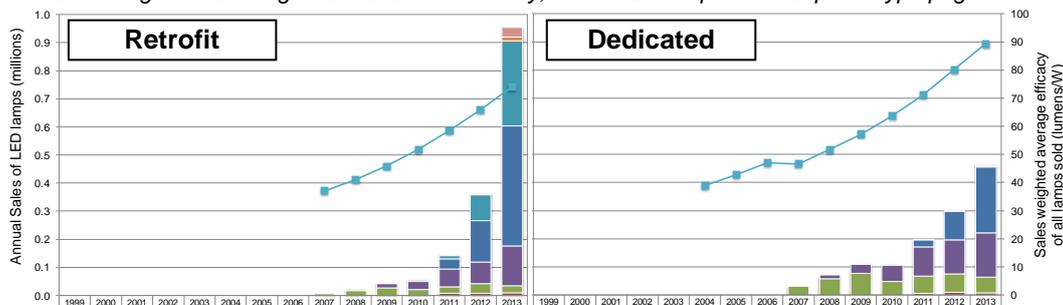
- Data shown is based on from data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps²⁶.
- Annual market average efficacies calculated on a sales weighted basis using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.

²⁶ Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.

Sales of dedicated LED lamps by wattage range - Austria



The graphs below are shown only for context; they show the share of sales of each lamp sub-type within the overall lamp family. Note that wattage bucket ranges and their colours vary; refer to the respective lamp sub-type page for details.



Key notes on Graph (See notes section 2)

- Data shown is based on from data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps²⁷.
- Annual market average efficacies calculated on a sales weighted basis using estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.

²⁷ Most 'domestic lighting' products are also used in other areas (e.g. hotels, shops, offices, etc). However, given the functionality of these products is virtually the same in all installations, and in almost all participating countries it will be impossible to separate sales to the domestic sector from sales elsewhere, all products shown will be considered as "domestic lighting" irrespective of final installation point.

Major Policy Interventions (See notes Section 3)

Policies actions fall into 2 categories, pan-EU member requirements and national interventions.

Pan-EU requirements:

- 1) **Mandatory MEPS:** As summarized in from page 2 in the sections and graphs titled "Phase out regulations" and described further in notes section 1
- 2) **Mandatory Product Labelling:** From the 1 July 1999 (with exclusions until 31 December 2000), lighting products within the EU were required to carry compulsory energy A-G labels. The packaging/labelling requirements have since been revised/extended in 2012 with the label scale being revised to A++ - E and refining of the associated derivation metrics.

National Level Interventions

- 3) None reported

Cultural Issues (See Notes Section 4)

Of relevance to the interpretation of data, it has been reported that the unusual peak in demand for incandescent lamps in 2009 was a result of the ban of 100 Watt light bulbs by the European Union. At this time there was a negative campaign against CFL in Austria (e.g., concerns about poor light quality, and mercury content) and this ban by the EU became a topic for the Austrian media. The effect was Austrian consumers started hoarding traditional light bulbs (especially 100 and 75 Watt), and sales went up by more than 100%.

Subsequently, there is anecdotal evidence which indicates that some retailers in Austria might have sourced large numbers incandescent lamps before each stage of the phase out came into force. Under the regulations, this would allow retailers to continue to sell them in later years. From the GfK market data in this report, this can be seen by the continued sale of lamps over 65W (banned on September 2011), and those over 7W (banned in September 2012).

Estimated Electricity consumption of lighting for households is given in the table below.

	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total of all households AT (GWh)	1395	1390	1363	1303	1319	1364	1369	1433	1426
Per household (kWh)	420	405	392	371	373	383	380	395	393

Notes on data

Section 1: Notes on Phase out regulations

1.1 Overview

The European Union announced their intention to “phase-out inefficient lighting” in April 2007.

At the time of preparation, regulations for “domestic lighting” covered only *non-directional lighting*. However, more recently directional lighting was regulated separately. Separate provisions are in place for street lighting and commercial lighting. At the time of publication of this document, the European Commission has just initiated a process seeking to update, and bring together into a single document, the regulations for domestic and commercial directional and non-directional lighting, and ideally the labelling requirements for these products.

Implementation of regulations is required to occur at the national level (ie individual EU member states) by inclusion in their relevant regulatory process within the timescales defined by the European Union.

1.1.1 Regulatory Requirements for Non-Directional Lighting²⁸

The Regulation was adopted and published in the EU Commission Official Journal on 18 March 2009 as Commission Regulation (EC) No 244/2009. It became law 20 days after publication. Key items within this text are as follows²⁹:

1.1.1.1 Overall requirement

(5) Products subject to this Regulation are designed essentially for the full or partial illumination of a household room, by replacing or complementing natural light with artificial light, in order to enhance visibility within that space. Special purpose lamps designed essentially for other types of applications (such as traffic signals, terrarium lighting, or household appliances) and clearly indicated as such on accompanying product information should not be subject to the ecodesign requirements set out in this Regulation.

(6) New technologies emerging on the market such as light emitting diodes should be subject to this Regulation.

(7) The environmental aspects of the products covered that are identified as significant for the purposes of this Regulation are energy in the use phase as well as mercury content and mercury emissions.

²⁸ Performance requirements for non-directional LEDs are included in Commission Regulation (EC) No 1194/2012, details of which can be found in section 1.1.2.

²⁹ While the official journal reference may be followed, interested parties are recommended to visit the http://www.lightingassociation.com/pdf/EUP_DIM1_FAQ.pdf. The link is to the UK Lighting Associations webpage which reproduces the legislative requirement, but also provides and interpretation of the legislation and associated other material.

(9) Although the mercury content of compact fluorescent lamps is considered to be a significant environmental aspect, it is appropriate to regulate it under Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

(14) ... requirements should not affect functionality from the user's perspective and should not negatively affect health, safety or the environment. In particular, the benefits of reducing the electricity consumption during the use phase should overcompensate potential, if any, additional environmental impacts during the production phase of products subject to this Regulation.

(15) A staged entry into force of the ecodesign requirements should provide a sufficient timeframe for manufacturers to re-design products subject to this Regulation as appropriate.

(20) A review of this measure should take particular note of the evolution of sales of special purpose lamp types so as to verify that they are not used for general lighting purposes, of the development of new technologies such as LEDs and of the feasibility of establishing energy efficiency requirements at the 'A' class level as defined in Commission Directive 98/11/EC of 27 January 1998 implementing Council Directive 92/75 with regard to energy labelling of household lamps

(21) The requirements contained in this measure allow halogen lamps of socket G9 and R7s to remain on the market for a limited period of time, recognising the need to service the existing luminaire stock, to prevent undue costs on consumers and to give time to manufacturers to develop luminaires dedicated to more efficient lighting technologies.

1.1.1.2 Subject matter and scope (within Article 1)

.... requirements for the placing on the market of non-directional household lamps, including when they are marketed for non-household use or when they are integrated into other products.

1.1.1.3 Timings (within Article 3)

Defined within Article 3:

Each ecodesign requirement shall apply in accordance with the following stages:

- Stage 1: 1 September 2009,
- Stage 2: 1 September 2010,
- Stage 3: 1 September 2011,
- Stage 4: 1 September 2012,
- Stage 5: 1 September 2013,
- Stage 6: 1 September 2016

Defined within Annex II:

Incandescent lamps with S14, S15 or S19 caps shall be exempted from the efficacy requirements of Stages 1 to 4 as defined in Article 3 of this Regulation, but not from Stages 5 and 6

1.1.1.4 Technical Requirements (Annex 1)

Defined within Annex II:



The maximum rated power (P_{max}) for a given rated luminous flux (Φ) is provided in Table 1.

The exceptions to these requirements are listed in Table 2 and the correction factors applicable to the maximum rated power are in Table 3.

Table 1

Application date	Maximum rated power (P_{max}) for a given rated luminous flux (Φ) (W)	
	Clear lamps	Non-clear lamps
Stages 1 to 5	$0,8 * (0,88\sqrt{\Phi}+0,049\Phi)$	$0,24\sqrt{\Phi}+0,0103\Phi$
Stage 6	$0,6 * (0,88\sqrt{\Phi}+0,049\Phi)$	$0,24\sqrt{\Phi}+0,0103\Phi$

Table 2

Exceptions

Scope of the exception	Maximum rated power (W)
Clear lamps $60 \text{ lm} \leq \Phi \leq 950 \text{ lm}$ in Stage 1	$P_{max} = 1,1 * (0,88\sqrt{\Phi}+0,049\Phi)$
Clear lamps $60 \text{ lm} \leq \Phi \leq 725 \text{ lm}$ in Stage 2	$P_{max} = 1,1 * (0,88\sqrt{\Phi}+0,049\Phi)$
Clear lamps $60 \text{ lm} \leq \Phi \leq 450 \text{ lm}$ in Stage 3	$P_{max} = 1,1 * (0,88\sqrt{\Phi}+0,049\Phi)$
Clear lamps with G9 or R7s cap in Stage 6	$P_{max} = 0,8 * (0,88\sqrt{\Phi}+0,049\Phi)$

The correction factors in Table 3 are cumulative where appropriate and also applicable to the products covered by the exceptions of Table 2.

Table 3

Correction factors

Scope of the correction	Maximum rated power (W)
filament lamp requiring external power supply	$P_{max}/1,06$
discharge lamp with cap GX53	$P_{max}/0,75$
non-clear lamp with colour rendering index ≥ 90 and $P \leq 0,5 * (0,88\sqrt{\Phi}+0,049\Phi)$	$P_{max}/0,85$
discharge lamp with colour rendering index ≥ 90 and $T_c \geq 5\,000 \text{ K}$	$P_{max}/0,76$
non-clear lamp with second envelope and $P \leq 0,5 * (0,88\sqrt{\Phi}+0,049\Phi)$	$P_{max}/0,95$
LED lamp requiring external power supply	$P_{max}/1,1$





Additional functionality requirements for CFLs (Table 4 Annex II):

Functionality parameter	Stage 1	Stage 5
Lamp survival factor at 6 000 h	≥ 0,50	≥ 0,70
Lumen maintenance	At 2 000 h: ≥ 85 % (≥ 80 % for lamps with second lamp envelope)	At 2 000 h: ≥ 88 % (≥ 83 % for lamps with second lamp envelope) At 6 000 h: ≥ 70 %
Number of switching cycles before failure	≥ half the lamp lifetime expressed in hours ≥ 10 000 if lamp starting time > 0,3 s	≥ lamp lifetime expressed in hours ≥ 30 000 if lamp starting time > 0,3 s
Starting time	< 2,0 s	< 1,5 s if P < 10 W < 1,0 s if P ≥ 10 W
Lamp warm-up time to 60 % Φ	< 60 s or < 120 s for lamps containing mercury in amalgam form	< 40 s or < 100 s for lamps containing mercury in amalgam form
Premature failure rate	≤ 2,0 % at 200 h	≤ 2,0 % at 400 h
UVA + UVB radiation	≤ 2,0 mW/klm	≤ 2,0 mW/klm
UVC radiation	≤ 0,01 mW/klm	≤ 0,01 mW/klm
Lamp power factor	≥ 0,50 if P < 25 W ≥ 0,90 if P ≥ 25 W	≥ 0,55 if P < 25 W ≥ 0,90 if P ≥ 25 W
Colour rendering (Ra)	≥ 80	≥ 80

Additional functionality requirements for lamps excluding CFLs and LEDS30 (Table 5 Annex II)

Functionality parameter	Stage 1	Stage 5
Rated lamp lifetime	≥ 1 000 h	≥ 2 000 h
Lumen maintenance	≥ 85 % at 75 % of rated average lifetime	≥ 85 % at 75 % of rated average lifetime
Number of switching cycles	≥ four times the rated lamp life expressed in hours	≥ four times the rated lamp life expressed in hours
Starting time	< 0,2 s	< 0,2 s
Lamp warm-up time to 60 % Φ	≤ 1,0 s	≤ 1,0 s
Premature failure rate	≤ 5,0 % at 100 h	≤ 5,0 % at 200 h
UVA + UVB radiation	≤ 2,0 mW/klm	≤ 2,0 mW/klm
UVC radiation	≤ 0,01 mW/klm	≤ 0,01 mW/klm
Lamp power factor	≥ 0,95	≥ 0,95

³⁰ Where the rated lamp lifetime is higher than 2 000 h, the Stage 1 requirements for the parameters 'Rated lamp lifetime', 'Lamp Survival Factor' and 'Lumen maintenance' in Tables 4 and 5 are only applicable as from Stage 2.



1.1.1.5 Exemptions/Exclusions

Defined within Article 1:

- a) lamps having the following chromaticity coordinates x and y :
 - $x < 0,200$ or $x > 0,600$
 - $y < -2,3172 x^2 + 2,3653 x - 0,2800$ or $y > -2,3172 x^2 + 2,3653 x - 0,1000$;
- b) directional lamps;
- c) lamps having a luminous flux below 60 lumens or above 12 000 lumens;
- d) lamps having:
 - 6 % or more of total radiation of the range 250-780 nm in the range of 250-400 nm,
 - the peak of the radiation between 315-400 nm (UVA) or 280-315 nm (UVB);
- e) fluorescent lamps without integrated ballast;
- f) high-intensity discharge lamps;
- g) incandescent lamps with E14/E27/B22/B15 caps, with a voltage equal to or below 60 volts and without integrated transformer in Stages 1-5 according to Article 3.

1.1.1.6 Marking Requirements (within Article 3)

Defined within Article 1:

Starting from 1 September 2009: For special purpose lamps, the following information shall be clearly and prominently indicated on their packaging and in all forms of product information accompanying the lamp when it is placed on the market:

- a) their intended purpose; and
- b) that they are not suitable for household room illumination.

Defined within Annex 3:

For non-directional household lamps, the following information shall be provided as from Stage 2, except where otherwise stipulated.

Information to be visibly displayed prior to purchase to end-users on the packaging and on free access websites

The information does not need to be specified using the exact wording of the list below. It may be displayed using graphs, figures or symbols rather than text. These information requirements do not apply to filament lamps not fulfilling the efficacy requirements of Stage 4.

- a) When the nominal lamp power is displayed outside the energy label in accordance with Directive 98/11/EC, the nominal luminous flux of the lamp shall also be separately displayed in a font at least twice as large as the nominal lamp power display outside the label;
- b) Nominal life time of the lamp in hours (not higher than the rated life time);
- c) Number of switching cycles before premature lamp failure;



- d) Colour temperature (also expressed as a value in Kelvins);
- e) Warm-up time up to 60 % of the full light output (may be indicated as 'instant full light' if less than 1 second);
- f) A warning if the lamp cannot be dimmed or can be dimmed only on specific dimmers;
- g) If designed for optimal use in non-standard conditions (such as ambient temperature $T_a \neq 25 \text{ }^\circ\text{C}$), information on those conditions;
- h) Lamp dimensions in millimetres (length and diameter);
- i) If equivalence with an incandescent lamp is claimed on the packaging, the claimed equivalent incandescent lamp power (rounded to 1 W) shall be that corresponding in Table 6 to the luminous flux of the lamp contained in the packaging.

The intermediate values of both the luminous flux and the claimed incandescent lamp power (rounded to 1W) shall be calculated by linear interpolation between the two adjacent values.

Table 6

Rated lamp luminous flux Φ [lm]			Claimed equivalent incandescent lamp power [W]
CFL	Halogen	LED and other lamps	
125	119	136	15
229	217	249	25
432	410	470	40
741	702	806	60
970	920	1 055	75
1 398	1 326	1 521	100
2 253	2 137	2 452	150
3 172	3 009	3 452	200

- j) The term 'energy saving lamp' or any similar product related promotional statement about lamp efficacy may only be used if the lamp complies with the efficacy requirements applicable to non-clear lamps in Stage 1 according to Tables 1, 2 and 3.

If the lamp contains mercury

- k) Lamp mercury content as X,X mg;
- l) Indication which website to consult in case of accidental lamp breakage to find instructions on how to clean up the lamp debris.

Information to be made publicly available on free-access websites

As a minimum, the following information shall be expressed at least as values.

- a) The information specified in [the section above];





- b) Rated wattage (0,1 W precision);
- c) Rated luminous flux;
- d) Rated lamp life time;
- e) Lamp power factor;
- f) Lumen maintenance factor at the end of the nominal life;
- g) Starting time (as X,X seconds);
- h) Colour rendering.

If the lamp contains mercury

- i) Instructions on how to clean up the lamp debris in case of accidental lamp breakage;
- j) Recommendations on how to dispose of the lamp at its end of life.

1.1.1.7 Review Requirements (Article 7)

A review of the regulation is required within 5 years of the date of regulation (ie March 2014).

1.1.2 Regulatory Requirements for Directional Lighting and LEDs³¹

The Regulation was adopted and published in the EU Commission Official Journal on 12 December 2012 as Commission Regulation (EC) No 1194/2012. It became law 20 days after publication. Key items within this text are as follows³²:

1.1.2.1 Overall requirement

Relevant items 5-7 identical to those detailed in Section 1.1.1.1. Additional items of relevance as follows:

(9) Although the mercury content of compact fluorescent lamps is considered to be a significant environmental aspect, it is appropriate to regulate it under Directive 2011/65/EU ... It is appropriate to regulate the ultraviolet light emissions from lamps and other parameters with potential health effects under Directives 2006/95/EC and 2001/95/EC...

(15) ... should not affect functionality from the user's perspective and should not negatively affect health, safety or the environment. In particular, the benefits of reducing the electricity consumption during the use phase should outweigh any potential additional environmental impact during the production phase of products subject to this Regulation. In order to ensure consumer satisfaction with energy-saving lamps, in particular LEDs, functionality requirements should be set not only for directional lamps, but also to non-directional LEDs, as they were not covered by the functionality requirements in Commission Regulation (EC) No 244/2009.

³¹ Performance requirements for LEDs covers both directional and non-directional lamps. The regulation also contains requirements for control gear (ie functional units between the switch and the lamp, eg ballast), but this is excluded from the information presented as it is beyond the scope of the main document)

³² While the official journal reference may be followed, interested parties are recommended to visit the http://www.lightingassociation.com/pdf/EUP_DIM1_FAQ.pdf. The link is to the UK Lighting Associations webpage which reproduces the legislative requirement, but also provides and interpretation of the legislation and associated other material.



(16) LED luminaires from which no LED lamp or module can be extracted for independent testing should not offer a way for LED manufacturers to escape the requirements of this Regulation.

(18) Phasing the ecodesign requirements should provide a sufficient timeframe for manufacturers to re-design products subject to this Regulation. The timing of the stages should be such that any negative impact on functionalities of equipment on the market are avoided and that the cost impact for end-users and manufacturers, in particular small and medium-sized enterprises, is taken into account, while ensuring timely achievement of the objectives of this Regulation.

1.1.2.1.1 Subject matter and scope (within Article 1)

...requirements for placing on the market the following electrical lighting products:

- a) directional lamps
- b) light-emitting diode (LED) lamps;
- c) equipment designed for installation between the mains and the lamps, including lamp control gear, control devices and luminaires (other than ballasts and luminaires for fluorescent and high-intensity discharge lamps);

including when they are integrated into other products. The Regulation also establishes product information requirements for special purpose products.

1.1.2.1.2 Timings (within Article 3)

Defined within Article 3:

Each ecodesign requirement shall apply in accordance with the following stages:

- Stage 1: 1 September 2013,
- Stage 2: 1 September 2014,
- Stage 3: 1 September 2016,

1.1.2.1.3 Technical Requirements (Annex 1)

Defined within Annex III:

The energy efficiency index (EEI) of the lamp is calculated as follows and rounded to two decimal places:

$$EEI = P_{cor} / P_{ref}$$

where:

P_{cor} is the rated power measured at nominal input voltage and corrected where appropriate in accordance with Table 1. The correction factors are cumulative where appropriate.

Table 1

Correction factors

Scope of the correction	Corrected power (P_{cor})
Lamps operating on external halogen lamp control gear	$P_{rated} \times 1,06$
Lamps operating on external LED lamp control gear	$P_{rated} \times 1,10$
Fluorescent lamps of 16 mm diameter (T5 lamps) and 4-pin single capped fluorescent lamps operating on external fluorescent lamp control gear	$P_{rated} \times 1,10$
Other lamps operating on external fluorescent lamp control gear	$P_{rated} \times \frac{0,24\sqrt{\Phi_{use}} + 0,0103\Phi_{use}}{0,15\sqrt{\Phi_{use}} + 0,0097\Phi_{use}}$
Lamps operating on external high-intensity discharge lamp control gear	$P_{rated} \times 1,10$
Compact fluorescent lamps with colour rendering index ≥ 90	$P_{rated} \times 0,85$
Lamps with anti-glare shield	$P_{rated} \times 0,80$

P_{ref} is the reference power obtained from the useful luminous flux of the lamp (Φ_{use}) by the following formula:

For models with $\Phi_{use} < 1\,300$ lumen: $P_{ref} = 0,88\sqrt{\Phi_{use}} + 0,049\Phi_{use}$

For models with $\Phi_{use} \geq 1\,300$ lumen: $P_{ref} = 0,07341\Phi_{use}$

Φ_{use} is defined as follows:

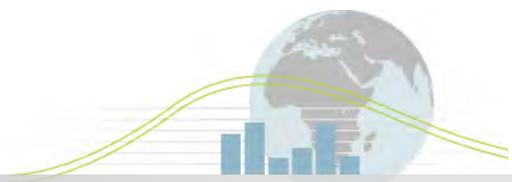
- directional lamps with a beam angle $\geq 90^\circ$ other than filament lamps and carrying a warning on their packaging in accordance with point 3.1.2(j) of this Annex: rated luminous flux in a 120° cone (Φ_{120°)
- other directional lamps: rated luminous flux in a 90° cone (Φ_{90°).

The maximum EEI of directional lamps is indicated in Table 2.

Table 2

Application date	Maximum energy efficiency index (EEI)			
	Mains-voltage filament lamps	Other filament lamps	High-intensity discharge lamps	Other lamps
Stage 1	If $\Phi_{use} > 450$ lm: 1,75	If $\Phi_{use} \leq 450$ lm: 1,20 If $\Phi_{use} > 450$ lm: 0,95	0,50	0,50





Application date	Maximum energy efficiency index (EEL)			
	Mains-voltage filament lamps	Other filament lamps	High-intensity discharge lamps	Other lamps
Stage 2	1,75	0,95	0,50	0,50
Stage 3	0,95	0,95	0,36	0,20

Stage 3 for mains-voltage filament lamps shall apply only if no later than 30 September 2015, evidence is produced by the Commission through a detailed market assessment and communicated to the Consultation Forum that there are mains-voltage lamps on the market that are:

- compliant with the maximum EEL requirement in stage 3;
- affordable in terms of not entailing excessive costs for the majority of end-users;
- broadly equivalent in terms of consumer-relevant functionality parameters to mains-voltage filament lamps available on the date of entry into force of this Regulation, including in terms of luminous fluxes spanning the full range of reference luminous fluxes listed in Table 6;
- compatible with equipment designed for installation between the mains and filament lamps available on the date of entry into force of this Regulation according to state-of-the-art requirements for compatibility.

Additional functionality requirements for directional CFLs

Table 3

Functionality requirements for directional compact fluorescent lamps

Functionality parameter	Stage 1 except where indicated otherwise	Stage 3
Lamp survival factor at 6 000 h	From 1 March 2014: $\geq 0,50$	$\geq 0,70$
Lumen maintenance	At 2 000 h: $\geq 80 \%$	At 2 000 h: $\geq 83 \%$ At 6 000 h: $\geq 70 \%$
Number of switching cycles before failure	\geq half the lamp lifetime expressed in hours $\geq 10\,000$ if lamp starting time $> 0,3$ s	\geq lamp lifetime expressed in hours $\geq 30\,000$ if lamp starting time $> 0,3$ s
Starting time	$< 2,0$ s	$< 1,5$ s if $P < 10$ W $< 1,0$ s if $P \geq 10$ W
Lamp warm-up time to 60 % Φ	< 40 s or < 100 s for lamps containing mercury in amalgam form	< 40 s or < 100 s for lamps containing mercury in amalgam form
Premature failure rate	$\leq 5,0 \%$ at 500 h	$\leq 5,0 \%$ at 1 000 h





Functionality parameter	Stage 1 except where indicated otherwise	Stage 3
Lamp power factor for lamps with integrated control gear	$\geq 0,50$ if $P < 25$ W $\geq 0,90$ if $P \geq 25$ W	$\geq 0,55$ if $P < 25$ W $\geq 0,90$ if $P \geq 25$ W
Colour rendering (Ra)	≥ 80 ≥ 65 if the lamp is intended for outdoor or industrial applications according to point 3.1.3(l) of this Annex	≥ 80 ≥ 65 if the lamp is intended for outdoor or industrial applications according to point 3.1.3(l) of this Annex

Additional functionality requirements for directional lamps excluding CFLs, LEDs and HIDs

Table 4

Functionality requirements for other directional lamps (excluding LED lamps, compact fluorescent lamps and high-intensity discharge lamps)

Functionality parameter	Stage 1 and 2	Stage 3
Rated lamp lifetime at 50 % lamp survival	$\geq 1\,000$ h ($\geq 2\,000$ h in stage 2) $\geq 2\,000$ h for extra low voltage lamps not complying with the stage 3 filament lamp efficiency requirement in point 1.1 of this Annex	$\geq 2\,000$ h $\geq 4\,000$ h for extra low voltage lamps
Lumen maintenance	$\geq 80\%$ at 75 % of rated average lifetime	$\geq 80\%$ at 75 % of rated average lifetime
Number of switching cycles	\geq four times the rated lamp life expressed in hours	\geq four times the rated lamp life expressed in hours
Starting time	$< 0,2$ s	$< 0,2$ s
Lamp warm-up time to 60 % Φ	$\leq 1,0$ s	$\leq 1,0$ s
Premature failure rate	$\leq 5,0\%$ at 100 h	$\leq 5,0\%$ at 200 h
Lamp power factor for lamps with integrated control gear	Power > 25 W: $\geq 0,9$ Power ≤ 25 W: $\geq 0,5$	Power > 25 W: $\geq 0,9$ Power ≤ 25 W: $\geq 0,5$



Additional functionality requirements for directional **and non-directional** LEDs

Functionality parameter	Requirement as from stage 1, except where indicated otherwise
Lamp survival factor at 6 000 h	From 1 March 2014: $\geq 0,90$
Lumen Maintenance at 6 000 h	From 1 March 2014: $\geq 0,80$
Number of switching cycles before failure	$\geq 15\,000$ if rated lamp life $\geq 30\,000$ h otherwise: \geq half the rated lamp life expressed in hours
Starting time	$< 0,5$ s
Lamp warm-up time to 95 % Φ	< 2 s
Premature failure rate	$\leq 5,0$ % at 1 000 h

Functionality parameter	Requirement as from stage 1, except where indicated otherwise
Colour rendering (Ra)	≥ 80 ≥ 65 if the lamp is intended for outdoor or industrial applications in accordance with point 3.1.3(l) of this Annex
Colour consistency	Variation of chromaticity coordinates within a six-step MacAdam ellipse or less.
Lamp power factor (PF) for lamps with integrated control gear	$P \leq 2$ W: no requirement 2 W $< P \leq 5$ W: PF $> 0,4$ 5 W $< P \leq 25$ W: PF $> 0,5$ $P > 25$ W: PF $> 0,9$

1.1.2.1.4 Exemptions/Exclusions

Defined within Article 1:

- a) LED modules shall be exempted from the requirements of this Regulation if they are marketed as part of luminaires that are placed on the market in less than 200 units per year.

Defined within Article 2:

- a) ‘Special purpose product’ ... that require technical parameters not necessary for the purposes of lighting average scenes or objects in average circumstances. They are of the following types:
 - (a) applications where the primary purpose of the light is not lighting, such as:
 - emission of light as an agent in chemical or biological processes (such as polymerisation, ultraviolet light used for curing/drying/hardening, photodynamic therapy, horticulture, petcare, anti- insect products);



- image capture and image projection (such as camera flashlights, photocopiers, video projectors);
 - heating (such as infrared lamps);
 - signalling (such as traffic control or airfield lamps);
- (b) lighting applications where:
- (i) the spectral distribution of the light is intended to change the appearance of the scene or object lit, in addition to making it visible (such as food display EN 14.12.2012 Official Journal of the European Union L 342/3) lighting or coloured lamps as defined in point 1 of Annex I), with the exception of variations in correlated colour temperature; or
 - (ii) the spectral distribution of the light is adjusted to the specific needs of particular technical equipment, in addition to making the scene or object visible for humans (such as studio lighting, show effect lighting, theatre lighting); or
 - (iii) the scene or object lit requires special protection from the negative effects of the light source (such as lighting with dedicated filtering for photosensitive patients or photosensitive museum exhibits); or
 - (iv) lighting is required only for emergency situations (such as emergency lighting luminaires or control gears for emergency lighting); or
 - (v) the lighting products have to withstand extreme physical conditions (such as vibrations or temperatures below $-20\text{ }^{\circ}\text{C}$ or above $50\text{ }^{\circ}\text{C}$);
- (c) products incorporating lighting products, where the primary purpose is not lighting and the product is dependent on energy input in fulfilling its primary purpose during use (such as refrigerators, sewing machines, endoscopes, blood analysers);

Defined by Annex 1:

- b) lamps having the following chromaticity coordinates x and y :
 - $x < 0,270$ or $x > 0,530$
 - $y < -2,3172 x^2 + 2,3653 x - 0,2199$ or $y > -2,3172 x^2 + 2,3653 x - 0,1595$;

1.1.2.1.5 Marking Requirements (within Article 3)

Defined by Annex 1 for special purpose (ie exempt) lamps:

If the product is placed on the market in a packaging containing information to be visibly displayed to the end-user prior to purchase, the following information shall be clearly and prominently indicated on the packaging and in all other forms of product information:

- a) the intended purpose; and
- b) that it is not suitable for household room illumination.

Defined by Annex IV for general cases

In all forms of product information, the term 'energy-saving lamp' or any similar product related promotional statement about lamp efficacy may be used only if the energy efficiency index of the lamp (calculated in accordance with the method set out in point 1.1 of this Annex) is 0,40 or below.

Information to be displayed on the lamp itself:

For lamps other than high-intensity discharge lamps, the value and unit ('lm', 'K' and '°') of the nominal useful luminous flux, of the colour temperature and of the nominal beam angle shall be displayed in a legible font on the surface of the lamp if, after the inclusion of safety-related information such as power and voltage, there is sufficient space available for it on the lamp without unduly obstructing the light coming from the lamp.

If there is room for only one of the three values, the nominal useful luminous flux shall be provided. If there is room for two values, the nominal useful luminous flux and the colour temperature shall be provided.

Information to be visibly displayed to end-users, prior to their purchase, on the packaging and on free access websites:

If the product is placed on the market in a packaging containing information to be visibly displayed to the end-users, prior to their purchase, the information shall also be clearly and prominently indicated on the packaging.

The information does not need to use the exact wording on the list below. It may be displayed in the form of graphs, drawings or symbols rather than text.

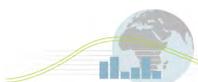
- a) Nominal useful luminous flux displayed in a font at least twice as large as any display of the nominal lamp power;
- b) Nominal life time of the lamp in hours (not longer than the rated life time);
- c) Colour temperature, as a value in Kelvins and also expressed graphically or in words;
- d) Number of switching cycles before premature failure;
- e) Warm-up time up to 60 % of the full light output (may be indicated as 'instant full light' if less than 1 second);
- f) A warning if the lamp cannot be dimmed or can be dimmed only on specific dimmers; in the latter case a list of compatible dimmers shall be also provided on the manufacturer's website;
- g) If designed for optimum use in non-standard conditions (such as ambient temperature $T_a \neq 25^\circ\text{C}$ or specific thermal management is necessary), information on those conditions;
- h) Lamp dimensions in millimetres (length and largest diameter);
- i) Nominal beam angle in degrees;
- j) If the lamp's beam angle is $\geq 90^\circ$ and its useful luminous flux as defined in point 1.1 of this Annex is to be measured in a 120° cone, a warning that the lamp is not suitable for accent lighting;
- k) If the lamp cap is a standardised type also used with filament lamps, but the lamp's dimensions are different from the dimensions of the filament lamp(s) that the lamp is meant to replace, a drawing comparing the lamp's dimensions to the dimensions of the filament lamp(s) it replaces;
- h) An indication that the lamp is of a type listed in the first column of Table 6 may be displayed only if the luminous flux of the lamp in a 90° cone ($\Phi 90^\circ$) is not lower than the reference luminous flux indicated in Table 6 for the smallest wattage among the lamps of the type concerned. The reference luminous flux shall be multiplied by the correction factor in Table 7. For LED lamps, it shall be in addition multiplied by the correction factor in Table 8;
- l) An equivalence claim involving the power of a replaced lamp type may be displayed only if the lamp type is listed in Table 6 and if the luminous flux of the lamp in a 90° cone ($\Phi 90^\circ$) is not lower than the corresponding reference luminous flux in Table 6. The reference luminous flux shall be multiplied by the correction factor in Table 7. For LED lamps, it shall



be in addition multiplied by the correction factor in Table 8. The intermediate values of both the luminous flux and the claimed equivalent lamp power (rounded to the nearest 1 W) shall be calculated by linear interpolation between the two adjacent values.

Table 6
Reference luminous flux for equivalence claims

Extra-low voltage reflector type		
Type	Power (W)	Reference Φ_{90° (lm)
MR11 GU4	20	160
	35	300
MR16 GU 5.3	20	180
	35	300
	50	540
AR111	35	250
	50	390
	75	640
	100	785
Mains-voltage blown glass reflector type		
Type	Power (W)	Reference Φ_{90° (lm)
R50/NR50	25	90
	40	170
R63/NR63	40	180
	60	300
R80/NR80	60	300
	75	350
	100	580
R95/NR95	75	350
	100	540
R125	100	580
	150	1 000





Mains-voltage pressed glass reflector type

Type	Power (W)	Reference Φ_{90° (lm)
PAR16	20	90
	25	125
	35	200
	50	300
PAR20	35	200
	50	300
	75	500
PAR25	50	350
	75	550
PAR30S	50	350
	75	550
	100	750
PAR36	50	350
	75	550
	100	720
PAR38	60	400
	75	555
	80	600
	100	760
	120	900

Table 7

Multiplication factors for lumen maintenance

Lamp type	Luminous flux multiplication factor
Halogen lamps	1
Compact fluorescent lamps	1,08
LED lamps	$1 + 0,5 \times (1 - LLMF)$ where LLMF is the lumen maintenance factor at the end of the nominal life



Table 8

Multiplication factors for LED lamps

LED lamp beam angle	Luminous flux multiplication factor
$20^\circ \leq \text{beam angle}$	1
$15^\circ \leq \text{beam angle} < 20^\circ$	0,9
$10^\circ \leq \text{beam angle} < 15^\circ$	0,85
beam angle $< 10^\circ$	0,80

If the lamp contains mercury:

- m) Lamp mercury content as X,X mg;
- n) Indication of which website to consult in case of accidental lamp breakage to find instructions on how to clean up the lamp debris.

Information to be made publicly available on free-access websites

As a minimum, the following information shall be expressed at least as values.

- a) The information specified in [the section above];
- b) Rated power (0,1 W precision);
- c) Rated useful luminous flux;
- d) Rated lamp life time;
- e) Lamp power factor;
- f) Lumen maintenance factor at the end of the nominal life (except for filament lamps);
- g) Starting time (as X,X seconds);
- h) Colour rendering;
- i) Colour consistency (only for LEDs);
- j) Rated peak intensity in candela (cd);
- k) Rated beam angle;
- l) If intended for use in outdoor or industrial applications, an indication to this effect;
- m) Spectral power distribution in the range 180-800 nm;
- n) If the lamp contains mercury:

- Instructions on how to clean up the lamp debris in case of accidental lamp breakage;
- (o) Recommendations on how to dispose of the lamp at the end of its life for recycling in line with Directive 2012/19/EU of the European Parliament and of the Council (1).

Additional requirements are placed on LEDs without integral ballast and for products inserted in luminaires.

1.1.2.1.6 Review Requirements (Article 7)

A review of the regulation is required within three years after its entry into force (ie September 2015). The review should:

...take particular note of the trend in sales of special-purpose lamp types in order to make sure that they are not used outside special applications, and of the development of new technologies such as LED and organic LED. It should assess the feasibility of establishing energy-efficiency requirements at class A level as defined in Regulation (EU) No 874/2012, or at least at class B level for directional mains voltage halogen lamps.... It should also assess whether the energy-efficiency requirements for other filament lamps can be significantly tightened. The review should also assess the functionality requirements regarding colour rendering index for LED lamps.

1.1.3 Regulatory Requirements for fluorescent lamps without integrated ballast

Flourescent lamps without integrated ballast were original regulated in 2000 under Directive 2000/55/EC. These regulations were revised and extended in March 2009 by No 245/2009, and further amended under regulation No 347/2010 in April 2010. Details are not presented here due to the complex nature and cross referencing of the various legislative requirement. Please refer to the relevant regulation for details.

Section 2: Notes on Sales and efficacy of all lamps, total light output And sales by product type

2.1 Data Source

Data shown is derived from data supplied by GfK. GfK report data represents approximately 55% of overall market in all years to 2009 rising by 75% in 2012/13. Due to the variation in coverage, sales are scaled up to show an estimate of 100% of the market. This approach is believed to provide a robust representation of the market for all domestic (household) sector lamps.

Manipulations of Data Supplied

Sales data used as supplied.

Average efficacies calculated on a sales weighted basis by:

$$\frac{\text{Sum (sales of lamp type a sales * efficacy of lamp type a) + + Sum (sales of lamp type x sales * efficacy of lamp type x)}}{\text{Sum (all lamp sales)}}$$

Instantaneous light output calculated as sales weighted basis by:

$$\frac{\text{Sum (sales of lamp type a sales * efficacy of lamp type a * wattage of lamp type a) + + Sum (sales of lamp type x sales * efficacy of lamp type x * wattage of lamp type n)}}{\text{Sum (all lamp sales)}}$$

Lifetime light output calculated as sales weighted basis by:

$$\frac{\text{Sum (sales of lamp type a sales * efficacy of lamp type a * wattage of lamp type a * lifetime of lamp type a) + + Sum (sales of lamp type x sales * efficacy of lamp type x * wattage of lamp type n * lifetime of lamp type n)}}{\text{Sum (all lamp sales)}}$$

2.1.1 Key assumptions:

Efficacies used for all calculations based on estimated average global efficacies for each lamp type and associated wattage range for 230V lamps.

Lifetimes used for all calculations based on estimated average global lamp life for each lamp type and associated wattage range for 230V lamps.

Tables for efficacy and assumed lifetimes of each lamp type/wattage range for the years 1996-2013 can be viewed in the product definition which is in the supporting documents section of the Domestic Lighting area of the Mapping and Benchmarking website – see <http://mappingandbenchmarking.iea-4e.org/matrix?type=product&id=5>

Section 3: Notes on Policy Interventions

Policies actions fall into 2 categories, pan-EU member requirements and national interventions.

Pan-EU requirements:

- 1) **Mandatory MEPS:** As described in notes section 1
- 2) **Mandatory Product Labelling:** From the 1 July 1999 (with exclusions until 31 December 2000), lighting products within the EU have been required to carry compulsory energy labels.

Original labelling requirements placing lamps on an A-G comparative scale were set out in 98/11/EC of 27 January 1998 implementing Council Directive 92/75/EEC with regard to energy labelling of household lamps³³. This regulation was revised by No 874/2012 of 12 July 2012 to change the labelling scale to A++ - E. Specific allocation of label “grade” on the scale is based on an Energy Efficiency Index defined in each regulation (please refer to the individual regulations for full information on the various labelling requirements).

National Level Interventions

No known national level interventions.

³³ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1998:071:0001:0008:EN:PDF>

Section 4: Notes on Cultural Issues

Data on Austrian national lighting consumption is from Statistik Austria, with the table shown adapted from: 1. Modellierung des Stromverbrauchs in den privaten Haushalten Österreichs. Statistik Austria, Direktion Raumwirtschaft, Energie, Wien 2011³⁴.

34

www.statistik.at/web_de/static/modellierung_des_stromverbrauchs_in_den_privaten_haushalten_oesterreichs_n_057712.pdf.