Introduction

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. Doing this ensures that comparison between the participating countries is done against a specific and consistent set of products.

The summary definition for this product is:

<table>
<thead>
<tr>
<th>Under Counter/ upright Refrigerators</th>
<th>Refrigerator with freezer (ice) compartment</th>
<th>Side-by-Side and Freezer top/Refrigerator bottom and Refrigerator top/Freezer bottom</th>
<th>Chest/Under Counter/Upright Freezer</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Single Grouping – collect data only)</td>
<td>(Single grouping – collect data only)</td>
<td>(Collect data on proportion of each type of unit in the market)</td>
<td>(Collect data on proportion of each type of unit in the market)</td>
</tr>
</tbody>
</table>

Where units are:

- From all climate classes (but collect data on specific climate class that may be useful for later analysis)
- Have freezer compartments with rated temperatures below -12 (all temperature ratings to refrigerator with freezer (ice) compartment)
- Differentiated (if possible) between units with peripheral water coolers and ice makers

Do not differentiate between

- Defrost Cycles including Manual/Cyclical/Automatic (although collect data in case normalisation is required)
- Controls mechanisms including manual, automatic and cyclical
- Built in and stand-alone units (but where differentiated in market, collect data to enable normalisation)
- Volume (but collect data on gross volumes as base metric)
- Climate class (but collect data on climate class in case future analysis required, plus data on related local test conditions for climate classes)

The detailed product definitions can be found at the Annex website: http://mappingandbenchmarking.iea-4e.org/
Energy Efficiency of New Fridge Freezers
Denmark

Key notes on Graph (See notes section 1)
- Best and worst product data is sourced from the Danish Utilities’ ELDA database.
- Average volumes are taken from a stock model and are therefore should only be viewed for indicative trends in new model volumes.

Issue date: August 2010
Energy Consumption of New Fridge Freezers

Denmark

Insufficient data available for analysis.
The information and analysis contained within this summary document is developed to inform policy makers. Whilst the information analysed was supplied by representatives of National Governments, a number of assumptions, simplifications and transformations have been made in order to present information that is easily understood by policy makers, and to enable comparisons with other countries. Therefore, information should only be used as guidance in general policy—it may not be sufficiently detailed nor robust for use in setting specific performance requirements. Details of information sources and assumptions, simplifications and transformations are contained within the document.

**Energy Efficiency in the Installed Fridge Freezer Stock Denmark**

**Key notes on Graph (See notes section 3)**
- Data derived from the Danish stock model ELMODEL-domestic.
Energy Consumption in the Installed Fridge Freezer Stock
Denmark

**Key notes on Graph (See notes section 4)**

- Data derived from the Danish stock model ELMODEL-domestic.
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Energy Consumption of New Freezers
Denmark

Insufficient data available for analysis.
Energy Efficiency in the Installed Freezer Stock
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Denmark

Domestic Cold Appliances

Energy Consumption of the Installed Freezer Stock Denmark

Key notes on Graph (See notes section 3)
- Data derived from the Danish stock model ELMODEL-domestic.

Issue date: August 2010
Major Policy Interventions (See notes Section 5)

EU Wide Regulations:

<table>
<thead>
<tr>
<th>Policy name</th>
<th>Period in force</th>
<th>Description</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC Energy Label ¹</td>
<td>1995 – 2010</td>
<td>Defines A to G efficiency classes</td>
<td>All cold appliances to be labelled – improvement in the average efficiency over time</td>
</tr>
<tr>
<td>EC MEPS (EuP)²</td>
<td>1999 – (July) 2010</td>
<td>Limit sales to A, B, C class, plus D &amp; E for chest freezers</td>
<td>All cold appliances - improvement in the average efficiency over time</td>
</tr>
<tr>
<td>EC Energy Label ³</td>
<td>2004-2010</td>
<td>Defines A+ and A++ classes</td>
<td>All cold appliances - improvement in the average efficiency over time</td>
</tr>
<tr>
<td>Industry Commitment ⁴</td>
<td>2002 - 2010</td>
<td>CECED commitment: only B or better (except chest freezers) on market by end 2004</td>
<td>Improvement in the average efficiency over time</td>
</tr>
</tbody>
</table>

² [www.opsi.gov.uk/si/si1997/19971941.htm](http://www.opsi.gov.uk/si/si1997/19971941.htm)
³ [www.opsi.gov.uk/si/si2007/uksi_20072037_en_1](http://www.opsi.gov.uk/si/si2007/uksi_20072037_en_1)


Issue date: August 2010
Cultural Issues (See Notes Section 6)

No Information provided.
Notes on data

Section 1: Notes on Product Efficiency

1.1 Test methodologies, Performance Standards and Labelling Requirements

Energy consumption is claimed according to the requirements of the EC energy label and the appropriate energy efficiency class allocated according to the calculations given in the energy label directives.

The test standard for EC energy labelling is EN 153 which calls upon the EN ISO 15502.

<table>
<thead>
<tr>
<th>Test Standard name</th>
<th>Date in force</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 153:2005</td>
<td>2005</td>
<td>Energy, temperature and volume of all types of domestic cold appliances are measured in accordance with test standard (BS) EN 153 and used for energy label declarations. EN 153 refers to EN ISO 15502:2005</td>
<td>Supersedes EN 153:1995 (withdrawn 30 June 2008). Although there is some debate as to which test standard is currently valid under UK law.</td>
</tr>
<tr>
<td>EN ISO 15502: 2005</td>
<td>2005</td>
<td>Defines characteristics and test methods</td>
<td>Prior to this standard there were four test standards for each of the main refrigerating appliance types</td>
</tr>
</tbody>
</table>
Specific information:

<table>
<thead>
<tr>
<th>External/ambient test temperature</th>
<th>25 ± 0.5°C (Deviations from 25°C within ± 0.5°C are corrected in accordance with EN 153:2006 Clause 15.2.1.)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Internal temperatures for the appliances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fridge compartment</td>
</tr>
<tr>
<td>Freezer compartment (3 or 4 star compartment)</td>
</tr>
</tbody>
</table>

1.2 Product Efficiency Graphic

Sources:

Efficiency data: Danish Utilities’ ELDA database.

Volume data: Danish stock model ELMODEL-domestic.

Key calculations undertaken:

Derived Total Model Volume: based on net volume (as defined in local regulations), multiply freezer by 2.15 (EU standard) to get equivalent fridge volume. Add this volume to the net fridge volume to establish the net total volume normalised to refrigerator. This volume is the Derived Total Volume

Derived Model Energy Consumption: based on total annual energy consumption under test conditions, multiply by factor to correct for external test temperature during test (3% addition in energy consumption for each degree C below 25 and 3% reduction for each degree C above 25). Reduce consumption by 5% if the unit has an ice maker. This energy consumption is the Derived Unit Energy Consumption

Derived Model Energy Efficiency: Equals Derived Model Energy Consumption divided by Derived Total Model Volume

Sales Weighted Energy Efficiency of New Models: (Sum of (Derived Model Energy Efficiency multiplied by sales volume of Model in year) for all Models) divided by (Sum of sales volume of all Models in year)

Model Weighted Energy Efficiency of New Models (used where no sales data is available): (Sum of Derived Model Energy Efficiency for all models sold in year) divided by (Number of Models sold in year).
Ave Product Volume: is the product weighted average volume of products sold in each year.

Section 2: Notes on Product Consumption
2.1 Test methodologies, Performance Standards and Labelling Requirements
Refer to section 1.1

2.2 Product Consumption Graphic
None

Section 3: Notes on Efficiency of Stock
Source: Danish stock model ELMODEL-domestic.

Section 4: Notes on Consumption of Stock
Source: Danish stock model ELMODEL-domestic.

Section 5: Notes on Policy Interventions
Program Type: Mandatory Label Year Published: 03/07/2003
Economy: EU Member Countries Year Effective: 2004
Implementing Agency: National bodies of EU member Countries

Description:
The European Commission has now formally adopted a new directive (2003/66/EC) which extends the existing A-G energy labelling scale for domestic refrigeration appliances through the introduction of 2 new high efficiency classes (A+ and A++) from 1 July 2004.


The framework directive provides a legal structure for the energy labeling of domestic appliances, requiring manufacturers and retailers to attach a label, including the energy performance, to the appliance when displayed for sale. The implementing directives describe what the indication should be for a specific appliance, given an energy consumption measured following a specified European test standard. These directives require EU member states to transpose the legal text into national law and have no legally binding meaning for citizens or companies.
Although a central directive is issued through the European Commission, each country needs to establish national legislation for the program to be enforced. Member States are responsible for all aspects of implementation including compliance, label accuracy, educational and promotional activities. Product suppliers need to provide proof of appliance efficiency and are also responsible for the supply of labels and brochures in appropriate languages.

This Directive shall apply to electric mains operated household refrigerators, frozen food storage cabinets, food freezers and their combinations. Appliances that may also use other energy sources, such as batteries, are excluded.

This directive is the amendment of the framework directive 94/2/EC implementing Council Directive 92/75/EEC for mandatory labeling scheme, which was agreed in 1992 and cancelled the framework directive 79/530/EEC.


**Directive 96/57/EC Refrigerators, Freezers and Combinations**
*Program Type:* Minimum Energy Performance Standard - Mandatory

*Product:* Refrigerator-freezers

*Economy:* EU Member Countries

*Year Published:* 03/09/1996

*Year Effective:* 03/09/1999


**Voluntary Commitment on Reducing Energy Consumption of Household Refrigerators, Freezers and their Combinations**
*Program Type:* Minimum Energy Performance Standard - Voluntary

*Product:* Refrigerator-freezers

*Economy:* EU Member Countries

*Description:* The European Commission has pursued voluntary agreement with the European Federation of Domestic Appliance Manufacturers (CECED) to improve the energy efficiency of household refrigerating appliances.

*Year Published:* 31/10/2002

*Year Effective:* Applicable from 2002-2010