

Preparatory Studies for Ecodesign Requirements of EuPs (III)

ENER Lot 21 – Central heating products that use hot air to distribute heat

Task 2: Economic and market analysis

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09 July 2012



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Task 2: Economic and market analysis

This chapter presents the economic and market analysis of the products covered in the scope of ENER Lot 21 preparatory study on central heating products using hot air to distribute heat (other than CHP¹). There are four main objectives of this chapter, which include:

1. To place the ENER Lot 21 product group within the total context of EU industry and trade.
2. To provide market (sales and installed stock) and energy consumption inputs for the assessment of EU-wide environmental impacts of the ENER Lot 21 products.
3. To provide insights in the latest market trends to indicate the market structures and ongoing trends in product design. This will serve as an input for the subsequent tasks such as improvement potentials.
4. The data on consumer prices and rates is provided to be used later in the study for Life Cycle Cost (LCC) calculations.

From Task 1 of this study it could be seen that air-based central heating products cover a broad range of applications, power capacities and energy sources. As the market for residential, commercial and industrial space heating are very different, a clear distinction will be made between them. Furthermore as most manufacturers tend to specialise in certain energy sources and technologies, this will also serve as a way of structuring the market analysis.

2.1 Generic economic data

The PRODCOM statistics have the advantage of being the official European Union (EU) source. It is based on products whose definitions are standardised across the European community thus guaranteeing comparability between Member States. It is used and referenced in other EU policy documents regarding trade and economic policy. PRODCOM classifies central heating products in the categories:

- NACE 27.51 *Manufacture of electric domestic appliances* (although these appear to rather cover local heating products)
- NACE 27.52 *Manufacture of non-electric domestic appliances,*
- NACE 28.21 *Manufacture of ovens, furnaces and furnace burners*
- NACE 28.25 *Manufacture of non-domestic cooling and ventilation equipment.*

However, none of these cover central heating products explicitly, and many seem to rather refer to local heating products. Furthermore PRODCOM data is not seen as reliable for determining product sales for ENER Lot 21 products by manufacturers. PRODCOM data on production,

¹ Combined Heat and Power

imports and exports of products within the categories NACE 27.51, NACE 27.52, NACE 28.21 and NACE 28.25 are shown in Annex: 2-1

Table 2—1: Market data from PRODCOM for heat pump and warm air heater related products in the EU-27.

Product (PRODCOM code)	Production	Import	Export
<i>Quantity in 1000 units</i>			
Warm air heater: 28 21 11 50 ²	1,325	54	352
Warm air heater: 28 21 11 30 ³	6,619	-	-
Heat pump: 28 25 12 70 ⁴	1,296	-	-
Heat pump: 28 25 13 80 ⁵	559	-	-

Since the PRODCOM data is not available to the necessary level of reliability or detail as described in the product categorisation in Task 1, it was necessary to investigate other sources of market and product stock data. Therefore, a questionnaire was sent to the stakeholders of ENER Lot 21 study to gather market and economic data. The responses of the questionnaires did help provide more specific market data and fill in certain data gaps, but this was not done in a consistent way. Stakeholders could typically only provide data for the countries and markets they were familiar with. Although it is possible to extrapolate the data from the few countries where data was received, this may lead to results that are not representative at the European level. The data presented in this report is the result of this stakeholder consultation and literature review.

2.2 Market and stock data

The aim of this subtask is to provide market and stock data for the central heating products covered in ENER Lot 21 study. According to a report by the Ecoheatcool project run by the EU Intelligent Energy Europe Programme, no coherent and harmonised description exists of the European heating market⁶. The current magnitude of this market is not yet defined. Due to various climatic, national, regional, and local conditions, space heating demands have been met in many different ways in Europe.

Air heating appliances can be used for central heating in residential houses. While hot air central heating is the most common form of central heating in Northern America, it is seldom used in Europe, where water-based heat distribution systems are preferred (DG ENER Lot 1 preparatory

² Furnace burners for solid fuels or gas (including combination burners)

³ Furnace burners for liquid fuel

⁴ Air conditioning machines not containing a refrigeration unit central station air handling units; vav boxes and terminals, constant volume units and fan coil units

⁵ Heat pumps other than air conditioning machines of HS 8415

⁶ Ecoheatcool (2003) The European heat market, WP1.

study⁷). In Europe, hot air heating appliances are mostly used in the industrial sector (e.g. warehouses, industries) and the commercial sector, such as malls, commercial kitchens, gymnasiums.⁸

The heating appliance market in general, is characterised by its diversity and complexity. Central heating products cover a wide range of product types (including air condition and ventilation) and applications, which can furthermore differ largely from one Member State (MS) to another.

At a macro level, a distinction is made between central heating appliances by technology:

- Warm air heaters
- Heat pumps

2.2.1 Sales

The aim of this section is to assess the sales volume (i.e. number of units sold in the EU) of different type of central heating appliances discussed in Task 1 report. Air-based central heating appliances in the EU are mostly used for commercial and industrial applications unlike in USA where central warm air heaters are often used for residential space heating.

Table 2—2: Sectors that use air-based central heating appliances in the EU⁹

Sector	Estimated share of units sold (%)	Data source
Residential	2%	Industry
Commercial	42%	Industry
Industrial	42%	Industry
Agricultural	14%	Industry

2.2.1.1 Warm air heaters

This section presents the warm air heater sales in EU-27, based on data directly obtained from the industry. The sales of warm air central heating in the EU are shown in Table 2—3 below. Gas fuel based warm air central heaters dominate the European warm air central heater market. Warm air heaters that use electricity, solid fuel or multiple fuels are not commonly used in the EU for air-based central heating systems. Table 2—3 presents the sales in the EU of warm air central heating that use gas and oil.

⁷ VHK (2007) Eco-design of CH-Boilers. Study commissioned by the European Commission. Available at: <http://www.ecoboiler.org>

⁸ A European average composition of service sector buildings is: 12% for hotels and restaurants, 13% for health and social buildings, 18% for education and research, 26% for offices and public administration, 22% for commercial purposes, and finally 10% for other purposes. This average composition is based on information available from 16 countries gathered for the Ecoheatcool Final report, 2006.

⁹ Stakeholder feedback to the questionnaire

Table 2—3: Combined sales of central warm air heaters in EU 2009

Fuel	Warm air heater type	Sales [units]	Data source
Gas	Residential central warm air heaters	9,000	Industry
	Non-residential central warm air heaters	29,500	Industry
Oil	Central warm air heaters	4,500	Industry
Total central warm air heaters		43,000	Industry

► Sales by appliance capacity range

Table 2—4 presents the estimated distribution of sales according to the capacity range of appliances for central warm air heaters. For residential applications, most of the warm air heaters have capacities lower than 19 kW, though some can reach up to 65 kW. The non-residential sector is more diverse, with capacities ranging from 19 kW in e.g. small shops to over 400 kW in industrial installations. However, it can be said that most of the warm air heaters in the industrial sector are between 65 and 120 kW.

Table 2—4: Central warm air heater sales in EU-27 by capacity range

Type of warm air heater	Division by capacity range in kW [%]					Data source
	4-19 kW	19-65 kW	65-120 kW	120-400 kW	>400 kW	
Residential central warm air heaters	70%	30%	0%	0%	0%	Industry
Non-residential central warm air heaters	10%	10%	50%	20%	10%	Industry

2.2.1.2 Heat pumps

This section presents the heat pump sales in EU-27, which are derived either from data directly obtained from the industry or calculated based on available data sources.

According to stakeholders, air-to-air constitutes by far the largest share of heat pumps used for heating. Water-to-air and ground-to-air heat pumps together account for less than 5% of the total market. Gas absorption heat pumps are hydronic systems and gas engine heat pumps are not common products on the EU market.

Table 2—5: Total EU-27 Heat pump sales in 2010

Type of heat pump	Sales (units)	Sales (kW)	Data source
VRF	79,200	2,288,000	DG ENTR Lot 6 ¹⁰
Ducted single split	36,900	656,000	DG ENTR Lot 6
Non-ducted single split > 12 kW	151,800	1,815,000	DG ENTR Lot 6
Total	267,900	4,759,000	DG ENTR Lot 6

According to the statistics reported by the European Heat Pump Association (EHPA), the total market in the EU-27 for all heat pumps (including reversible units, air, water and ground sources and exhaust air heat pumps) is around 600,000 units in 2008¹¹. The market data estimations of the EHPA report are based on specific market surveillance in six Member States, which account for the majority of the European heat pump market. The specific sales data for these countries are shown in the Table 0—9 in Annex: 2-1.

According to data presented by JRAIA¹², the European market of Variable Refrigerant Flow (VRF) heat pumps in 2006 is around 64,000 units, of which 10,000 units are sold in Italy. Information provided by a stakeholder suggests a total market of air-to-air VRF heat pumps in 2006 of 185,000 units. The sales figures for the Italian market provided by another industry representative is 11,518 VRF units sold in 2006. As shown, the data from the different sources are not coherent. The figures presented are estimates.

The distribution of the heat pump market in the EU-27 by heating capacity ranges is presented in Table 2—6. VRF systems are used in collective heating systems where the heat demand is high, with a range from 12 kW to over 200 kW of heating capacity. The heating capacity of single split heat pumps (ducted and non-ducted) is mostly below 25 kW.

Table 2—6: Heat pump sales in EU-27 by capacity range

Type	Division by capacity range [%]					Data source
	12 to 15 kW	15 to 50 kW	50 to 100 kW	100 to 200 kW	>200 kW	
VRF	25%	50%	13%	10%	2%	Industry
Ducted single split	95%	5%				Industry
Non-ducted single split	95%	5%				Industry
Gas engine heat pumps	0%	100%		0%	0%	Industry

¹⁰ ARMINES (2011) DG ENTR Lot 6 preparatory study on Air conditioning and Ventilation systems.

¹¹ EHPA (2009) European Heat Pump Outlook 2009.

¹² JRAIA: Japan Refrigeration and Air Conditioning Industry (2008) World Air Conditioner Market. JARN magazine, April 2008.

2.2.2 Stocks

Stock is the installed base of existing appliances, i.e. the number of units in operation in Europe. However, the shortage of data availability on heating systems in the EU outside of the residential sectors poses a challenge as it makes the market evaluation of central heating systems using hot air to distribute heat difficult. However, various approaches are possible to calculate the existing stock of these appliances such as direct or in-direct estimation of the stock. For the purpose of this preparatory study, the stock data has been gathered directly from the industry.

2.2.2.1 *Stock of warm air heaters*

As per one of the stakeholders, at present there are around 400,000 residential dwellings in the United Kingdom, which use indirect-fired gas warm air heaters. Warm air central heating systems were popular with new house builds in the UK in the 1970's, but not so common nowadays¹³. It is estimated that United Kingdom represents 60% percent of the overall market share of the current stock of these warm air heaters in the EU.

According to information provided by other stakeholder, the total installed stock of central warm air heaters in the EU is around 850,000 units.

Table 2—7: Central warm air heater installed stock in EU-27 (year 2009)

Type of warm air heater	Installed stock [units]	Data source
Residential central warm air heaters	400,000	Industry
Non-residential central warm air heaters	450,000	Industry
Total warm air heaters	850,000	Industry

2.2.2.2 *Stock of heat pumps*

According to information provided by stakeholders, the total installed stock of reversible heat pumps in the EU-27 is around 3.2 million units. The majority of the heat pumps in use are air-to-air products, while water sources and ground sources of heat are not common in the market (both account for around 5% of the installed products).

Table 2—8: Heat pump installed stock in EU-27 (2010)

Type	Installed stock [units]	Installed stock [kW]	Data source
VRF	557,920	16,192,000	DG ENTR Lot 6
Ducted single split	379,660	7,790,000	DG ENTR Lot 6
Non-ducted single split > 12 kW	1,533,840	18,414,000	DG ENTR Lot 6
Total	2,471,420	42,396,000	DG ENTR Lot 6

¹³ Heating and Hot water Industry Council (HHIC). Heating types. www.centralheating.co.uk/heating-types/warm-air

One of the alternative approaches to direct stock data is to evaluate the heat demands in the residential, industrial and service sectors in the EU to give an idea of the EU market for central air-based heating appliances¹⁴. However, the global heat demand is matched not only by air-based central heating, but also by a number of other types of heating systems. The market distribution between different technologies based on heating demand therefore has to be estimated. The calculation of heat demand in the EU is presented in Annex: 2-1.

2.2.3 Average product life

Lifetime can be used to estimate the stock data based on sales. In the context of this study, the focus is on 'active lifetime' or the so-called economic lifetime, i.e. the duration that the product is in service. Lifetime of products within the scope of this preparatory study is analysed in Task 3 (Consumer behaviour and local infrastructure).

2.3 Market trends

This section presents recent evolution and expected orientation of the market, as well as a review of the parameters, which are likely to influence appliances sales and design in the future. It is important to understand such trends to identify products, which might represent a significant or marginal market in the near future.

► Overall heat pump market trends in EU

The European heat pump market is still growing progressively in most European countries, according to the European heat pump outlook report¹⁵. Most significant growth from 2005 to 2007 is found in the larger markets of Italy (33%), France (30%), Norway (+27%), Finland (+25%) and Austria (+15%) while the markets in Germany (+1.5%), and Switzerland are consolidating. After long years of extraordinary growth, the Swedish market saw a decline of 23%. This decline has long been foreseen and is the consequence of a saturated market. The market for residential heat pumps in single-family houses is close to saturation. Heat pumps are by now the most common heating system in single-family houses in Sweden (approx. 34%).

In Europe, VRF heat pumps and chillers share the market niche. In Western Europe the VRFs become well understood as a good option, especially when the air conditioning is to be added to existing old building without AC, and the market is steadily growing, according to JRAIA¹².

Information provided by one stakeholder show the European market close to saturation in VRF and air-to-air heat pumps, with growth trends of 2%-5% per year until 2026 for VRF and 2018 for air-to-air heat pumps. After these years, the European market would become saturated and the net installations would be nearly zero. Market research carried out in the ENTR Lot 6 preparatory study, however, shows a growth trend of around 12% per year from 2010 to 2025 for VRF heat pumps.

¹⁴ Naturally, we already know the shares covered by hydronic central heating (DG ENER lot 1) and direct heating (DG ENER lot 15 and DG ENER lot 20) which need to be taken into account to avoid double counting.

¹⁵ EHPA (2009) European Heat Pump Outlook 2009.

VRF are becoming a popular technology in the EU heat pump market, and are replacing some air-to-air heat pumps. Heat recovery is a growing technology for heat pumps, which according to manufacturers can achieve higher efficiencies in systems combining cooling and heating.

► **Geographic trends**

The existing opportunities of market development are likely to be found in the segment of multi-family homes and commercial applications as well as in the segment for renovation. The market in Germany came to a sudden halt 2007 with only 1.5% increase of sales over 2005. The slowdown of the market is believed to be the consequence of an increase of the value added tax that came into force 1 January 2007. Developing markets like Ireland, the UK, the Netherlands and the Eastern European markets see steep increases, albeit from a very small base.

While markets in Germany, Austria and Switzerland still see large sales of ground source heat pumps, those in Norway and Finland are dominated by air-to-air heat pumps. This is due to a high percentage of houses equipped with direct resistance heating. Air-air heat pumps are marketed as heating devices with additional comfort cooling functionality in all Scandinavian countries.

► **Product trends**

Heat pumps that use ambient air as a heat source have shown the strongest growth in recent years. When considering total sales figures, air source heat pumps dominated the European heat pump market in 2007. Technological innovation in this field consists of improvements in materials, in size reduction, introduction of microprocessor-based controls and in other technologies such as variable refrigerant flow, inverter motors for compressors or heat recovery systems to reduce energy use. With rising electricity and gas prices, consumers are looking for other ways to heat their homes without paying expensive heating bills.

The key factors influencing the future market of central heating appliances are:

- Energy Performance of Buildings Directive (EPBD)
- Environmental legislation
- Energy supply
- New technologies
- Safety legislation

The analysis of general trends in product design and product features is critical because it will indicate the mid-term development and therefore the state-of-the-art when possible Ecodesign requirements may take effect. The analysis of market trends takes into account various aspects for market prediction, such as:

- Local climate conditions
- Emerging markets

The sales of heat pumps and warm air heaters may be affected by the increased popularity of Combined Heat and Power (CHP) products. As heat pumps and warm air heaters, CHPs are designed to provide heat, but they also produce electricity. This allows more useful

energy to be extracted from the fuel. The amount of electricity produced usually exceeds the demand in the building, and is therefore sold to the grid.

The current micro CHP market is relatively small with just over 22,700 units sold globally in 2009, but the stock numbers have reached over 100,000 units. Japan is by far the most important market for micro CHP, with Germany and the UK following and showing high interest in the technology¹⁶. The European market as a whole is expected to have an increase of 14.3% during the period of 2011-2016, as micro CHP is considered an important technology towards the decarbonisation of energy systems¹⁷.

2.3.1 Emerging markets

In the industry and service sectors, the demand for hot-air based central-heating appliances may be tied to economic growth. Economic and demographic forecasts¹⁸ indicate that the Eastern European markets are likely to continue their current dynamic growth, and this is expected to positively impact the hot-air heating appliances market. Since the industry and services in these countries are growing, this can boost the demand for hot air based central heating systems markets. As a result, the markets in this region will grow at a faster rate than that of their western counterparts. Furthermore, replacement of inefficient heating systems in existing buildings and commercial areas can be an important market niche for air based central heating systems. Within the residential sector, the growing demand for air-cooling appliances¹⁹ may help shift the central heating market towards air-circulation systems, since reversible heat pumps together with AHU can supply both functionalities. Residential demands for central heating appliances based on hot air to distribute heat may therefore start growing in new buildings and in countries where both central heating and air conditioning are needed. However, a major limitation of air circulating systems compared to water-based ones is the space taken up by air ducts compared to hot water pipes. As a result, the market for hot air systems is more likely to develop in locations where the price for floor space is lower, such as in the countryside.

2.4 Market channels and product structures

In general, the production and distribution channels for central heating products are similar for their application in commercial and industrial buildings, however differing from their applications in the residential buildings.

¹⁶ www.cospp.com/articles/print/volume-10/issue-4/features/micro-chp-edging-towards-the-mass-market.html
accessed at: 09/05/2012

¹⁷ www.marketsandmarkets.com/Market-Reports/micro-chp-market-419.html Accessed on: 09/05/2012

¹⁸ Frost and Sullivan (2003) Market research.

¹⁹ DG ENER Lot 10 study

2.4.1 Distribution channels

Central heating products are distributed through several channels. In the following sub-sections, these differences between the distribution channels are illustrated.

► Warm air heaters

Most of the warm air heaters for the residential, industrial and commercial heating market are supplied by the manufacturers directly to the installer, who is contracted by the end user. Sales via distributors/wholesalers account for a negligible share in the EU. These products are generally not sold directly by the manufacturer to the end user.

Distribution chain for furnaces
(all fuel types for residential, commercial and industrial applications)

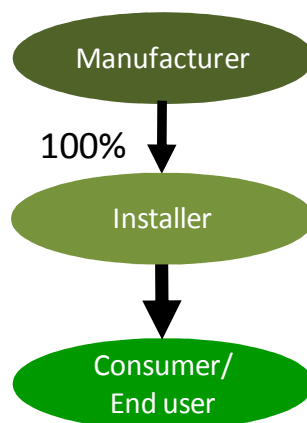


Figure 2-1: Sales mechanism for warm air heaters

► Heat pumps

In the heat pumps market, between 25 and 50% of heat pumps sales are made via distributors to installers. The rest of the products are sold directly to the installer. Furthermore, between the customer and the installer the chain of decision often includes architects and consultants.

Distribution chain for heat pumps
(all fuel types for residential, commercial and industrial applications)

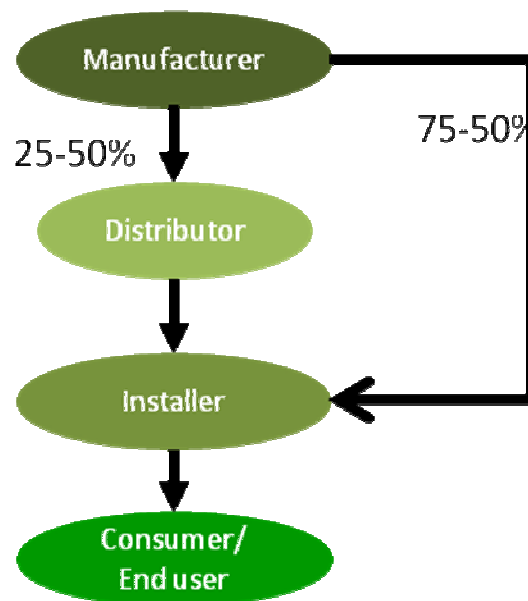


Figure 2-2: Sales mechanism for heat pumps

2.4.2 Production structures

Manufacturers of heating products have traditionally based their business on the domestic (national) market. This follows the differences in national characteristics of heating systems. As a consequence of this structure, only some international groups have emerged offering their products all over Europe and to other parts of the world, whilst others remain quite regional.

► Warm air heaters

The central warm air heater market in EU is comprised of a few large manufacturers. Some of these players that have an active presence in the EU market are presented in Table 2—9. The manufacturers are organised in industry associations at the Member State and the European level. These include EUROVENT²⁰, EURO-AIR²¹, FIGAWA²² and ICOM²³.

²⁰ EUROVENT, the European Committee of Air Handling and Refrigeration Equipment Manufacturers. Website: www.eurovent-association.eu

²¹ EURO-AIR: European Association of Air Heater Manufacturers. Website: www.euro-air.com

²² FIGAWA: Technical Association of all German companies in the Water & Gas related industries – 1,000 member companies. Website: www.figawa.de

²³ ICOM: UK manufacturers' association for the commercial and industrial heating industry. Website: www.icomenergyassociation.org.uk

Table 2—9: The main manufacturers of central warm air heaters (active in EU-27)

Type of warm air heater	Manufacturer's name
Direct-fired gas warm air heater	Nordair Niche, Nordluft, Roberts Gordon, Robur Group
Indirect-fired gas warm air heater	Ambi-Rad Ltd, Apen Group, Benson Heating, Brink, Colt, Dantherm, Johnson & Starley, Lennox, Powrmatic, Reznor, Roberts Gordon, Winterwarm
Liquid fuel warm air heater	Benson heating, Dantherm, Powrmatic, Roberts Gordon
Electric warm air heater	Dimplex

► Heat pumps

The heat pump market is comprised of a handful large manufacturers (most of them Japanese or Korean), some of these players having an active presence in the EU market are presented in Table 2—10.

Table 2—10: The main manufacturers of heat pumps (active in EU-27)

Type of heat pump	Manufacturer's name
Air-to-air	Carrier, Colt, Daikin, Fujitsu, Hitachi, LG, Mitsubishi Electric, Samsung, Sanyo, Toshiba, Trane
Water-to-air	Carrier, CIAT, Daikin
Ground-to-air	Daikin, York

2.5 Consumer expenditure base data

The parameters presented below will be required for the LCC calculations:

- Product price
- Energy price
- Service, maintenance and repair cost
- Disposal tariff
- Interest rate
- Inflation rate
- Average economic life expectation

The choice of a central heating system is not simply a matter of fixed cost (purchase price), but running costs also greatly influence the consumer decision. The total costs of a central heating system can therefore be divided in:

- Purchase cost: appliance purchase price and installation cost
- Running costs: energy cost and repair and maintenance costs
- Disposal cost

All these costs do not necessarily affect the same person. For example, an investor can be concerned by the purchase of an appliance, whereas the running costs could be borne by the tenant(s).

Table 2—11 presents the main elements influencing the “total cost” of a central heating system to the final consumer.

Table 2—11: Main factors influencing the “total costs” of central heating systems

Element	Influencing factors	Examples of variability / comments
Choice of warm air heater type	Country habits / preferences	Simpler and cheaper models in recent accession in Member States
	Country energy policy	Support for Renewable Energy Sources (RES)
	Fuel price	High oil prices influenced the shift towards other types of fuels, among which gas and electricity
Accessories and features	E.g. control systems, or weather control	There is a great variability in versions (from the basic versions to the most high-tech ones, provided with an interface) and thus cost
Other	Legislation / subsidies and incentives	Between Member States
	Tax rates	Differences in VAT rates
	Purchasing power of consumer	Within Member States but also between countries / regions
	Level of “education” of the consumer	In particular about the long term trade-off between initial investment and running costs and about the environmental impact of various systems
		The role of the internet on this issue is reportedly quite considerable
	Public awareness campaigns	Information campaigns, normally driven by public authorities often and associated with some kind of subsidy scheme, seem to have an increasing impact on consumer choice
	The “owner / occupier” dilemma	In rented accommodation, the owner usually pays for the system and its installation, whereas The occupier pays the running costs. This can create a conflict of interests, with the owner ending up choosing a sub-efficient solution.
	Pricing policies of manufacturers	Although the introduction of the Euro seems to have reduced the scope for manufacturers to have widely varying pricing policies across the EU, differences still remain, especially between Old and New MS. These price differences can sometimes be due to economic disparity (thus purchasing power) or additional costs (e.g. transport when the appliance

Element	Influencing factors	Examples of variability / comments
		is not manufactured in its country of sale)
	Distribution channels	In particular, the largest differences result from the central heating units being purchased by a building contracting company for a new build (or new installation), as opposed to individual purchases by consumers through a longer distribution channel

2.5.1 Appliance purchase cost

Central heating products are complex systems that need to be installed by a professional. Therefore, the cost of installation also needs to be considered together with the purchase cost of the appliance.

In the context of this study, average appliance consumer prices are of interest as they are required as an input for Life Cycle Cost (LCC) calculations that will be performed in Task 5. Prices presented in this section are product purchase prices only, and the installation costs are analysed in section 2.5.2. Prices within an appliance category can vary widely. Parameters that are the most critical for fixing the price are the capacity of the appliance, type of material used, the technical features and the design of the appliance.

► Warm air heaters

Stakeholder responses to the questionnaire and prices observed in product catalogues indicate that average product prices²⁴ for the ranges of capacity concerned in this study are €4,000 per unit for residential central warm air heaters and €10,500 for non-residential warm air heaters.

As per the feedback of stakeholders, the cost per kW of residential warm air heaters corresponds to around €80/kW with an average capacity range between 4 and 19 kW. The cost per kW of non-residential is around €70/kW, in the range of 65 to 120 kW.

► Heat pumps

The average purchase price of a single split heat pump in the EU is around €6,450, with an average price per kW of heating capacity around €400/kW. In the case of VRF heat pumps, the price per kW of capacity is €430/kW and the average product price is €23,650.

2.5.2 Installation cost

The installation costs of a central heating appliance can vary depending on a number of parameters, such as the type and size of the building, the extent of the work needed (first installation, replacement, renovation), labour hourly rates, cost of materials and components, etc.

²⁴ "Average" product price in this context is not understood as an arithmetic mean, but more as a representative price for a typical average product in each category.

► Warm air heaters

Costs for warm air heater installation have been estimated based on information provided by stakeholders. The average cost of installing a new residential warm air heater can be around € 1,200 whereas for non-residential warm air heaters the cost is between €11,000-12,500.

► Heat pumps

According to the information provided by stakeholders, the average installation cost for single split heat pumps is around €2,500, while the average installation cost of a VRF system is around €5,300.

2.5.3 Running costs

Running costs, understood as costs generated by the use of the appliances, can be split in:

- Energy costs (fuel price)
- Maintenance and repair costs

Energy costs primarily depend on the annual energy consumption (which in turn is a function of heating season duration) and the overall system efficiency. The operational costs are a function of maintenance, repair, service charges and inspection costs. The costs related to heating controls are also accounted for in the operational costs.

2.5.3.1 *Fuel prices*

In order to calculate the life cycle costs of central heating appliances in the later stages of the study, it is necessary to determine representative fuel prices

Furthermore, fuel (especially electricity) prices differ from a country to another depending on their energy policies and local characteristics, e.g. availability of different resources. Energy price plays a major role in appliance operating costs and also in appliance choice. Therefore it is interesting to compare the prices of fuels used for central heating with the prices of other energy sources. Figure 2-3 shows the differences observed in France. Fuel used in central heating appliances are in general expensive than other energy sources. Within the central heating fuel category, electricity and propane appear to be the most expensive ones.

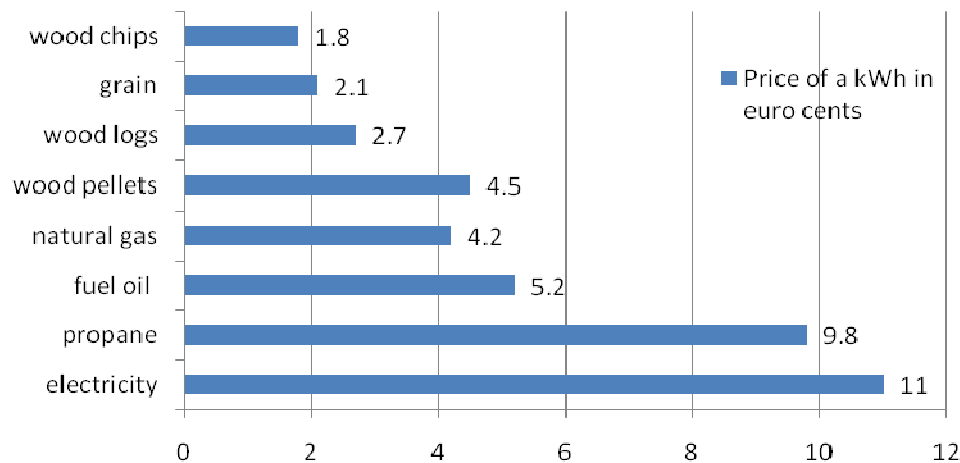


Figure 2-3: Price of different energy sources in France in 2005²⁵

► Electricity prices

Electricity costs have to be taken into account for heat pumps and fans used in warm air heaters, for electric heating elements used in electrical warm air heaters and for the other appliances having an electrically controlled part. The evolution of electricity prices in EU Member States since 2008 as reported by Eurostat are presented in Annex: 2-1 for both domestic (Table o—12) and industrial consumers (Table o—13, Table o—14). The average price per kWh in the EU-27 increased 6.25% in 2010 respect to the price in 2009.

► Natural gas prices

Natural gas costs have to be taken into account for appliances such as direct and in-direct gas fired warm air heaters, multi-fuel fired warm air heaters, etc. The evolution of natural gas prices in EU Member States since 2008 as reported by Eurostat are presented in Annex: 2-1 for both domestic (Table o—15) and industrial consumers (Table o—16,

²⁵ French Ministry of the Economy (2005) The Exchequer and the Industry. Available at: www.arecpc.com/Energie/bois/combustible.htm

Table 0—17). The average price per GJ in the EU-27 market decreased 11.1% from 2008 to 2010.

► **Heating oil prices**

Heating oil costs have to be taken into account for appliances such as liquid fuel based warm air heaters. The heating gasoil prices in EU Member States as of January 2009 are presented in Annex: 2-1 (Table 0—18).

► **Liquefied Petroleum Gas (LPG) prices**

LPG costs have to be taken into account for appliances such as liquid fuel warm air heaters. The LPG gasoil prices in EU Member States as of April 2010 are presented in Annex: 2-1 (Table 0—19).

2.5.3.2 *Maintenance and repair cost*

The main elements influencing maintenance costs include legal requirements of periodic inspections, standard length of warranty, types of maintenance service contracts, and cost of materials and components.

The EN 15459 standard for the economic evaluation of energy systems in buildings gives average estimations of annual maintenance costs, in percentage of initial investment costs. These annual costs vary from 0.5% to 10% of the investment costs.

► **Warm air heaters**

The maintenance costs of warm air heaters according to the stakeholders are between € 250 and € 1,100 per year. The maintenance practices include vacuum cleaning of air filters; status check of ancillary mechanical and electronic components (blowers, insulations, ducts, wiring, power supply, etc.)

► **Heat pumps**

For the lower heat demand applications, single split heat pumps have maintenance costs in the order of € 400 annually. The cost of maintenance practices per year for VRF systems is around € 1,200. The maintenance practices include checking of the refrigerant lines, replacement of filters, eventual replacement of compressor if needed, etc.

2.5.4 **Disposal cost**

Most of the central heating appliances are made of either steel or cast iron, and in the current market situation, they have a positive value as a scrap metal at end-of-life. However, in practice, in most cases the installer of the new heating appliances or system takes back the old appliance without any charge. Thus, the revenue at the end-of-life goes to the installer rather than to the consumer, who nevertheless benefits as he does not need to worry about the transport of the heavy and bulky appliance. There is no second hand market for central heating appliances.

Hence, on average both the disposal costs and resale value (as scrap metal or second-hand product) for these central heating appliances are estimated to around € 5 to € 100.

2.5.5 Interest and inflation rates

When the investment cost is high, as is usually the case in central heating systems that require installation, the interest rate and inflation rate may play an important role in the decision. Table 20 in Annex: 2-1 shows national inflation and interest rates for the EU-27 as published by Eurostat and the European Central Bank (ECB). The European Commission's Impact Assessment Guidelines²⁶ propose a discount rate (interest rate minus inflation rate) of 4%.

2.5.6 Summary of consumer expenditure

Table 2—12: Consumer expenditure for central warm air heaters

	Residential warm air heater	Non-residential warm air heater
Average power capacity (in kW)	4 - 19 kW	65 - 120 kW
European product price range (in €/kW)	€ 80 - 300/kW	€ 40 - 100/kW
Average European product price per unit (in €)	€ 3,000 – 4,500	€ 7,200 – 12,000
Installation cost (€)	€ 1,200	€ 4,000
Maintenance and repair cost (€/year)	€ 250 - 1,100	€ 250 - 1,100
Disposal cost (€)	€ 5 - 100	€ 5 - 100

Table 2—13: Consumer expenditure for heat pumps

	Non-ducted single split	VRF
Average power capacity (in kW)	16 kW	55 kW
European product price range (in €/kW)	€ 400/kW	€ 430/kW
Average European product price (in €)	€ 6,450	€ 23,650
Installation cost (€)	€ 2,500	€ 5,300
Maintenance and repair cost (€/year)	€ 400	€ 1,200
Disposal cost (€)	€ 20	€ 20

2.6 Conclusions

The data presented in Task 2 will form the basis for selecting the most representative products on the European market and eventually formulating the Base-Cases in Task 5. However, estimating sales and establishing the stock of central heating appliances in sufficient detail to

²⁶ European Commission (2009) Impact Assessment Guidelines

allow base-case selection through existing data sources represents a challenge. This report presents the best estimates based on a number of individual sources.

The available data shows that the yearly sales of some of the products are lower than the indicative 200,000 unit threshold set in the ErP Directive. However, the energy consumption and improvement potential of central heating applications in the EU make these product groups important to study further.

Regarding the stock numbers of ENER Lot 21 products when compared to other space-heating products covered in ENER Lot 1, ENER Lot 10 and ENER Lot 15, it can be said that they represent only a small fraction of the market. The central heating boilers of ENER Lot 1 and the solid fuel small combustion installations of ENER Lot 15 comprise by far the biggest market share with more than 98 million units installed in 2005 and 73.5 millions in 2006 respectively. The room air conditioning appliances studied in ENER Lot 10 have a significant part of the European stock with 31 million units (where 70% of their energy consumption is used for heating purposes).

Table 2—14: EU installed stock of space heating products

Study	Stock (million units)	Year	Geographical scope
ENER Lot 1 ²⁷	97	2004	EU-25
ENER Lot 10 ²⁸	31.09	2005	EU 27
ENER Lot 15 ²⁹	73.48	2007	EU-27
ENER Lot 21	3.35	2009	EU-27

This leaves ENER Lot 21 products representing just above 1.6% of the space-heating market (in units). Although 1.6% might seem small, the size and total number of warm air heaters and heat pumps of stock units installed in 2010 was over 3.35 million units and it will continue to grow. The following tasks of this preparatory study will determine the energy consumption, the environmental impacts and the potential for improvement of this product sector.

Energy prices and fuel availability are the most important parameters that explain the current structure of the market. Government actions at a national level (e.g. financial incentives) have played a fundamental role in some countries. Available energy sources on the one hand and increasing environmental concerns on the other hand appear to be the main elements that currently determine appliance design.

²⁷ VHK (2007) DG ENER Lot 1 preparatory study on CH-Boilers.

²⁸ ARMINES (2008) DG ENER Lot 10 preparatory study on residential air conditioning and ventilation.

²⁹ BIO Intelligence Service (2009) DG ENER Lot 15 preparatory study on solid fuel small combustion installations

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Annex: 2-1

PRODCOM DATA

Table o—1: Market data from PRODCOM for other electric space heaters (PRODCOM code: 27 51 26 90)

EU-27	2005	2006	2007	2008	2009	Annual average increase or decrease
Quantity in 1000 units						
Production	7,193	7,410	8,141	9,034	8,052	3.24%
Import	8,470	10,168	10,165	11,580	10,430	6.00%
Export	1,206	1,635	1,345	1,319	4,423	62.81%
Sales³⁰	14,457	15,944	16,960	19,294	14,059	0.82%
Value in million €						
Production	288	421	405	489	467	14.64%
Import	117	139	139	136	133	3.45%
Export	52	65	68	70	72	8.67%
Sales	353	496	476	555	528	12.02%
Average price in €						
Production	40	57	50	54	58	11.34%
Import	14	14	14	12	13	-1.81%
Export	43	40	51	53	16	-11.32%
Sales	24	31	28	29	38	12.63%

Table o—2: Market data from PRODCOM for Iron or steel gas domestic appliances with an exhaust outlet, including heaters, grates, fires and braziers, for both gas and other fuels (excluding cooking appliances and plate warmers) (PRODCOM code: 27 52 12 33)

EU-27	2005	2006	2007	2008	2009	Annual average increase or decrease
Quantity in 1000 units						
Production	1,365	1,239	982	914	634	-16.89%
Import	103	96	91	106	96	-1.31%

³⁰ Sales = Production + Imports - Exports

EU-27	2005	2006	2007	2008	2009	Annual average increase or decrease
Export	416	314	310	208	87	-29.21%
Sales	1,052	1,021	763	813	643	-10.66%
<i>Value in million €</i>						
Production	438	456	391	419	319	-6.72%
Import	4	6	6	5	6	10.66%
Export	38	45	47	34	15	-14.75%
Sales	404	417	351	390	309	-5.57%
<i>Average price in €</i>						
Production	320	368	398	458	502	11.94%
Import	41	60	70	44	60	15.45%
Export	90	144	151	162	173	19.78%
Sales	384	408	460	480	481	5.88%

Table o—3: Market data from PRODCOM for Iron or steel gas domestic appliances, including heaters, grates, fires and braziers, for both gas and other fuels radiators (excluding cooking appliances, plate warmers and appliances with an exhaust outlet) (PRODCOM code: 27 52 12 35)

EU-27	2005	2006	2007	2008	2009	Annual average increase or decrease
<i>Quantity in 1000 units</i>						
Production	2,759	2,119	1,972	2,591	2,101	-4.42%
Import	3,069	1,927	2,062	1,353	2,465	4.42%
Export	709	863	509	536	298	-14.63%
Sales	5,118	3,183	3,526	3,408	4,268	-1.28%
<i>Value in million €</i>						
Production	238	211	201	221	214	-2.38%
Import	40	46	54	43	47	5.20%
Export	43	51	52	52	34	-3.67%
Sales	235	206	203	212	226	-0.61%
<i>Average price in €</i>						
Production	86	100	102	85	102	5.16%
Import	13	24	26	32	19	18.82%
Export	61	59	102	97	114	20.46%
Sales	46	65	57	62	53	5.87%

Table o—4: Market data from PRODCOM for Air heaters or hot air distributors n.e.c., of iron or steel, non-electric (PRODCOM code: 27 52 13 00)

EU-27	2005	2006	2007	2008	2009	Annual average increase or decrease
Quantity in 1000 units						
Production	1,425	1,489	1,808	4,109	2,152	26.40%
Import	-	-	-	-	-	-
Export	-	-	-	-	-	-
Sales	-	-	-	-	-	-
Value in million €						
Production	504	584	637	631	482	0.08%
Import	27	30	30	25	22	-4.30%
Export	84	104	130	136	89	4.55%
Sales	447	510	537	519	415	-0.97%
Average price in €						
Production	354	393	352	153	224	-2.47%
Import	-	-	-	-	-	-
Export	-	-	-	-	-	-
Sales	-	-	-	-	-	-

Table o—5: Market data from PRODCOM for Furnace burners for liquid fuel (PRODCOM code: 28 21 11 30)

EU-27	2005	2006	2007	2008	2009	Annual average increase or decrease
Quantity in 1000 units						
Production	1,093	1,080	1,263	1,352	1,325	5.20%
Import	59	79	238	125	54	32.26%
Export	320	335	441	587	352	7.33%
Sales	832	824	1,060	889	1,027	6.76%
Value in million €						
Production	378	390	420	375	325	-3.30%
Import	10	12	9	11	10	0.02%
Export	97	99	101	122	103	2.44%
Sales	291	302	328	263	231	-4.89%

EU-27	2005	2006	2007	2008	2009	Annual average increase or decrease
Average price in €						
Production	346	361	333	277	245	-7.93%
Import	175	146	39	86	186	36.95%
Export	303	295	229	208	294	1.79%
Sales	350	367	310	296	225	-9.78%

Table o—6: Market data from PRODCOM for Furnace burners for solid fuel or gas (including combination burners) (PRODCOM code: 28 21 11 50)

EU-27	2005	2006	2007	2008	2009	Annual average increase or decrease
Quantity in 1000 units						
Production	7,520	6,650	1,600	1,605	6,619	56.28%
Import	-	-	-	-	-	-
Export	-	-	-	-	-	-
Sales	-	-	-	-	-	-
Value in million €						
Production	527	640	610	645	513	0.53%
Import	13	15	18	23	21	13.03%
Export	197	238	290	308	284	10.21%
Sales	342	417	338	360	250	-5.32%
Average price in €						
Production	70	96	381	402	78	64.55%
Import	-	-	-	-	-	-
Export	-	-	-	-	-	-
Sales	-	-	-	-	-	-

Table o—7: Market data from PRODCOM for Air conditioning machines not containing a refrigeration unit; central station air handling units; vav boxes and terminals, constant volume units and fan coil units (PRODCOM code: 28 25 12 70)

EU-27	2005	2006	2007	2008	2009	Annual average increase or decrease
Quantity in 1000 units						
Production	2,341	2,582	1,837	1,667	1,296	-12.52%
Import	-	-	-	-	-	-
Export	-	-	-	-	-	-
Sales	-	-	-	-	-	-
Value in million €						
Production	1,253	1,531	1,688	1,777	7,274	86.79%
Import	251	254	357	274	207	-1.51%
Export	244	270	344	390	328	8.91%
Sales	1,260	1,516	1,702	1,661	7,153	90.20%
Average price in €						
Production	535	593	919	1,066	5,613	127.10%
Import	-	-	-	-	-	-
Export	-	-	-	-	-	-
Sales	-	-	-	-	-	-

Table o—8: Market data from PRODCOM for Heat pumps other than air conditioning machines of HS 8415 (PRODCOM code: 28 25 13 80)

EU-27	2005	2006	2007	2008	2009	Annual average increase or decrease
Quantity in 1000 units						
Production	2,630	2,150	560	571	559	-23.07%
Import	-	-	-	-	-	-
Export	-	-	-	-	-	-
Sales	-	-	-	-	-	-
Value in million €						
Production	1,350	1,670	1,620	1,800	1,521	4.08%
Import	146	148	95	91	73	-14.55%
Export	449	561	486	409	281	-8.91%
Sales	1,047	1,257	1,229	1,483	1,314	6.77%

EU-27	2005	2006	2007	2008	2009	Annual average increase or decrease
Average price in €						
Production	513	777	2,893	3,150	2,720	79.74%
Import	-	-	-	-	-	-
Export	-	-	-	-	-	-
Sales	-	-	-	-	-	-

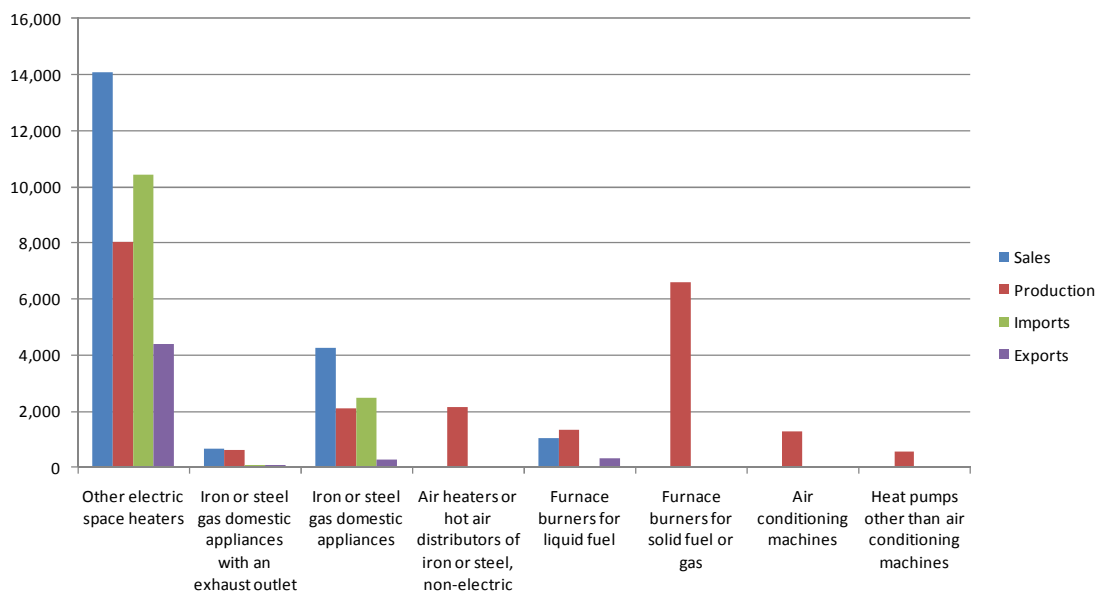


Figure o-1: Market size of possible central heating products using hot air in the EU in 2009 (in number of units) based on PRODCOM data

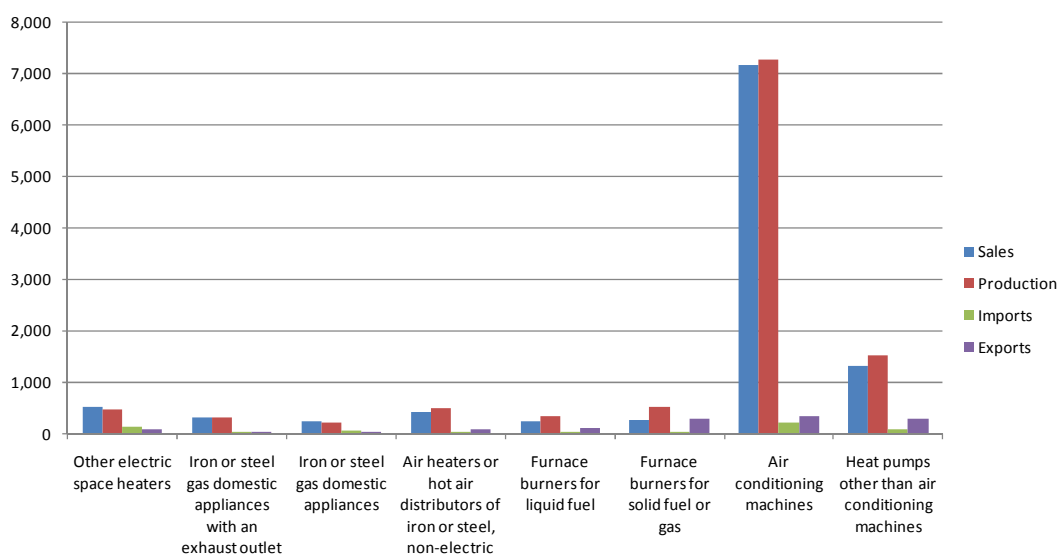


Figure o-2: Market size of possible central heating products using hot air in the EU in 2009 (market value in million euros) based on PRODCOM data

Product specific data

Table o—9: Space heating heat pump sales

Member State	Sales 2006 [Units]	Sales 2007 [Units]	Data source
Austria	8,853	14,662	EHPA ³¹
Finland	36,950	46,150	EHPA
France	53,510	69,600	EHPA
Germany	51,827	52,630	EHPA
Italy	21,665	28,901	EHPA
Sweden	122,473	93,791	EHPA
Total	295,278	305,734	EHPA

Table o—10: VRF sales in EU in 2006

Country	VRF sales 2006 (units)	Data source
UK	13,000	JRAIA
France	11,000	JRAIA
Italy	10,000	JRAIA
Spain	9,000	JRAIA
Germany	5,000	JRAIA
Total	64,000	JRAIA

Table o—11: Heat pump sales in Italy in 2008

Product	Sales in Italy 2008 (units)	Data source
VRF heat pumps	15,160	Industry
Heat pumps with inverter system	671,521	Industry
Rooftop heat pumps	1,787	Industry
Total heat pumps	1,222,834	Industry
Total split system	1,251,159	Industry

³¹ EHPA (2008) European Heat Pump Outlook 2008. Available at: <http://www.ehpa.org/heat-pump-statistics/2007>

Indirect estimation of stock

► Heat demand estimation based on general EU-wide parameters

A survey of the industrial, residential and service sector heat demands in Europe (EU-25 + EFTA countries (Iceland, Norway, Switzerland) + Bulgaria, Croatia, Romania, Turkey) was performed in the framework of the Ecoheatcool EU study, for the year 2003³². The key results of this study are presented and discussed in this section of the report, which concerns the potential stock of all types of air-based central heating appliances using in the EU.

The total heat demands in 2003 were similar in the industrial and residential sectors, and respectively approximately the double for the service sector. See Figure 0-3. The use of natural gas and electricity for heating dominates in all three sectors, having total market shares of 32.9% each. Germany, France, United Kingdom, Italy, and Spain are the five largest national markets for heating within the EU. These markets constitute 58% of the European market. Natural gas and electricity in these five countries have a combined market share of 73.5%. In the remaining 27 countries, natural gas and electricity have a somewhat lower combined market share of 55%.

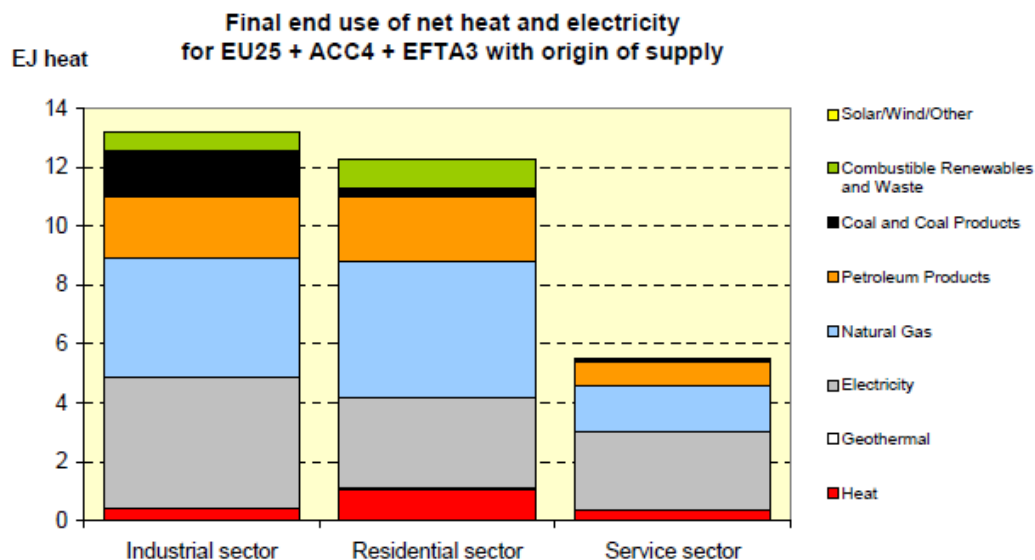


Figure 0-3: End use of heat and electricity in the EU, for industrial, services, and residential sectors, according to the energy supply (source Ecoheatcool, 2006)

► Industrial sector demands

Industrial heat demands are very diverse with respect to temperature levels, sectors, countries, and energy supply, since the energy supply and industrial processes can differ from country to country due to local conditions. Only part of the heat used in the industry is used for central space heating purposes. Most of it is typically used at much higher temperatures (>100°C) for industrial processes, such as drying, manufacturing of metals, ceramics, glass, etc. Figure 0-4 gives an overview of the European market for central-heating (and hot water) in the industry

³² Ecoheatcool (2006) Euroheat & Power, final report.

(temperatures below 100°C), according to industrial sector. Within the EU, Finland, Luxembourg, Norway, Sweden and Belgium show especially large industrial demands. On a per-capita basis, the largest heat demands in the industry (including central heating and industrial processes) appear in Finland, Netherlands and some new MS (Poland, Czech Republic, Hungary, Lithuania, Estonia).

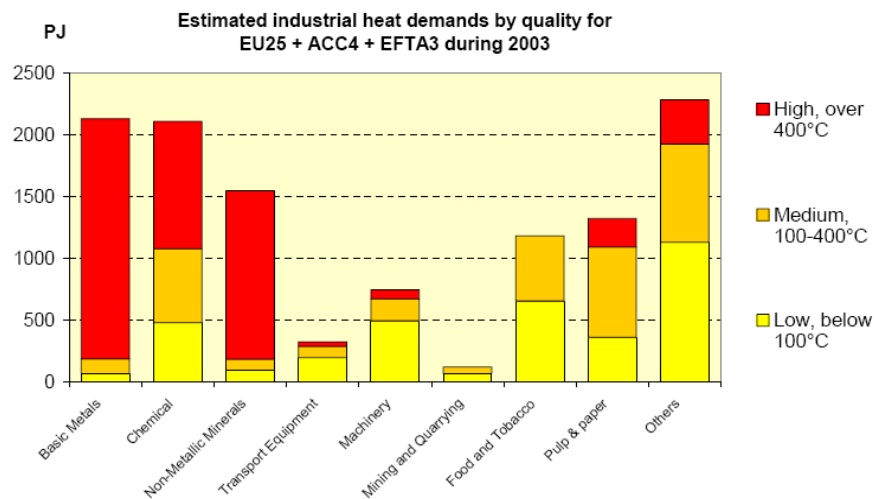


Figure 0-4: Industrial heat demands estimated by temperature quality and by manufacturing branch for EU-32 (source: Ecoheatcool report, 2006)

In order to compensate for varying national use of floor areas in the residential and service sectors, the specific use of net heat and electricity per square meter has also been estimated, and is presented in the following sections.

► Service sector demands

The heat demands in the service sector are in general higher than the residential demands, but more scattered (Figure 0-5). In contrast to residential heat demands, in the service sector, heat demands in the new MS are higher than in the EU-15: the overall average demand was 793 MJ/m², with 795 MJ/m² for the EU-15 countries and 826 MJ/m² for the new MS countries. There is a large variation in the national data (up to +/- 40%), due to large uncertainties concerning the supply of service sector floor areas.

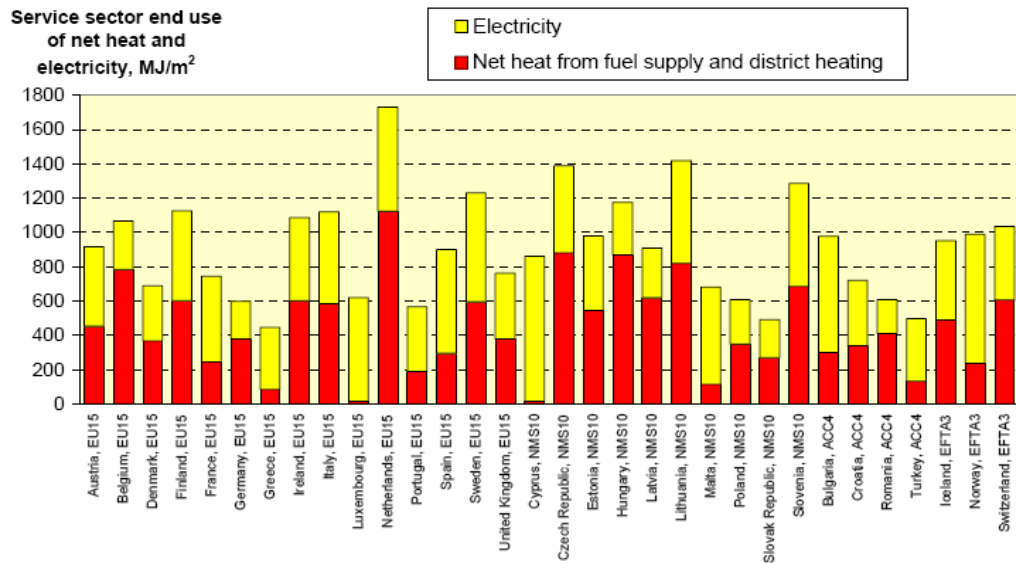


Figure o-5: Total use of heat and electricity per m² in the service sector in 2003 for the different MS (source Ecoheatcool report, 2006).

► Residential demands

In the residential sector the total heat demands shared between electricity and net heat, are presented in Figure o-6. These results contradict the widespread idea that residential heat demands are much higher in the new MS than in the old MS. The differences in heat demands are more evident along a North-South axis, with Mediterranean countries in general having lower residential heat demands than Northern, Central or Eastern European countries. Indeed, the presence of central heating is higher in the Northern part of Europe compared to the Mediterranean area, where it is common to have no heating system at all. This reflects that heating demands dominate over cooling demands in Europe. This is an important limitation for the residential warm air heating market, given that cooling systems are typically air-conditioning systems, which can also be used for heating systems based on air circulation.

Another major conclusion is that the North-South gradient in heating demands is pronounced only below latitudes of 40°N. The residential demands in Western, Central, and Eastern Europe are not much lower than the demands in the Nordic and Baltic countries. For instance, the residential end-user demand is higher in Austria and Belgium than in Sweden, despite the fact that the average annual outdoor temperature is about 4 °C lower in Sweden. In a similar way, the demands in France and United Kingdom are higher than the demands in Denmark.

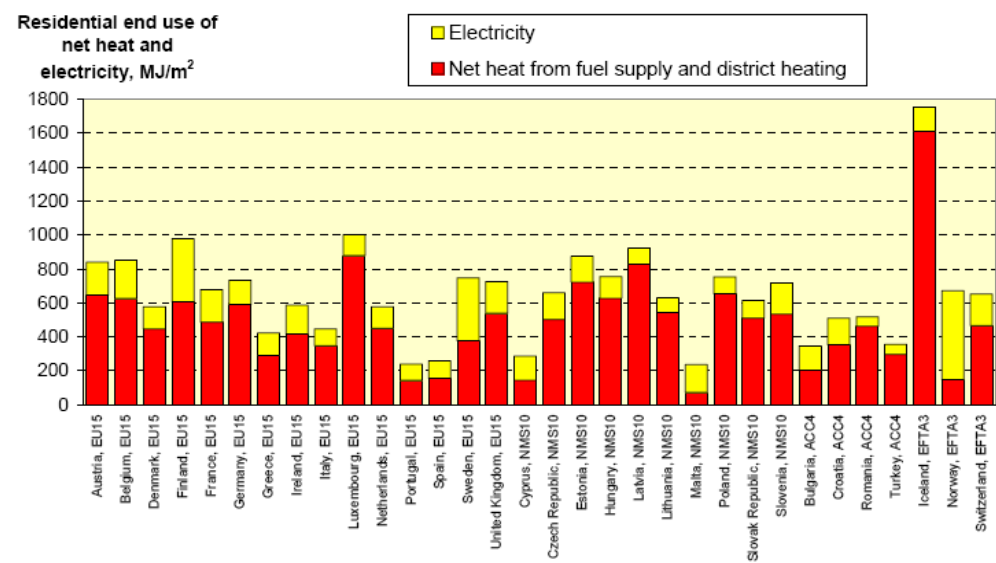


Figure o-6: Total use of heat and electricity per m² in the residential sector in 2003 for the different MS (source Ecoheatcool report, 2006).

Energy prices

Table o—12: Electricity prices³³ (including taxes) for household consumers³⁴

Member State	Electricity prices [Euros/kWh]		
	2008	2009	2010 S1
Austria	0.18	0.19	0.20
Belgium	0.20	0.19	0.20
Bulgaria	0.08	0.08	0.08
Cyprus	0.19	0.16	0.19
Czech Republic	0.13	0.14	0.13
Denmark	0.27	0.26	0.27
Estonia	0.08	0.09	0.10
Finland	0.12	0.13	0.13
France	0.12	0.12	0.13
Germany	0.22	0.23	0.24
Greece	0.11	0.11	0.12
Hungary	0.16	0.16	
Italy	0.21	0.20	0.20
Ireland	0.19	0.19	0.18
Latvia	0.09	0.11	0.10
Lithuania	0.09	0.09	0.12
Luxembourg	0.16	0.19	0.17
Malta	0.13	0.16	
Netherlands	0.18	0.19	0.17
Poland	0.13	0.12	0.13
Portugal	0.15	0.16	0.16
Romania	0.11	0.10	0.10
Slovenia	0.12	0.13	0.14
Slovakia	0.14	0.16	0.15
Spain	0.15	0.16	0.17
Sweden	0.17	0.16	0.18
United Kingdom	0.15	0.14	0.14
Average EU-27	0.157	0.163	0.175

³³ Eurostat. Energy statistics. Available at : www.epp.eurostat.ec.europa.eu

³⁴ Household consumers refer to consumer band Dc (annual consumption between 2 500 and 5 000 kWh).

Table o—13: Industrial electricity consumer categories, their electricity consumption and the corresponding electricity prices in EU-27 in 2008

Category	Electricity consumption	Electricity prices [Euros/kWh]
Band IA	Consumption < 20 MWh	0.1544
Band IB	20 MWh < Consumption < 500 MWh	0.1458
Band IC	500 MWh < Consumption < 2 000 MWh	0.1281
Band ID	2 000 MWh < Consumption < 20 000 MWh	0.1135
Band IE	20 000 MWh < Consumption < 70 000 MWh	0.1073
Band IF	70 000 MWh < Consumption < 150 000 MWh	0.0990
Band IG	Consumption > 150 000 MWh	0.1056

Table o—14: Electricity prices (including taxes) for industrial consumers, average of the prices for categories IA to IC

Member State	Electricity prices [Euros/kWh]		
	2008	2009	2010
Austria	0.143	:	:
Belgium	0.167	0.159	0.160
Bulgaria	0.081	0.086	0.086
Cyprus	0.199	0.169	0.200
Czech Republic	0.163	0.164	0.167
Denmark	0.231	0.221	0.208
Estonia	0.076	0.085	0.093
Finland	0.089	0.094	0.096
France	0.101	0.106	0.110
Germany	0.179	0.187	0.193
Greece	0.121	0.132	0.139
Hungary	0.161	0.152	0.140
Italy	0.203	0.212	0.208
Ireland	0.168	0.165	0.156
Latvia	0.099	0.122	0.122
Lithuania	0.111	0.117	0.135
Luxembourg	0.129	0.158	0.138
Malta	0.157	0.158	0.235
Netherlands	0.168	0.182	0.168
Poland	0.137	0.138	0.152

Member State	Electricity prices [Euros/kWh]		
	2008	2009	2010
Portugal	0.123	0.128	0.132
Romania	0.122	0.112	0.118
Slovenia	0.147	0.158	0.145
Slovakia	0.174	0.209	0.183
Spain	0.139	0.161	0.170
Sweden	0.113	0.108	0.131
United Kingdom	0.137	0.138	0.141
Average EU-27	0.150	0.156	0.160

Table o—15: Natural gas average price (including taxes) for domestic household consumers (standard household consumer has consumption less than 20 GJ/year)

Member State	Natural gas prices [Euros/GJ]		
	2008	2009	2010 S1
Austria	16.7	17.6	17.3
Belgium	18.3	15.6	14.7
Bulgaria	10.4	11.4	10.2
Czech Republic	13.4	13.4	13.0
Denmark	26.6	26.2	29.7
Estonia	9.8	10.5	10.1
France	15.3	15.7	14.5
Germany	19.5	17.2	15.7
Hungary	12.1	13.3	:
Ireland	16.6	16.6	13.8
Italy	18.7	17.9	17.1
Latvia	11.3	12.5	8.7
Lithuania	9.9	11.5	10.4
Luxembourg	14.9	13.3	12.1
Netherlands	20.2	20.9	19.5
Poland	12.9	11.8	11.8
Portugal	17.4	16.6	16.5
Romania	9.3	7.8	7.6
Slovakia	12.2	13.0	12.1
Slovenia	17.6	16.6	16.0
Spain	17.1	15.9	14.8

Member State	Natural gas prices [Euros/GJ]		
	2008	2009	2010 S1
Sweden	27.7	25.8	28.7
United Kingdom	12.1	11.8	11.3
Average EU-27	16.3	15.4	14.5

Table o—16: Industrial natural gas consumer categories, their natural gas consumption and the corresponding natural gas prices in EU-27 in 2008

Category	Natural gas consumption	Natural gas prices [Euros/GJ]
Band I1	Consumption < 1 000 GJ	14.85
Band I2	1 000 GJ < Consumption < 10 000 GJ	13.47
Band I3	10 000 GJ < Consumption < 100 000 GJ	11.92
Band I4	100 000 GJ < Consumption < 1 000 000 GJ	10.52
Band I5	1 000 000 GJ < Consumption < 4 000 000 GJ	:
Band I6	Consumption > 4 000 000 GJ	:

Table o—17: Natural gas prices (including taxes) for industrial consumers, average of the prices for categories I1 to I3.

Member State	Natural gas prices [Euros/GJ]		
	2008	2009	2010
Austria	:	:	:
Belgium	14.71	11.83	12.47
Bulgaria	8.28	10.46	9.59
Czech Republic	12.51	10.99	12.08
Denmark	24.76	17.92	26.88
Estonia	10.03	15.78	9.88
Finland	10.55	9.88	10.72
France	12.85	11.61	12.92
Germany	16.64	13.01	14.55
Hungary	14.23	14.35	13.42
Italy	13.09	12.72	12.05
Ireland	13.79	12.99	10.72
Latvia	11.86	11.64	10.43
Lithuania	12.63	12.12	11.32
Luxembourg	12.11	11.32	12.31
Netherlands	16.00	14.29	14.75
Poland	12.10	14.58	11.75
Portugal	11.97	10.29	11.29
Romania	9.17	10.00	7.52
Slovenia	16.03	11.18	15.80
Slovakia	13.61	14.65	12.77
Spain	10.47	12.99	11.15
Sweden	20.36	15.28	18.69
United Kingdom	11.35	12.41	9.25
Average EU-27	13,41	11,58	12,45

Table o—18: LPG prices (including taxes) for Member States in EU as of April 2010³⁵

Member State	LPG prices [Euros/litre]
Belgium	0.57
Bulgaria	0.52
Czech Republic	0.57
Estonia	0.63
France	0.72
Germany	0.62
Hungary	0.64
Italy	0.66
Latvia	0.54
Lithuania	0.57
Luxembourg	0.53
Netherlands	0.7
Poland	0.53
Portugal	0.69
Romania	0.46
Slovakia	0.48
Slovenia	0.67
Spain	0.62
United Kingdom	0.75
Average EU-27	0.60

³⁵ European Commission. Europe's energy portal. Available at: www.energy.eu

Table o—19: Heating gasoil prices (including taxes) for Member States in EU as of on
26/01/2009³⁶

Member State	Heating gasoil prices [Euros/1000 litre]
Austria	599
Belgium	452
Bulgaria	776
Cyprus	524
Czech Republic	493
Denmark	895
Estonia	547
Finland	574
France	593
Germany	555
Greece	510
Hungary	849
Italy	1,026
Ireland	620
Latvia	509
Lithuania	475
Luxembourg	420
Malta	770
Netherlands	639
Poland	520
Portugal	657
Romania	512
Slovenia	538
Slovakia	543
Spain	536
Sweden	890
United Kingdom	479
Average EU-27	611

³⁶ Market Observatory for Energy. Evolution of oil and petroleum product prices and taxation levels during the year 2008. Available at: http://ec.europa.eu/energy/observatory/oil/doc/prices/oil_price_in_2008.pdf

Interest and inflation rates

Table o—20: Most recent average interest and inflation rates for EU-27

Member State	Inflation rate ³⁷ [%]	Interest rate ³⁸ [%]
Austria (AT)	1.1p*	3.99
Belgium (BE)	1.5	4.15
Bulgaria (BG)	5.4	6.78
Cyprus (CY)	1.4	4.60
Czech Republic (CZ)	2.2	4.82
Denmark (DK)	1.9	3.81
Estonia (EE)	3.8	8.34
Finland (FI)	2.6	3.98
France (FR)	0.8	3.85
Germany (DE)	0.8	3.43
Greece (EL)	1.9	5.19
Hungary (HU)	3.9	9.39
Ireland (IE)	0.0	5.09
Italy (IT)	1.6	4.55
Latvia (LV)	7.7	10.03
Lithuania (LT)	6.9	11.46
Luxembourg (LU)	0.6	4.47
Malta (MT)	3.6	4.65
Poland (PL)	4	6.08
Portugal (PT)	0.1	4.41
Romania (RO)	6.4	9.30
Slovakia (SK)	2.3	4.90
Slovenia (SI)	1.7	4.62
Spain (ES)	0.8	4.17
Sweden (SE)	2.2	3.34
The Netherlands (NL)	1.6p	3.90
United Kingdom (UK)	2.9	3.67
Euro area (MUICP)	1.1p	4.32
EU (EICP)	1.8p	

* Signifies provisional

³⁷ 12 month average rates Aug 09-08 / Aug 08-07, source: EUROSTAT, available at: www.europa.eu/rapid/pressReleasesAction.do?reference=STAT/09/132&format=HTML&aged=0&language=EN&guiLanguage=en

³⁸ ECB long-term interest rates; 10-year government bond yields, secondary market. Most recent 13 month average (%), Aug 2008 to Aug 2009 (www.ecb.int/stats/money/long/html/index.en.html)



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