

Country: Switzerland

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:

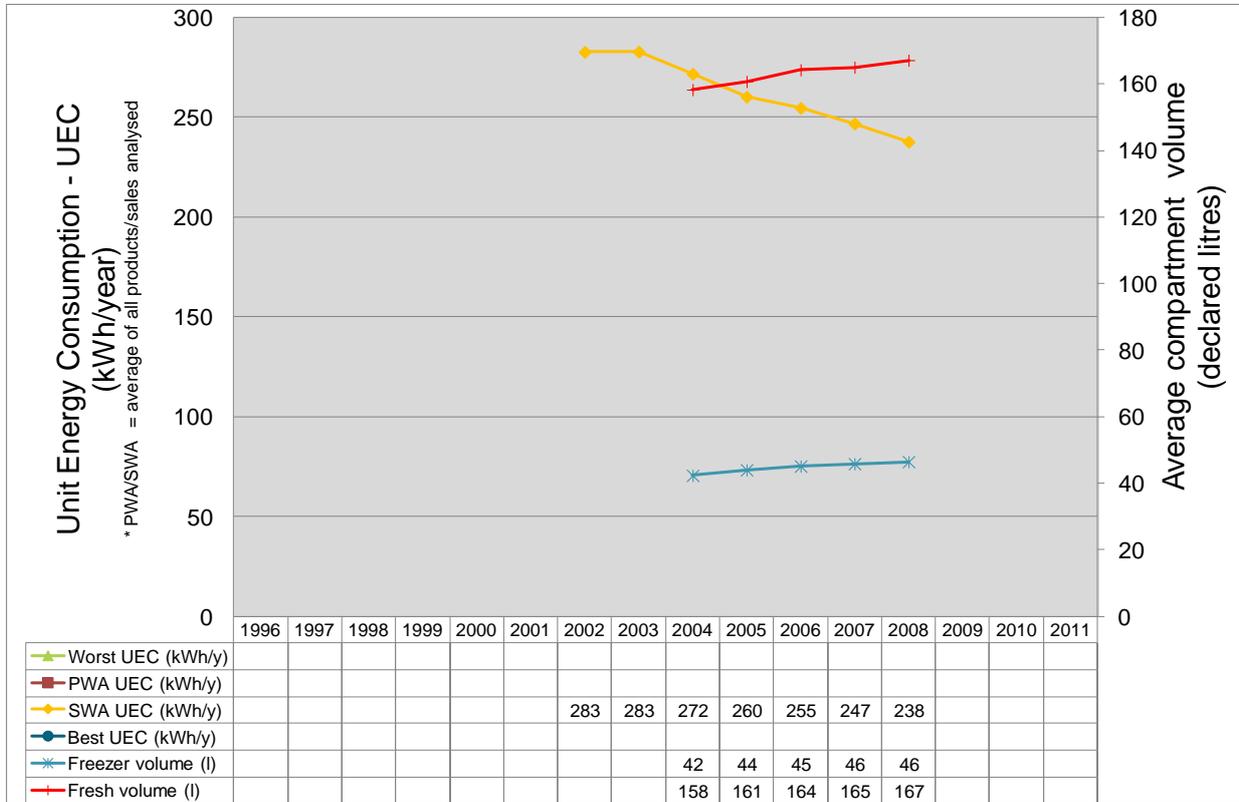
M&B Category	Description
Refrigerator only and refrigerators with freezer compartments	<p>The primary compartment is for fresh storage in the temperature range $5^{\circ}\text{C} \geq T > 0^{\circ}\text{C}$ and</p> <ul style="list-style-type: none"> • The unit has no freezer compartment, or • The unit 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	<p>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 $T \leq -15^{\circ}\text{C}$</p>
Freezer only	<p>A unit where <i>all</i> compartments have a temperature rating $T \leq -15^{\circ}\text{C}$</p>

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

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



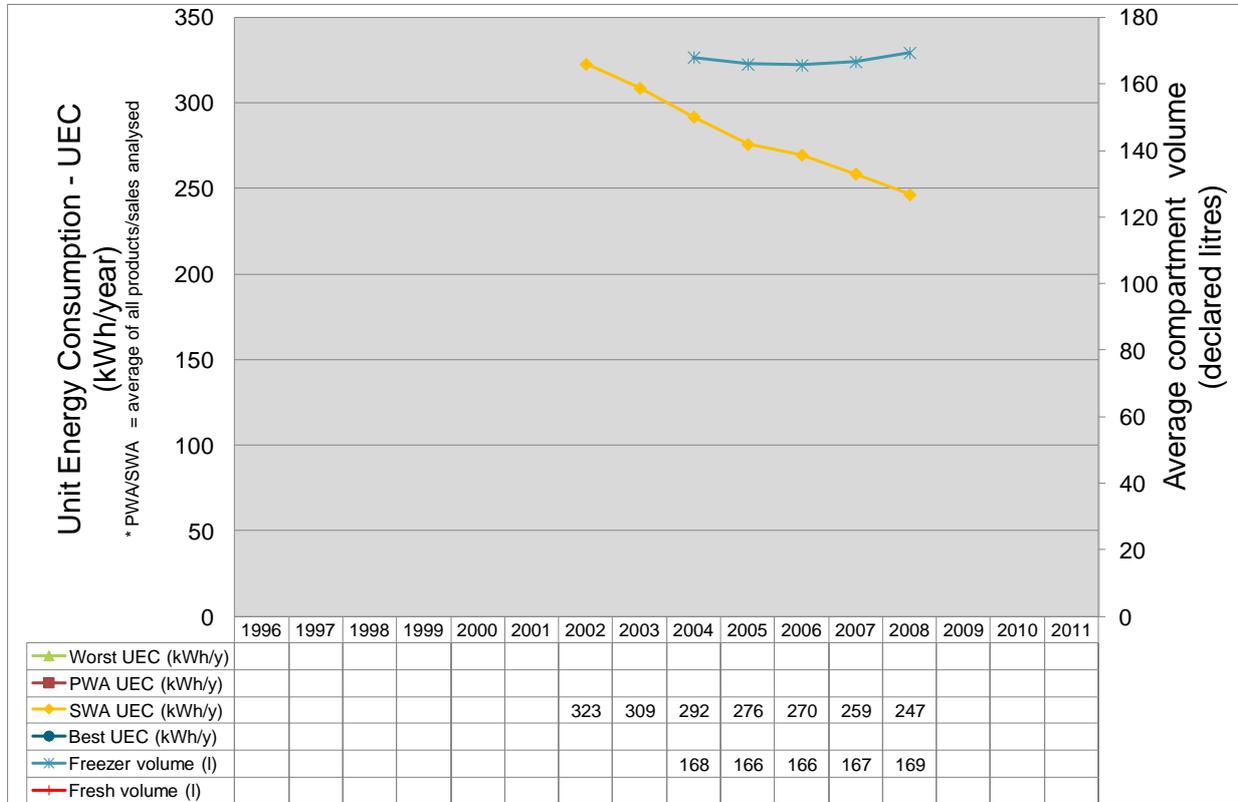
Unit Energy Consumption of new refrigerators and refrigerator freezers in Switzerland



Key notes on Graph (see notes section 1)

- Unit Energy Consumption (UEC) data was supplied as market averages combining both refrigerators and refrigerator-freezer combinations and was taken directly from the SwissEnergie report of the period 2008 (published in December 2009).
- **All volumes shown are sales weighted averages for Austria.** No Swiss data was available for product volumes, but Austrian data is presented as it is believed to be a reasonable approximation of models on sale in Switzerland.
- No data on Best or Worst performing products was available.

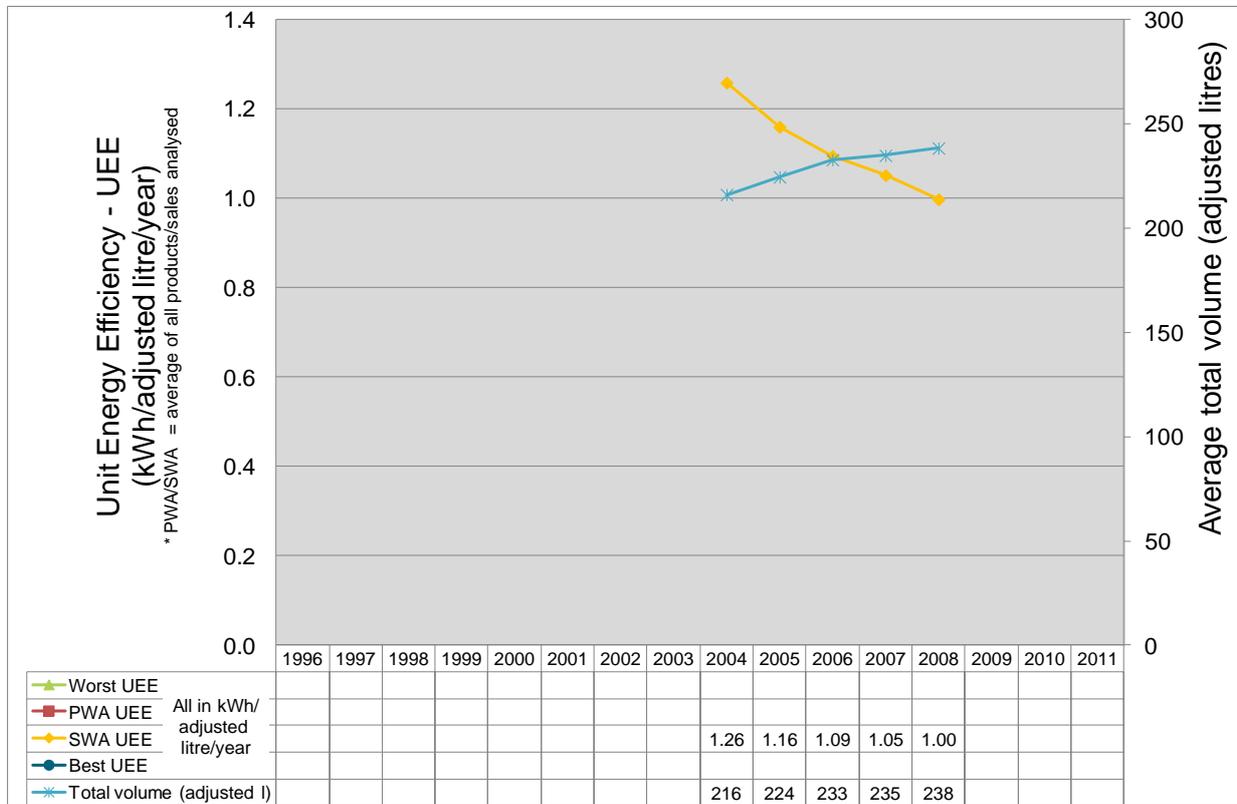
Unit Energy Consumption of new freezers in Switzerland



Key notes on Graph (see notes section 1)

- Unit Energy Consumption (UEC) data was supplied as market averages taken directly from the SwissEnergie report for 2008 (published in December 2009).
- The figures include upright and under counter models. Deep-freeze cabinets are also included (13% share sold in 2008). Of the freezer units, upright freezers account for 87% of units sold in 2008). 97% of the upright freezer are standing alone, 3% are built-in.
- All volumes shown are sales weighted averages for Austria. No Swiss data was available for product volumes, but Austrian data presented as it is is believed to be a reasonable approximation of models on sale in Switzerland.
- No data on Best or Worst performing products was available.

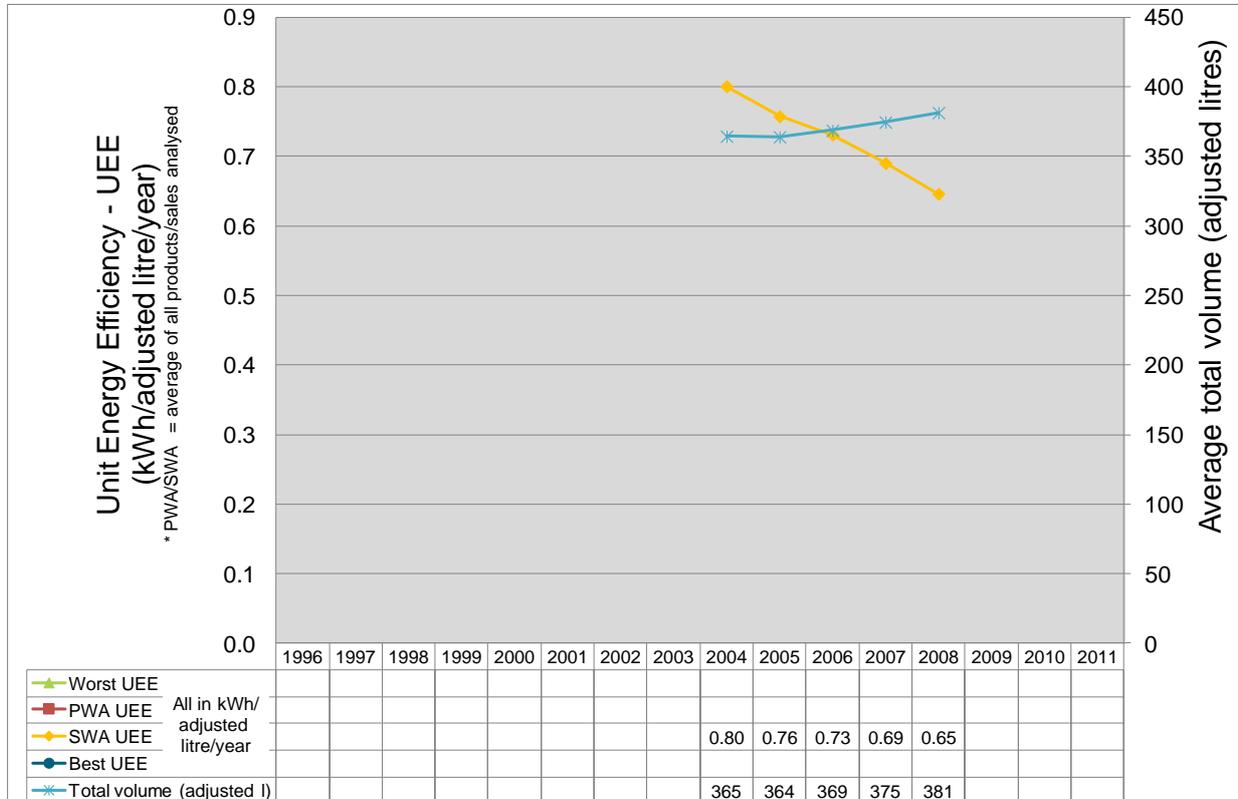
Unit Energy Efficiency of new refrigerators and refrigerator freezers in Switzerland



Key notes on Graph (see notes section 1)

- **Unit Energy Efficiency (UEE) is calculated from Swiss Unit Energy Consumption (UEC) data and Austrian volume data. Adjusted volumes shown are sales weighted averages for Austria.** No Swiss volume data was available and Austrian data is presented as it is believed to be a reasonable approximation of models in Switzerland.
- UEC data was supplied as market averages combining both refrigerators and refrigerator-freezer combinations and was taken directly from the SwissEnergie report of the period 2008 (published in December 2009).
- Furthermore, 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 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.
- As a result of these significant assumptions, UEE results should be viewed with caution.
- No data on Best or Worst performing products was available.

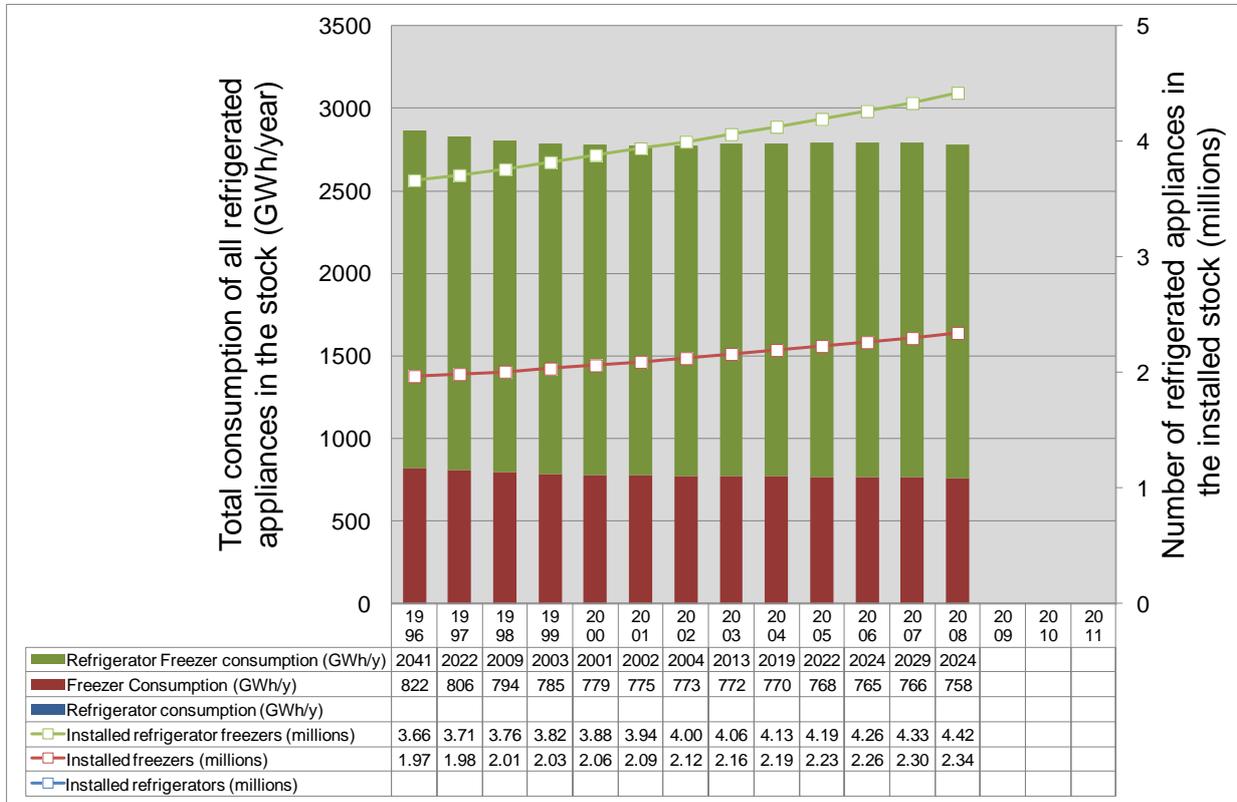
Unit Energy Efficiency of new freezers in Switzerland



Key notes on Graph (see notes section 1)

- **Unit Energy Efficiency (UEE) is calculated from Swiss Unit Energy Consumption (UEC) data and Austrian volume data. Adjusted volumes shown are sales weighted averages for Austria.** No Swiss volume data was available and Austrian data is presented as it is believed to be a reasonable approximation of models in Switzerland.
- Furthermore, 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 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.
- Unit Energy Consumption (UEC) data was supplied as market averages taken directly from the SwissEnergie report for 2008 (published in December 2009). The figures include upright and under counter models. Deep-freeze cabinets are also included (13% share sold in 2008). Of the freezer units, upright freezers account for 87% of units sold in 2008). 97% of the upright freezer are standing alone, 3% are built-in
- No data on Best or Worst performing products was available.

Energy Consumption of the installed stock of refrigerated appliances in Switzerland



Key notes on Graph (see notes section 2)

- This data is taken directly from the SwissEnergie report of the period 2008 (published in December 2009) and has not been processed specifically for this IEA 4E-Report.
- The refrigerator-freezer data shown includes refrigerators and refrigerators with freezer compartments as it was supplied in combination. Refrigerator-freezers are the most common products in the stock.

Major Policy Interventions (see notes section 3)

Swiss actions:

The following policy interventions are the primary Swiss actions on refrigerated appliances:

Policy name	Period in force	Description	Impact <i>Relative impact of policy</i>
Introduction of EC Energy Label ¹ in Switzerland	2002	Defines A to G efficiency classes	All cold appliances to be labelled – improvement in the average efficiency over time
Foundation of Swiss Energy agencies	2002	Swiss Energy agency for electrical appliances	The agency supports actions for promoting the efficiency in electrical household appliances
Introduction of MEPS for cold appliances	January 2010	Efficient class A	All cold appliances with an efficiency less than A cannot be sold anymore
Introduction of MEPS for cold appliances	January 2011	Efficient class A+	All cold appliances with an efficiency less than A+ cannot be sold anymore
Introduction of more stringent MEPS for cold appliances (exceptions: - Wine chiller EEI < 55 - non-compressor cold appliances until 60l - EEI < 125 - from July 2015 EEI < 110	January 2013	EEI < 33 (new class A++)	Cold appliances with an efficiency less than A++ cannot be sold anymore

EU Wide Regulations:

The following European policy intervention influences as well the Swiss actions:

Policy name	Period in force	Description	Impact <i>Relative impact of policy</i>
EC Energy Label ²	1995 – 2010	Defines A to G efficiency classes	All domestic refrigeration appliances to be labelled – improvement in the average efficiency over time

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

² www.legislation.hmso.gov.uk/si/si1994/Uksi_19943076_en_1.htm.



Policy name	Period in force	Description	Impact <i>Relative impact of policy</i>
EC MEPS (EuP) ³	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 ⁴	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 ⁵	2004-2010	Defines A+ and A++ classes	All domestic refrigeration - improvement in the average efficiency over time
EC MEPS (EuP) ⁶	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
EC Energy Label ⁷	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

³ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1996:236:0036:0043:EN:PDF>

⁴ "Voluntary commitment of reducing energy consumption of household refrigerators, freezers and their combinations (2002-2010)" 31st October 2002.
<http://www.cecce.eu/ICECED/easnet.dll/ExecReq/Redirection?eas:oldfilename=/community/files/296/phpXLY1ow/UICCOLD2002.pdf>

⁵ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:170:0010:0014:EN:PDF>

⁶ 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>

⁷ Directive 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>



Cultural Issues (see notes section 4)

The selling of freezers is stable since about 2004 on a level of about 105'000 to 110'000 units. The share of larger units (volume of over 300 l) is about 25%.

The change of freezer in the direction of A/A+/A++ is evident over the last few years. In 2007 the percentage of A-, A+ or A++-Upright models was around 92,3%. In 2006, this percentage was 80,8% and in 2005 only 78,5%.

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

UEC data Source: SwissEnergy: Project Report Energy efficient statistics, Period 2008, from the energy agency electrical appliances eae (published in December 2009). The datasets submitted are reported to cover 100% of sales in the Swiss market. The number of sales included by product category are presented in the tables below.

Refrigerators and refrigerator freezers:

	2002	2003	2004	2005	2006	2007	2008
Sales in dataset	257,100	268,594	258,903	264,605	276,017	274,743	279,222
Sales analysed	257,100	268,594	258,903	264,605	276,017	274,743	279,222
% Sales included	100%	100%	100%	100%	100%	100%	100%

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>



Freezers:

	2002	2003	2004	2005	2006	2007	2008
Sales in dataset	100,210	107,783	105,944	107,294	107,031	113,463	111,021
Sales analysed	100,210	107,783	105,944	107,294	107,031	113,463	111,021
% Sales included	100%	100%	100%	100%	100%	100%	100%

Austrian Volume data source: 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.

The market average GfK data was sales weighted to give the following tables of volumes that have been used in the Swiss analysis:

Austrian Refrigerators and refrigerator freezers:

	2004	2005	2006	2007	2008
Declared Fresh volume	158	161	164	165	167
Declared Freezer volume	42	44	45	46	46
% of models with auto defrost	2%	4%	5%	7%	9%
Adjusted volume	216	224	233	235	238

Austrian Freezers:

	2004	2005	2006	2007	2008
Declared Freezer volume	168	166	166	167	169
% of models with auto defrost	5%	10%	18%	23%	24%
Adjusted volume	365	364	369	375	381

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.

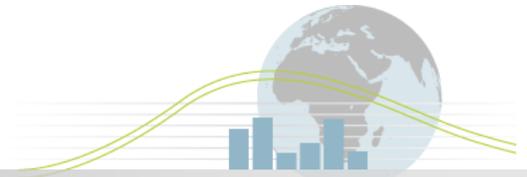
All these documents can be found at the annex website:

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

by clicking on the "X" in the matrix table that aligns with *Switzerland* 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

Source: SwissEnergy: Project Report Energy efficient statistics, Period 2008, from the energy agency electrical appliances eae (published in December 2009).



Section 3. Major Policy Interventions

3.1 Swiss Actions:

In 2002, Switzerland made labelling of domestic refrigeration products mandatory using the EU label.

In 2008 the Swiss energy law was revised and the following regulation is now in force:

- from 1.1.2010: only freezer with class A can be sold
- from 1.1.2011: only freezer with A+ (EEI<42) can be sold

3.2 Pan-European Policy

Swiss products are heavily influenced by the regulations in Europe. These regulations are as follows:

3.2.1 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

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>



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 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.

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>



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

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.

3.2.2 Voluntary Initiatives

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

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

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.



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

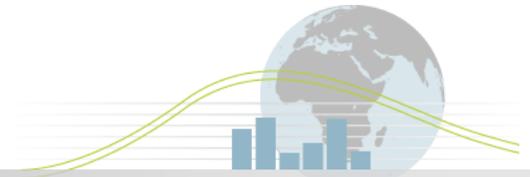
Year Effective: Applicable from 2002-2010

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

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

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Section 4. Cultural Issues

No additional information.

