Mapping Document

Country:	United States of America
Technology:	Domestic Lighting
Sub Category:	All domestic lamps

IMPORTANT NOTE:

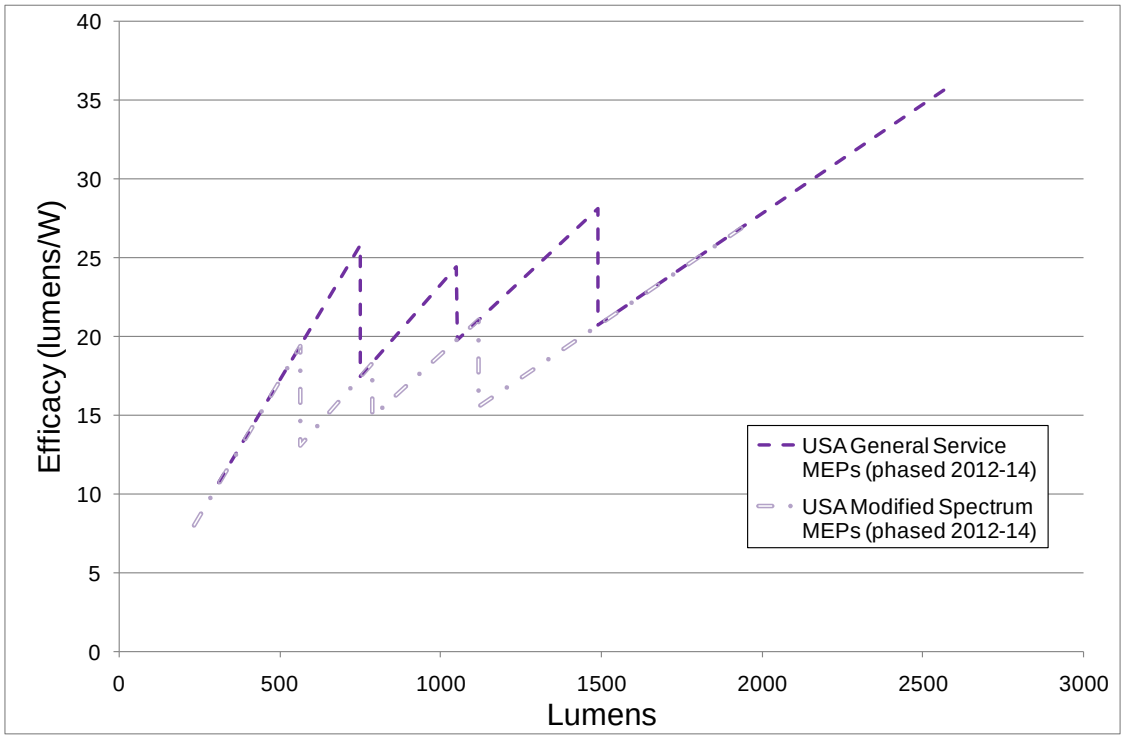
During 2014, the IEA 4E's Mapping and Benchmarking programme is updating the 2011 Benchmarking Report[1] analysing the market impact resulting from the introduction of policies to phase-out inefficient lighting and emergence of new technologies in the domestic lighting sector. As part of this process, the national mappings produced in 2011 have been updated with the most recent information on national policy interventions and the resulting changes in product sales across a range of lighting technologies.

Unfortunately, it has not been possible to source updated comprehensive information on the sales of the various lamp types from the USA, therefore this Mapping ONLY provides limited updates to information on the US regulatory framework for lighting products presented in 2011. However:

- ***The original 2011 mapping document which contains sales information up to that point remains available at http://mappingandbenchmarking.iea-4e.org/matrix?type=product&id=5***
- ***Page 3 of this mapping provides readers with alternative sources of information and analysis of the potential and actual impact of the phase-out regulations in the USA.***

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

Higher efficiency regulations for domestic lighting - USA



Key notes on Graph (see notes section 1)

The Energy Independence and Security Act 2007[2] (EISA 2007) requires that sales of the majority of none-specialist 110-130V lamps meet new higher efficiency levels. Key timeframes and values are:

General Service Lamps		Modified Spectrum Lamps	
Lumen Output	**Maximum Wattage**	**Lumen Output**	**Maximum Wattage**
January 1, 2012		**January 1, 2012**	
1490 to 2600 lumens	72W	1118 to 1950 lumens	72W
January 1, 2013		**January 1, 2013**	
1050 to 1489 lumens	53W	788 to 1117 lumens	53W
January 1, 2014		**January 1, 2014**	
750 to 1049 lumens 310 to 749 lumens	43W 29W	563 to 787 lumens 232 to 562 lumens	43W 29W

It is important to note that the act also requires a second rule-making to begin in 2014 (and be completed by 2017) which will require a minimum average lamp efficacy of at least 45 lumen per watt. However, the specific requirements are yet to be defined and so have not been included in this report. Please refer to notes section for more details.

A number of other lighting related regulations are in place such as the phase out of T12 magnetic ballast phased from 2007-2012.

[2] http://www.govtrack.us/congress/bill.xpd?bill=h110-6

Mapping of lamp sales in the USA

The provision of data to the 4E mapping and benchmarking programme is facilitated by national governments. However, currently the US Government is prohibited by law from spending funds to implement or enforce energy standards for certain incandescent light bulbs. This prohibition is interpreted as including provision of data on the product, import or sale of these lamps. Therefore, at the present time it has not been possible to source data on recent lamp sales within the US. However, for those seeking information on sales and the impact of regulations, the following may be useful:

- The original 2011 mapping document containing sales information up to that point remains available at http://mappingandbenchmarking.iea-4e.org/matrix?type=product&id=5

- The US National Electrical Manufacturers Association (NEMA) published details of percentage changes in the sales of lamp types over time based on indicies at http://www.nema.org/Intelligence/Pages/Lamp-Indices.aspx

- Limited sales data for some regions of the USA has been collected and analyzed, with the results presented in two reports prepared by Scott Dimetrosky and Katie Parkinson of Apex Analytics:
  - The Lights They Are A Changing: Early Results from EISA 2007
  - Midterm Results from EISA 2007

  Other publically available reports that may be of value include:

  - DoE (2010 U.S. Lighting Market Characterization) http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/2010-lmc-final-jan-2012.pdf
  - DoE (2012 Energy Savings Potential of Solid-State Lighting in General Illumination Applications): http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_energy-savings-report_10-30.pdf
  - 2012-2013 Northwest Residential Lighting Market Tracking Study: http://neea.org/docs/default-source/reports/2012-2013-northwest-residential-residential-lighting-market-tracking-study.pdf?sfvrsn=10
  - DoE (2013 Adoption of Light-Emitting Diodes in Common Lighting Applications: http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/led-adoption-report_2013.pdf

- A number of commercial entities have gathered statistics and produced analysis on sales of lighting products in the USA which are available on a confidential commercial basis.

Major Policy Interventions (See notes Section 3)

The USA has had a number of national and regional policies related to lighting. These policies can be summarised as:

National Policies

- Minimum Performance Standards: Refer to Notes Section 1
- ENERGY STAR: ENERGY STAR seeks to identify premium performing products (in this case lighting) and promote these products within the market. Such promotion is through information campaigns, promotions with partner organisations, listing on the energy star website, etc. Products must complete an initial registration process and are subject to compliance testing[3]:
- Building codes/regulations: Building regulations within the US place specific energy related requirements on the energy consumption of new (and in some cases refurbished) properties. These requirements impact the selection of lighting systems.

Regional and State Based Policies

- Minimum Performance Standards: California and Nevada have regulations placing minimum efficiency regulations on lighting. In general, these regulations will be superseded when the federal (national) regulations noted above come into force.
- Miscellaneous promotional and subsidy programmes: A range of local, state and regional organisations run promotional programmes related to lighting products and lighting design.

[3] The current listing and specification for all ENERGY STAR products can be found at http://www.energystar.gov/index.cfm?c=products.pr_find_es_products

Cultural Issues (See Notes Section 4)

No additional relevant cultural information.

Notes on data

Section 1: Notes on Phase out Regulations

1.1 Overview

The *Energy Policy and Conservation Act* of 1975 (EPCA) established the *Energy Conservation Program for Consumer Products Other Than Automobiles* designed to improve the energy efficiency ***of*** major household appliances,.

The *Energy Independence and Security Act* 2007[4] (EISA 2007) amended EPCA and directed the Department of Energy to undertake new energy conservation standards rulemakings. EISA 2007 also amended EPCA with regard to general service fluorescent lamps, incandescent reflector lamps, and general service incandescent lamps.

A Technical Amendment placed the energy conservation standards, test procedures, and related definitions prescribed in EISA 2007 in the Code of Federal Regulations[5]. The requirements can be summarised as follows:

Prohibition of sales of medium screw cap incandescent or halogen lamps of 110-130V. Key timeframes

General Service Lamps		Modified Spectrum Lamps	
Lumen Output	**Maximum Wattage**	**Lumen Output**	**Maximum Wattage**
January 1, 2012		**January 1, 2012**	
1490 to 2600 lumens	72W	1118 to 1950 lumens	72W
January 1, 2013		**January 1, 2013**	
1050 to 1489 lumens	53W	788 to 1117 lumens	53W
January 1, 2014		**January 1, 2014**	
750 to 1049 lumens 310 to 749 lumens	43W 29W	563 to 787 lumens 232 to 562 lumens	43W 29W

It is important to note that the act also required:

- A new rulemaking to commence by 1 January 2014, and be finalized by 1 January 2017.
- The new rule shall would go into effect no earlier than three years after publication, but no later than 1 January 2020.
- If this deadline is not met, or the proposed standard does not yield savings equivalent to a 45lm/w (eg, set a 40 lm/w limit for low light output bulbs and a 55 lm/w limit for brighter bulbs with the result being a weighted average that yields savings >=45

[4] http://www.govtrack.us/congress/bill.xpd?bill=h110-6
[5] http://www1.eere.energy.gov/buildings/appliance_standards/pdfs/74fr12058.pdf

lm/w), an automatic limit will come into place that sets an automatic across the board 45lm/w limit effective 1 January 2020 for non-directional lighting

However, the exact requirement ***for the new regulations*** is yet to be developed. Hence the remainder of this section relates to the 2014 requirement.

(Please note that a number of other lighting related regulations are in place such as the phase out of T12 magnetic ballast phased from 2007-2012).

1.1.1 General Service Lamps

1.1.1.1 Energy Efficiency Regulations

The following regulatory requirements are drawn from *The Energy Independence and Security Act* 2007[6] (EISA 2007).

Technical requirements

Regulatory definition

General lighting application means lighting that provides an interior or exterior area with overall illumination.

General service fluorescent lamp means any fluorescent lamp which can be used to satisfy the majority of fluorescent lighting applications, but does not include any lamp designed and marketed for the following non - general application:

(1) Fluorescent lamps designed to promote plant growth;
(2) Fluorescent lamps specifically designed for cold temperature applications;
(3) Colored fluorescent lamps;
(4) Impact-resistant fluorescent lamps;
(5) Reflectorized or aperture lamps;
(6) Fluorescent lamps designed for use in reprographic equipment;
(7) Lamps primarily designed to produce radiation in the ultra-violet region of the spectrum; and
(8) Lamps with a Color Rendering Index of 87 or greater.

General service incandescent lamp means a standard incandescent or halogen type lamp that is intended for general service applications; has a medium screw base; has a lumen range of not less than 310 lumens and not more than 2,600 lumens; and is capable of being operated at a voltage range at least partially within 110 and 130 volts; however this definition does not apply to the following incandescent lamps—

(1) An appliance lamp;
(2) A black light lamp;
(3) A bug lamp;
(4) A colored lamp;
(5) An infrared lamp;
(6) A left-hand thread lamp;
(7) A marine lamp;
(8) A marine signal service lamp;
(9) A mine service lamp;
(10) A plant light lamp;
(11) A reflector lamp;

[6] http://www.govtrack.us/congress/bill.xpd?bill=h110-6

(12) A rough service lamp;
(13) A shatter-resistant lamp (including a shatter-proof lamp and a shatter-protected lamp);
(14) A sign service lamp;
(15) A silver bowl lamp;
(16) A showcase lamp;
(17) A 3-way incandescent lamp;
(18) A traffic signal lamp;
(19) A vibration service lamp;
(20) A G shape lamp (as defined in ANSI C78.20) (incorporated by reference; see § 430.3) and ANSI C79.1– 2002 (incorporated by reference; see § 430.3) with a diameter of 5 inches or more;
(21) A T shape lamp (as defined in ANSI C78.20) (incorporated by reference; see § 430.3) and ANSI C79.1– 2002 (incorporated by reference; see § 430.3) and that uses not more than 40 watts or has a length of more than 10 inches; and
(22) A B, BA, CA, F, G16–1/2, G–25, G30, S, or M–14 lamp (as defined in ANSI C79.1–2002) (incorporated by reference; see § 430.3) and ANSI C78.20 (incorporated by reference; see § 430.3) of 40 watts or less.

General service lamp includes general service incandescent lamps, compact fluorescent lamps, general service light-emitting diode lamps, organic light-emitting diode lamps, and any other lamps that the Secretary determines are used to satisfy lighting applications traditionally served by general service incandescent lamps; however, this definition does not apply to any lighting application or bulb shape excluded from the ‘‘general service incandescent lamp’’ definition, or any general service fluorescent lamp or incandescent reflector lamp.

Modified spectrum means, with respect to an incandescent lamp, an incandescent lamp that—

(1) Is not a colored incandescent lamp; and
(2) When operated at the rated voltage and wattage of the incandescent lamp—
(A) Has a color point with (x,y) chromaticity coordinates on the C.I.E. 1931 chromaticity diagram, figure 2, page 3 of IESNA LM–16 (incorporated by reference; see § 430.3) that lies below the black-body locus; and
(B) Has a color point with (x,y) chromaticity coordinates on the C.I.E. 1931 chromaticity diagram, figure 2, page 3 of IESNA LM–16 (incorporated by reference; see § 430.3) that lies at least 4 MacAdam steps, as referenced in IESNA LM–16, distant from the color point of a clear lamp with the same filament and bulb shape, operated at the same rated voltage and wattage.

Notes on Exemptions:

For five of the lamp types excluded from the current regulations (rough service lamps, vibration service lamps, 3-way incandescent lamps, 2,601-3,300 lumen general service incandescent lamps, and shatter-resistant lamps) provision is made such that if actual sales exceed the forecast benchmark sales by 100% at anytime after the implementation of the regulation, a rulemaking for an energy conservation standard for that lamp type is automatically triggered. More information is available at http://www.regulations.gov/#!documentDetail;D=EERE-2011-BT-NOA-0013-0013

Requirements: General service incandescent lamps, intermediate base incandescent lamps and candelabra base incandescent lamps.

(1) The energy conservation standards in this paragraph apply to general service incandescent lamps:

(i) Intended for a general service or general illumination application (whether incandescent or not);

(ii) Has a medium screw base or any other screw base not defined in ANSI C81.61 (incorporated by reference; see § 430.3); and

(iii) Is capable of being operated at a voltage at least partially within the range of 110 to 130 volts.

(A) General service incandescent lamps manufactured after the effective dates specified in the tables below, except as described in paragraph (x)(1)(B) of this section, shall have a color rendering index greater than or equal to 80 and shall have rated wattage no greater than and rated lifetime no less than the values shown in the table below:

GENERAL SERVICE INCANDESCENT LAMPS

Rated lumen ranges	Maximum rate wattage	Minimum rate life-time	Effective date
1490–2600	72	1,000 hrs	1/1/2012
1050–1489	53	1,000 hrs	1/1/2013
750–1049	43	1,000 hrs	1/1/2014
310–749	29	1,000 hrs	1/1/2014

(B) Modified spectrum general service a color rendering index greater than or lifetime no less than the values shown incandescent lamps manufactured after equal to 75 and shall have a rated in the table below: the effective dates specified shall have wattage no greater than and rated

MODIFIED SPECTRUM GENERAL SERVICE INCANDESCENT LAMPS

Rated lumen ranges	Maximum rate wattage	Minimum rate life-time	Effective date
1118–1950	72	1,000 hrs	1/1/2012
788–1117	53	1,000 hrs	1/1/2013
563–787	43	1,000 hrs	1/1/2014
232–562	29	1,000 hrs	1/1/2014

(2) Each candelabra base incandescent lamp shall not exceed 60 rated watts.

(3) Each intermediate base incandescent lamp shall not exceed 40 rated watts.

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

No further notes.

Section 3: Notes on Policy Interventions

No further notes.

Section 4: Notes on Cultural Issues

No further notes.