

Country: Austria

Technology: Domestic refrigerated appliances

Sub Category: Refrigerators, refrigerator-freezers and freezers

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

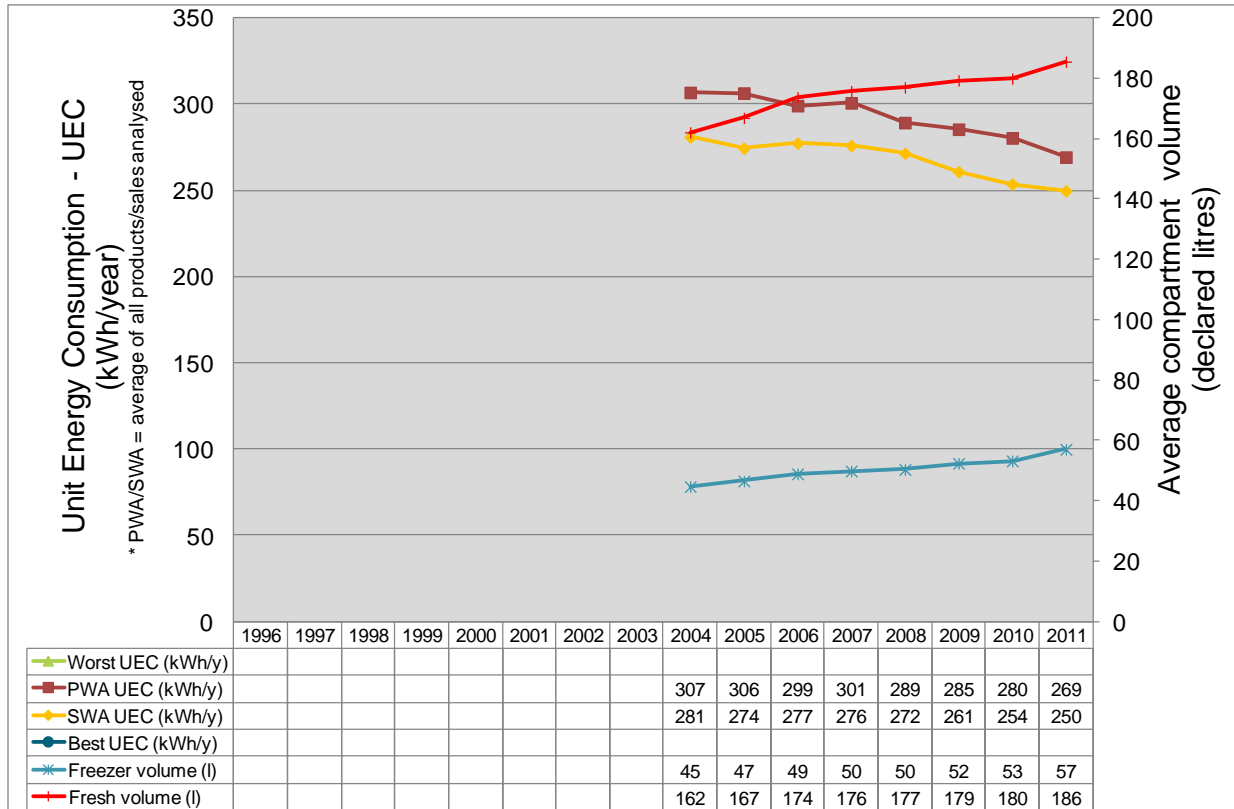
The summary definition for this product is:

M&B Category	Description
Refrigerator only and refrigerators with freezer compartments	The primary compartment is for fresh storage in the temperature range $5^{\circ}\text{C} \geq T > 0^{\circ}\text{C}$ and <ul style="list-style-type: none"> The unit has no freezer compartment, or The unit has a freezer compartment of any temperature rating but a volume of less than 14 litres, or The unit has a frozen food compartment of any volume that is rated as $0^{\circ}\text{C} \geq T > -15^{\circ}\text{C}$
Refrigerator/Freezer	The primary compartment for fresh storage in the temperature range $5^{\circ}\text{C} \geq T > 0^{\circ}\text{C}$ and the primary frozen food compartment is greater than 14 litres and has a rated temperature $T \leq -15^{\circ}\text{C}$
Freezer only	A unit where <i>all</i> compartments have a temperature rating $T \leq -15^{\circ}\text{C}$

The detailed product definition can be found at the Annex website:

<http://mappingandbenchmarking.iea-4e.org/matrix?type=product&id=13>

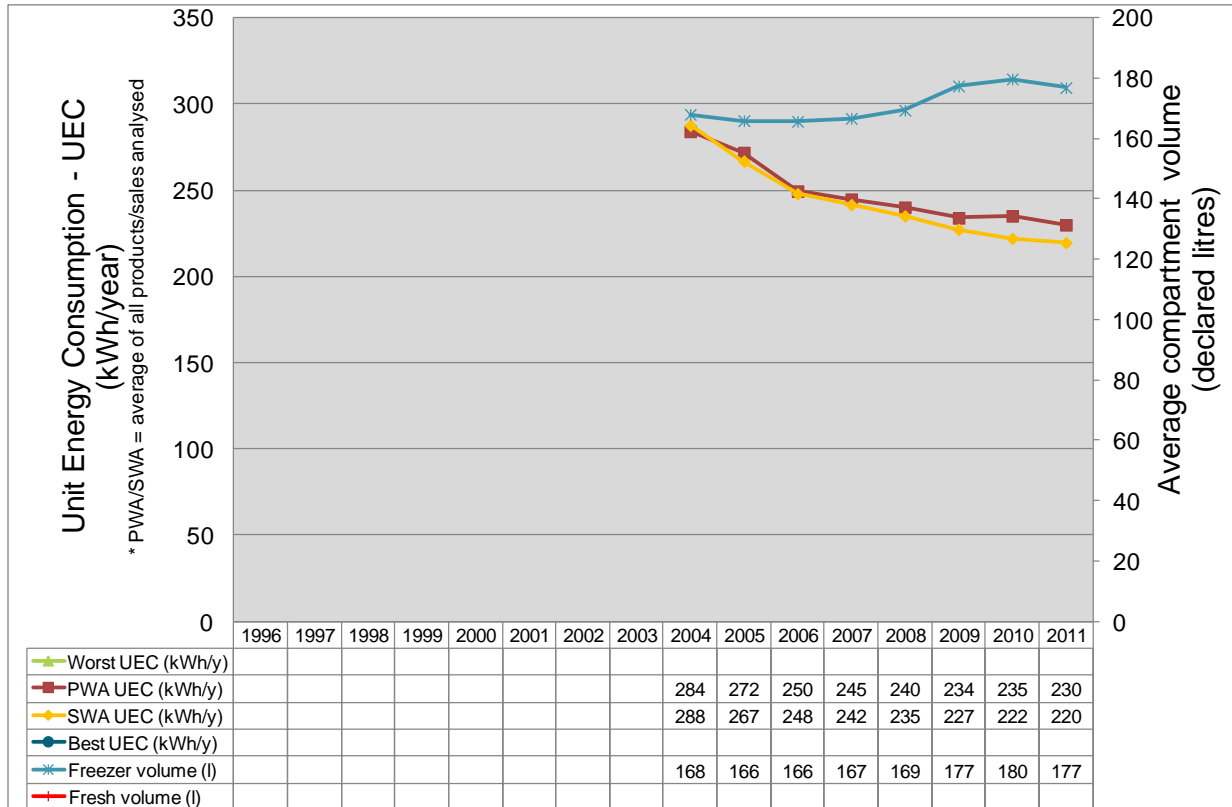
Unit Energy Consumption of new refrigerator freezers in Austria



Key notes on Graph (see notes section 1)

- Data was supplied to the Annex as market averages from a dataset that covers approximately 90% of sales in the market.
- No data on Best or Worst performing products was available.
- All volumes shown are sales weighted averages.

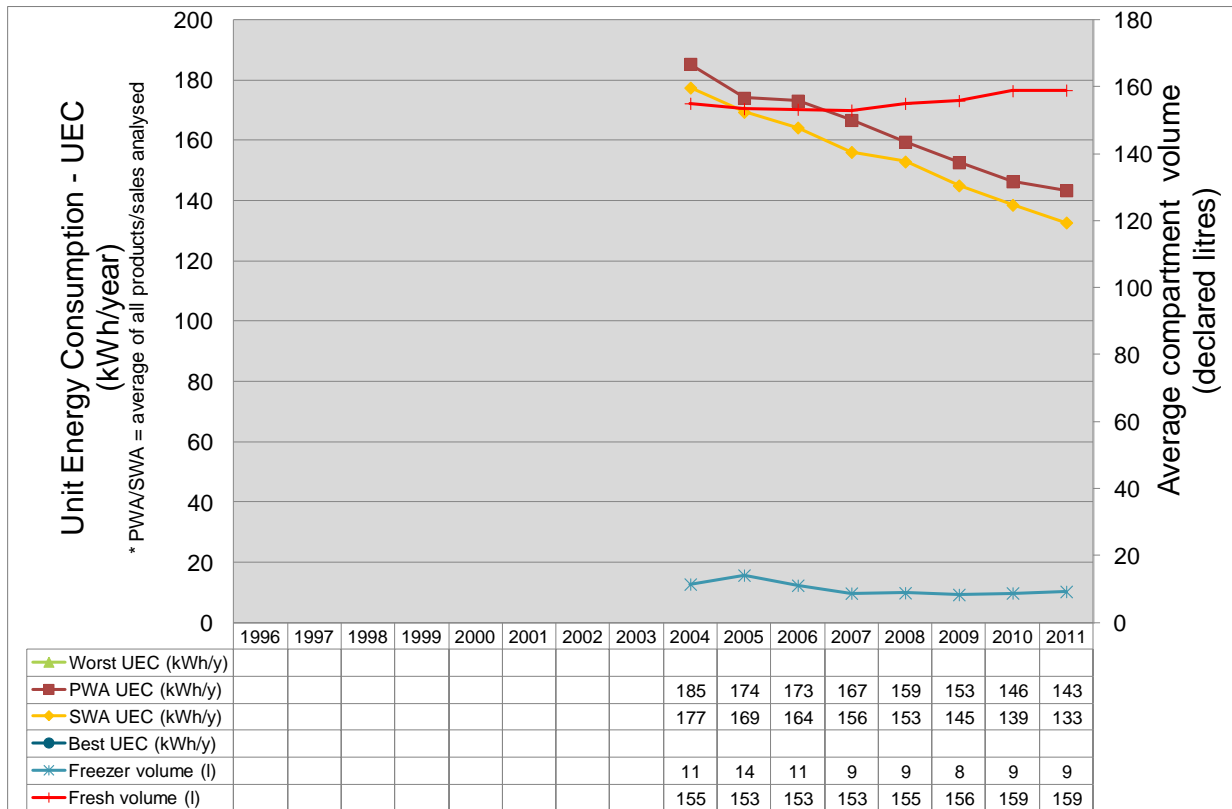
Unit Energy Consumption of new freezers in Austria



Key notes on Graph (see notes section 1)

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- No data on Best or Worst performing products was available.
- All volumes shown are sales weighted averages.

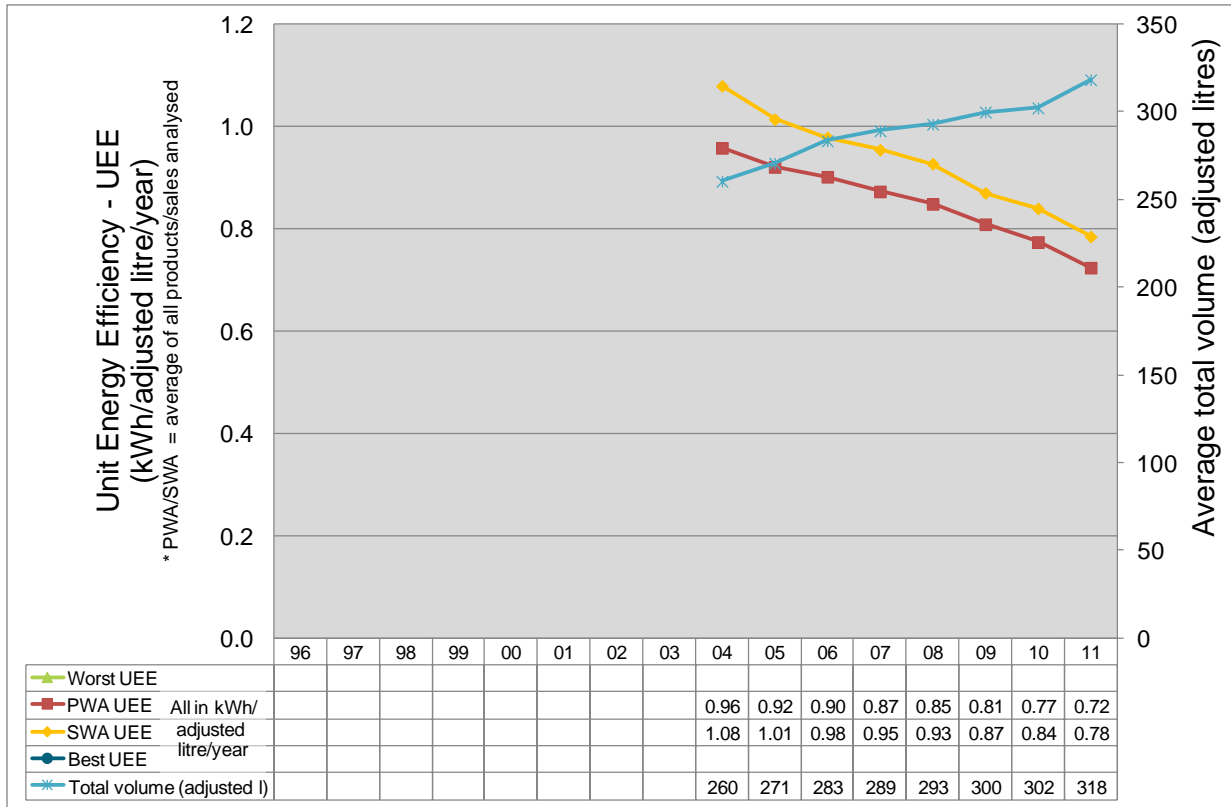
Unit Energy Consumption of new refrigerators and refrigerators with freezer compartments in Austria



Key notes on Graph (see notes section 1)

- Data was supplied to the Annex as market averages from a dataset that covers approximately 90% of sales in the market.
- No data on Best or Worst performing products was available.
- All volumes shown are sales weighted averages.

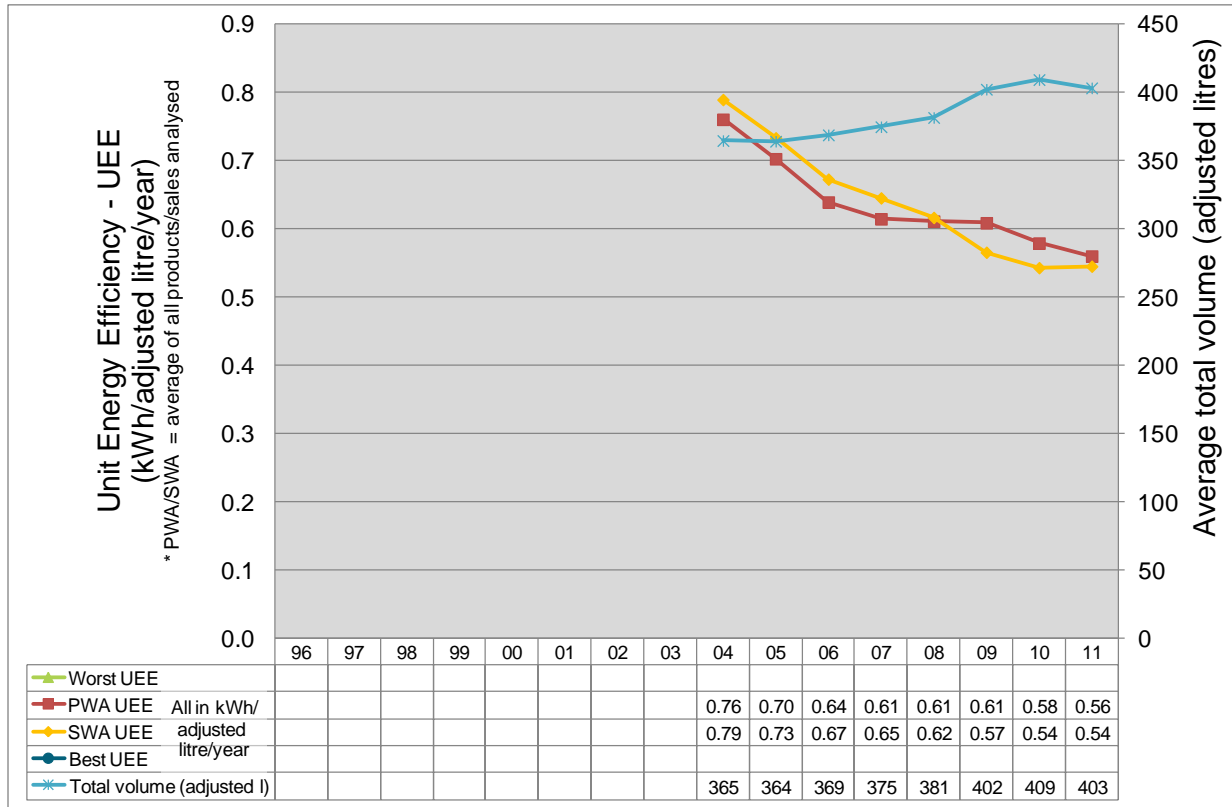
Unit Energy Efficiency of new refrigerator freezers in Austria



Key notes on Graph (see notes section 1)

- Data was supplied to the Annex as market averages from a dataset that covers approximately 90% of sales in the market.
- No data on Best or Worst performing products was available.
- The average total volumes shown (adjusted litres) are calculated using the temperatures and a slightly modified version of the volume adjustment method defined in EU/regulations. The average unit energy efficiency (UEE) is then calculated using these total adjusted volumes. These calculations are based on market average values for consumption, compartment volume and the percentage of sales with auto-defrost functionality. While the use of these market averages, as opposed to product level data, to calculate UEE will generally give reliable results, the approach introduces a level of uncertainty that cannot be quantified.
- All volumes shown are sales weighted averages.

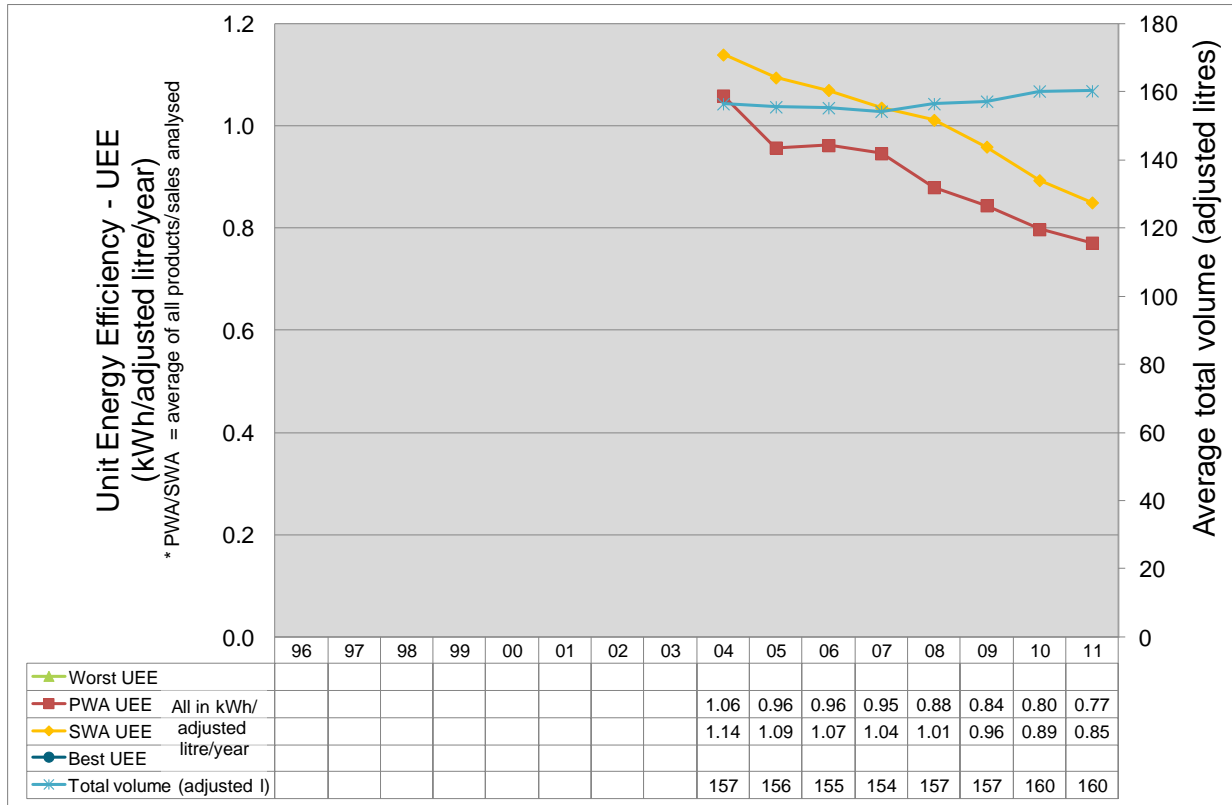
Unit Energy Efficiency of new freezers in Austria



Key notes on Graph (see notes section 1)

- Data was supplied to the Annex as market averages from a dataset that covers approximately 90% of sales in the market.
- No data on Best or Worst performing products was available.
- The average total volumes shown (adjusted litres) are calculated using the temperatures and a slightly modified version of the volume adjustment method defined in EU/regulations. The average unit energy efficiency (UEE) is then calculated using these total adjusted volumes. These calculations are based on market average values for consumption, compartment volume and the percentage of sales with auto-defrost functionality. While the use of these market averages, as opposed to product level data, to calculate UEE will generally give reliable results, the approach introduces a level of uncertainty that cannot be quantified.
- All volumes shown are sales weighted averages.

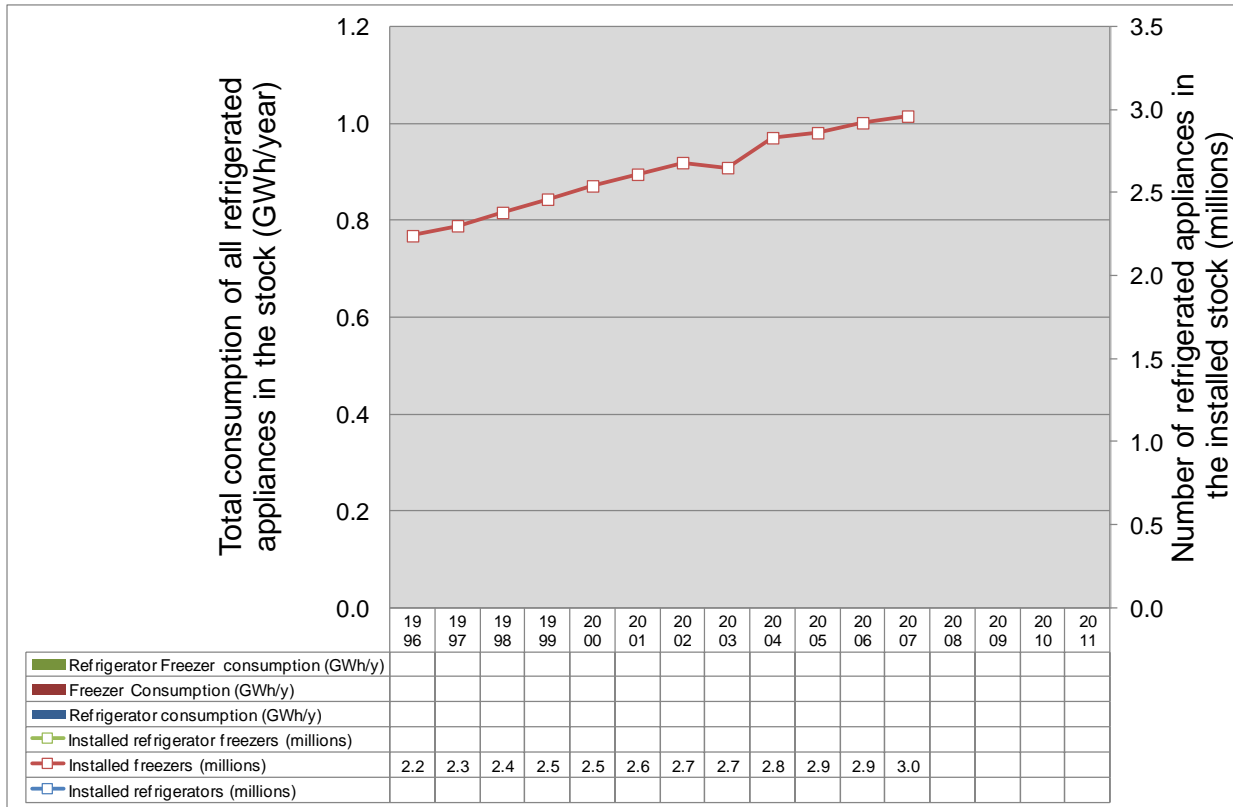
Unit Energy Efficiency of new refrigerators and refrigerators with freezer compartments in Austria



Key notes on Graph (see notes section 1)

- Data was supplied to the Annex as market averages from a dataset that covers approximately 90% of sales in the market.
- No data on Best or Worst performing products was available.
- The average total volumes shown (adjusted litres) are calculated using the temperatures and a slightly modified version of the volume adjustment method defined in EU/regulations. The average unit energy efficiency (UEE) is then calculated using these total adjusted volumes. These calculations are based on market average values for consumption, compartment volume and the percentage of sales with auto-defrost functionality. While the use of these market averages, as opposed to product level data, to calculate UEE will generally give reliable results, the approach introduces a level of uncertainty that cannot be quantified.
- All volumes shown are sales weighted averages.

Energy Consumption of the installed stock of refrigerated appliances in Austria



Key notes on Graph (see notes section 2)

- Information shown is on the installed number of products only. No data available on the total consumption of the installed stock was available to the Annex at the time of publication.

Major Policy Interventions (see notes section 3)

EU Wide Regulations:

Policy name	Period in force	Description	Impact <i>Relative impact of policy</i>
EC Energy Label ¹	1995 – 2010	Defines A to G efficiency classes	All domestic refrigeration appliances to be labelled – improvement in the average efficiency over time
EC MEPS (EuP) ²	1999 – (July) 2010	Limit sales to A, B, C class, plus D & E for chest freezers	All domestic refrigeration - improvement in the average efficiency over time
Industry Commitment ³	2002 - 2010	CECED commitment: only B or better (except chest freezers) on market by end 2004	Improvement in the average efficiency over time
EC Energy Label ⁴	2004-2010	Defines A+ and A++ classes	All domestic refrigeration - improvement in the average efficiency over time
EC MEPS (EuP) ⁵	July 2010 July 2012	Limits sales to products to those reaching at least A class. Limits sales to products attaining at least A+ class. (note that the maximum EEI requirement for A+ is lowered in 2014)	All domestic refrigeration - improvement in the average efficiency over time

¹ www.legislation.hmso.gov.uk/si/si1994/Uksi_19943076_en_1.htm.

² <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1996:236:0036:0043:EN:PDF>

³ "Voluntary commitment of reducing energy consumption of household refrigerators, freezers and their combinations (2002-2010)" 31st October 2002.

<http://www.ceced.eu/ICECED/easnet.dll/ExecReq/Redirection?eas:oldfilename=/community/files/296/phpXLy1ow/UICCOLD2002.pdf>

⁴ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:170:0010:0014:EN:PDF>

⁵ Directive 96/57/EC repealed and replaced by Regulation 2009/643/EC <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:191:0053:0068:EN:PDF>

Policy name	Period in force	Description	Impact <i>Relative impact of policy</i>
EC Energy Label ⁶	2011-	Introduces new labelling format and the introduction of A+++. Also slightly revises EEI definition of A+.	All domestic refrigeration - improvement in the average efficiency over time

Other Relevant Interventions Within Austria

The Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services (deadline for the transposition of the Directive into Austrian national law was May 2008).

Within the Energy Service Directive – ESD (directive 2006/32/EC), Austria is obliged to improve the energy efficiency by 9% by 2016 compared to the business as usual scenario 2001-2005. Voluntary agreements to support energy savings with energy suppliers, distributors and trading associations and an Agreement between the federal, state and the provincial governments concerning issues on energy efficiency competence are being implemented.

Austria revised its energy strategy in April 2009, following the establishment of a new government. One of the goals of this strategy is to limit Austria's final energy consumption for the year 2020 to the 2005 level, which is 1100 PJ.

Programs:

There are programs in Austria which aim to improve energy efficiency by granting subsidies for suitable measures for the household sector. These subsidies have usually been designed as a contribution towards investment costs or as a loan with reduced interest rates.

For purchasing energy efficient electrical appliances subsidies can be obtained from some regional electrical utilities. These subsidies are granted to all customers of the respective utility, regardless of whether the customer is the owner of a private household, an enterprise or a public institution.

The most innovative and popular measure in Austria is the long-term program for active climate protection (klima: aktiv), that was launched in 2004 from the Environmental Ministry (Lebensministerium). The program's main focus lies on increasing the market share of energy efficient products and services. The overall goal is to reduce the greenhouse gas emissions. As part of the initiative klima: aktiv, the program of "Top products" – Platform for

⁶Directive 94/2/EC repealed and replaced by Regulation 1060/2010 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:314:0017:0046:EN:PDF>



energy efficient appliances provides information on best and worst available products in the market (<http://www.topprodukte.at>), for household and commercial users.

Approximately 33000 household cold appliances were exchanged through the “UFH Trennungsprämie“ program between 2009 and 2010 in Austria (8186 Refrigerators, 7251 Refrigerator-freezer combinations, 12847 freezers as well as 4532 freezer cabinets). The 2,94 million Euros program administered by the private organization UFH and supported by manufacturers promoted the exchange of old products for energy saving products of class A++ from all brands. Consumers buying a new model from the most efficient appliances (and bringing back their old devices at the same time) received a payment of 50 Euros for products up to 90 cms high; or 100 Euros for devices over 90 cms high, and for freezer (only) (Ref 3).

Cultural Issues (see notes section 4)

From the 2008 Micro-census it is known that all participating households have one refrigerator, and 19.4 % have a second device. In the households with more than one device, these are newer than in households with only one device, showing that the second device is not necessarily replacing an old, less functioning one, but might show other influencing trends such as size of household or living space (Larger household and larger living space = increasing number of second refrigerators) . Approximately 9% of households have an A+ or A++ refrigerator, 25% have an A class, and 9% have a B or C class device.

The half of the participating households has a freezer (independent freezer) and 9% have at least two devices. Again with the increase in household size, increases the number of freezers. Only 38% of households with one person have a freezer, but 58% of the households with two people have a freezer, and almost 80% households with three or more people have a freezer. 12,3% of the total electricity consumption in households for year 2008 (average of 4417 kWh) corresponded to refrigerators and freezers⁷ (Ref 1).

⁷ „Strom- und Gastagebuch 2008: Strom- und Gaseinsatz sowie Energieeffizienz österreichischer Haushalte. Auswertung Gerätebestand und Einsatz“. Statistik Austria/Direktion Raumwirtschaft, Energie, Wien 2009.



Section 1. Unit Energy Consumption and Unit Energy Efficiency Graphics

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.

Test Standard name	Date in force	Description	Comments
EN 153:2005 Methods of measuring the energy consumption of electric mains operated household refrigerators, frozen food storage cabinets, food freezers and their combinations, together with associated characteristics.	2005	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	Supersedes EN 153:1995 (withdrawn 30 June 2008). Although there is some debate as to which test standard is currently valid under UK law.
EN ISO 15502: 2005 Household refrigerating appliances, refrigerator freezers – characteristics and test methods.	2005	Defines characteristics and test methods	Prior to this standard there were four test standards for each of the main refrigerating appliance types

Specific information:

External/ambient test temperature

25 ± 0.5°C (Deviations from 25°C within ± 0.5°C are corrected in accordance with EN 153:2006 Clause 15.2.1.)



Internal temperatures for the appliances

<ul style="list-style-type: none"> Fridge compartment 	Mean temp of +5°C (no tolerance because in general, the energy consumption at this temp is obtained by interpolation.)
<ul style="list-style-type: none"> Freezers (0-2 Star) 	Various classifications incorporating temperature ranges from +3 to -18°C
<ul style="list-style-type: none"> Freezer compartment (3 or 4 star compartment) 	-18°C or colder

1.2 Product Classifications

(Source: COMMISSION REGULATION (EC) No 643/2009⁸)

Group	Description
1	Refrigerator with one or more fresh-food storage compartments
	Refrigerator-cellar, cellar and wine storage appliance
3	Refrigerator-chiller and refrigerator with a 0-star compartment
4	Refrigerator with a 1-star compartment
5	Refrigerator with a 2-star compartment
6	Refrigerator with a 3-star compartment
7	Refrigerator-freezer
8	Upright freezer
9	Chest freezer
10	Multi-use and other appliances

1.3 Data sources and limitations

Sources: Data is sourced from GfK data. Data is split by refrigerators with a 0*, 1* or 2* rated freezer compartment, refrigerators with a 3* or 4* freezer compartment split by volumes either less or more than 14 litres and Freezers. Data was supplied as market averages in the form:

Metric	Year
Product Weighted Energy Consumption [kWh]	
Sales Weighted Energy Consumption [kWh]	
Product Weighted Freezer Volume [Litres]	
Product Weighted Fridge Volume [Litres]	
Sales Weighted Freezer Volume [Litres]	
Sales Weighted Fridge Volume [Litres]	

⁸ Directive 96/57/EC repealed and replaced by Regulation 2009/643/EC <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:191:0053:0068:EN:PDF>



Metric	Year
Sales Units With auto defrost %	
Sales Units Without auto defrost %	
Sales Units Built in/under %	
Sales Units With ice-cube dispenser %	
Coverage %	
Number of products	
Sales [Thousand Units]	

The datasets submitted are reported to cover between 88%-89% of sales in the Austrian market. The number of models and sales analysed by product category are presented in the tables below.

Refrigerator freezers:

	2004	2005	2006	2007	2008	2009	2010	2011
Products in dataset	1077	1185	1356	1477	1643	1858	1805	2100
Products analysed	1077	1185	1356	1477	1643	1858	1805	2100
% products included	100%	100%	100%	100%	100%	100%	100%	100%
Sales in dataset ('000s)	116	131	137	144	148	161	158	160
Sales analysed ('000s)	116	131	137	144	148	161	158	160
% Sales included	100%	100%	100%	100%	100%	100%	100%	100%

Freezers:

	2004	2005	2006	2007	2008	2009	2010	2011
Products in dataset	673	709	740	760	723	722	703	777
Products analysed	673	709	740	760	723	722	703	777
% products included	100%	100%	100%	100%	100%	100%	100%	100%
Sales in dataset ('000s)	102	104	98	101	104	114	100	94
Sales analysed ('000s)	102	104	98	101	104	114	100	94
% Sales included	100%	100%	100%	100%	100%	100%	100%	100%

Refrigerators and refrigerators with freezer compartments:

	2004	2005	2006	2007	2008	2009	2010	2011
Products in dataset	581	587	668	642	681	750	717	777
Products analysed	581	587	668	642	681	750	717	777
% products included	100%	100%	100%	100%	100%	100%	100%	100%
Sales in dataset ('000s)	81	80	79	83	83	85	80	84
Sales analysed ('000s)	81	80	79	83	83	85	80	84
% Sales included	100%	100%	100%	100%	100%	100%	100%	100%

1.4 Data manipulations and specific limitations

1.4.1 Overview of the mapping and benchmarking process

There are essentially 4 stages to the mapping and benchmarking process for domestic refrigerated appliances as detailed below:

Stage:	Description
1. Data Cleaning and Pre-processing	<ul style="list-style-type: none"> • Removal of duplicate entries • Pre-processing to align all terminology and reported test values to be consistent between countries • Assigning of local, mapping and benchmarking and EU categories • Etc
2. Production of mapping outputs	<ul style="list-style-type: none"> • Production of mapping outputs based on local test methodologies
3. Normalisation of test data	<ul style="list-style-type: none"> • Calculation of adjusted volumes • Assignment Unit Energy Consumption to individual compartments • Normalisation for test temperature differentials
4. Production of Benchmarking outputs	<ul style="list-style-type: none"> • Post processing of benchmarking results • Production of benchmarking report

The details of this process are described in three supporting documents that accompany this mapping report:

1. The **product definition** describes the exact characteristics of the product being analysed; the energy metrics that will be calculated; the technological, usage and other characteristics that will be considered; and any other policy or cultural information that will be collected
2. The **summary of approach** provides an overview of the mapping and benchmarking process for analyzing domestic refrigerated appliances for all countries and regions.
3. The **actions and assumptions** report details the specific steps that were necessary to allow the data submitted from a specific country or region to be included in the mapping and benchmarking process as described in the product definition and summary of approach.

All these documents can be found at the annex website:

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

by clicking on the "X" in the matrix table that aligns with *Austria* and *Domestic refrigerated appliances 2012*.

1.4.2 Specific cautions for this data

Please refer to the actions and assumptions document described in Section 1.4.1.



Section 2. Energy Consumption of the installed stock of refrigerated appliances graphic

2.1 Data sources and limitations

No data is available other than the number of freezers installed (as shown in graphic) and volumes for products in 1996. These volumes are:

For refrigerator/freezer combination units

- Refrigerator Compartment = 159.74 litres
- Freezer Compartment = 148.26 litres

For Freezer only units

- Freezer Compartment = 358.38 litres

The data is an extract of data gathered for Austria for the ODYSSEE project (www.odyssee-indicators.org). The ODYSSEE projects relies on databases that contain detailed data on the energy consumption drivers by end-use and sub-sector as well as energy efficiency and CO2 related indicators. It is believed the original source of data is GfK. Source:

Section 3. Major Policy Interventions

3.1 Pan-European Policy

3.1.1 Mandatory Legislation:

COMMISSION REGULATION (EC) No 1060/2010⁹

Program Type: Mandatory Label

Year Published: 28/09/2010

Year Effective: 30/11/2011¹⁰

Economy: EU Member Countries

Implementing Agency: National bodies of EU member Countries

Description:

Revises energy labelling scale for domestic refrigeration appliances through the introduction of a new high efficiency class (A+++ where unit EEI<22) from 30 November 2011. The regulations also revises the maximum EEI value for A+ declarations from EEI<44 to EEI<42 from 1 July 2014.

This deregulated regulation repeals and replaces by Directive 96/57/EC.

COMMISSION REGULATION (EC) No 643/2009 (implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for household refrigerating appliances)¹¹

Program Type: Mandatory Minimum Performance Standards

Year Published: 22/07/2009

Year Effective: 1 July 2010 and 1 July 2014

Economy Affected: EU Member Countries

Implementing Agency: National bodies of EU member Countries

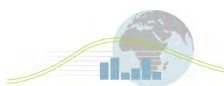
Description:

Technically this regulation repeals Directive 96/57/EC and places a requirement on national governments to enact appropriate legislation to restrict the sales of domestic refrigerated

⁹Directive 94/2/EC repealed and replaced by Regulation 1060/2010 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:314:0017:0046:EN:PDF>

¹⁰ Implementation of some requirements delayed to 30/3/2012

¹¹ Directive 96/57/EC repealed and replaced by Regulation 2009/643/EC <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:191:0053:0068:EN:PDF>



products to those where the performance exceeds a specified energy efficiency index (EEI) as follows:

Application date	EEI	Equivalent EU Label
01 July 2010	EEI < 55	A
01 July 2012	EEI < 44	A+
01 July 2014	EEI < 42	A+ ¹²

In general, other requirements laid out in the preceding directives detailed below remain the same.

Commission Directive 2003/66/EC¹³

Program Type: Mandatory Label

Year Published: 03/07/2003

Year Effective: 2004

Economy: EU Member Countries

Implementing Agency: National bodies of EU member Countries

Description:

Revises and 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.

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

Directive 96/57/EC¹⁴

Program Type: Minimum Energy Performance Standard - Mandatory

Product: Refrigerator-freezers

Economy: EU Member Countries

Year Published: 03/09/1996

¹² Note the maximum required EEI for A+ units were reduced from 44 to 42 from 1 July 2014

¹³ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:170:0010:0014:EN:PDF>

¹⁴ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1996:236:0036:0043:EN:PDF>



Year Effective: 03/09/1999

Implementing Agency: National bodies of EU member Countries

Description:

Introduces Minimum Energy Performance Standards for all domestic refrigeration types. In effect removes all products below European Label C from the market (labels D and E allowed for chest freezers).

Commission Directive 94/2/EC¹⁵

Program Type: Mandatory Label

Year Published: 22/09/1992

Year Effective: 21/01/1994

Economy: EU Member Countries

Implementing Agency: National bodies of EU member Countries

Description:

Introduces the EU's A-G energy label for refrigerated domestic appliances.

3.1.2 Voluntary Initiatives

Voluntary Commitment on Reducing Energy Consumption of Household Refrigerators, Freezers and their Combinations¹⁶

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

Implementing Agency: European Federation of Domestic Appliance Manufacturers - <http://www.cecед.org/>

¹⁵ www.legislation.hmso.gov.uk/si/si1994/Uksi_19943076_en_1.htm.

¹⁶ "Voluntary commitment of reducing energy consumption of household refrigerators, freezers and their combinations (2002-2010)" 31st October 2002. <http://www.cecед.eu/ICECED/easnet.dtl/ExecReq/Redirection?eas:oldfilename=/community/files/296/phpXLy1ow/UICCOLD2002.pdf>



3.2 Austria Specific Policy

The majority of the other policy information is derived from three sources:

- Ref 1: „Strom- und Gastagebuch 2008: Strom- und Gaseinsatz sowie Energieeffizienz österreichischer Haushalte. Auswertung Gerätebestand und Einsatz“. Statistik Austria/Direktion Raumwirtschaft, Energie, Wien 2009.
- Ref 2: “Energy Efficiency Policies and Measures in Austria”. Monitoring of Energy Efficiency in EU 27, Norway and Croatia (ODYSSEE-MURE). Austrian Energy Agency. Vienna, Austria September 2009.
- Ref 3: UFH Umweltforum Haushalt GmbH & Co KG:
http://www.ufh.at/index.php?i_ca_id=412&CMSFRONT=vueumft

Section 4. Cultural Issues

The majority of the cultural issues information is derived from two sources:

- Ref 1: „Strom- und Gastagebuch 2008: Strom- und Gaseinsatz sowie Energieeffizienz österreichischer Haushalte. Auswertung Gerätebestand und Einsatz“. Statistik Austria/Direktion Raumwirtschaft, Energie, Wien 2009.
- Ref 2: “Energy Efficiency Policies and Measures in Austria”. Monitoring of Energy Efficiency in EU 27, Norway and Croatia (ODYSSEE-MURE). Austrian Energy Agency. Vienna, Austria September 2009.