



Supported by



Energy saving concepts for the European ceramic industry

CERAMIN



Public Final Report

written by
KI Keramik-Institut GmbH
Rüdiger Köhler

Legal disclaimer

The sole responsibility for the content of this publication lies with the authors. It does not necessarily reflect the opinion of the European Communities. The European Commission is not responsible for any use that may be made of the information contained therein.



Table of Contents

Basic project data	5
Executive summary	6
0 Introduction	8
1 Energy consumption figures of different ceramic branches and EU-countries..	11
1.1 Procedure for data collecting and data from the partner -countries	11
1.2 Energy consumption figures - United Kingdom	12
1.3 Energy consumption figures - Poland	14
1.4 Energy consumption figures - Italy	15
1.5 Energy consumption figures - Germany	16
1.6 Energy consumption figures - Spain	18
1.7 Energy consumption figures - France	19
1.8 Energy consumption figures - Austria, Netherlands, Portugal and further countries	19
1.9 Summery of European Energy consumption in the ceramic industry divided into sub branches	20
2 Judgement of existing labels supporting low energy consumption in relation to the “Triple-E-Label”	23
2.1 Existing labels - <i>ECO-Label</i>	25
2.2 Existing labels - <i>Energy Star</i>	26
2.3 Existing labels - <i>European Union energy label</i>	27
2.4 Existing labels - The European Energy Trophy	28
2.5 Existing labels - <i>KlimaHaus/CasaClima</i>	30
2.6 Summary about existing labels	31
3 The CERAMIN-Label: Characteristics, awarding and verification procedures ..	32
3.1 Course of data collection at each national partner	32
3.2 Rules for calculation from collected data	34
3.3 Rules for awarding	35
3.4 Verification of data	35
4 Results of the championship	36
5 Tutorial about energy saving	40



6	Individual final reports from the partner countries	41
7	Summary	42
8	Prospect, „Triple-E-Label” awarding from 2010 to 2015	43
	Annex 1: Data to be collected from companies, who wants to apply for one of the „Triple-E-Labels”	45
	Annex 2: Verification questionnaire	47
	Annex 3: Results of data collection of energy consumption	51
	Annex 4: Example of a Certificate	54
	Annex 5: Chapter “Masonry bricks” as example of “Tutorial about energy saving”	55
	Annex 6: Short final report by CERAM – United Kingdom	61
	Annex 7: Short final report by Institute of Glass, Ceramics, Refractory and Construction Materials – Poland	64
	Annex 8: Short final report by ETA – Italy	69

List of Tables

Table 1:	Project-Partner data.....	5
Table 2:	Different use of the European decree about CO ₂ -trading in the partner - countries	12
Table 3:	Number of companies per branch and country that take part in the CERAMIN project until 31.10.2009	36
Table 4:	Companies with lowest absolute energy consumption and largest energy mitigation per ceramic sub branch.	37
Table 5:	Winners of CERAMIN	39

List of Pictures

Picture 1:	Energy consumption of the ceramic industry in the UK in 2002-2006.....	13
Picture 2:	Number of enterprises of British ceramic industry in 2002-2006	13
Picture 3:	Energy consumption of Polish ceramic sub branches in 2005.....	14



Picture 4: Energy consumption in some Italian ceramic sub branches 2002-2004	15
Picture 5: Number of German ceramic companies, divided into sub-branches.....	17
Picture 6: Energy consumption of German ceramic companies, divided into sub- branches.....	17
Picture 7: Energy consumption of Spanish ceramic companies, divided into sub- branches.....	18
Picture 8: Energy consumption of French ceramic companies, divided into sub- branches.....	19
Picture 9: Energy consumption of European ceramic industries sub branches	21
Picture10: Energy consumption and number of ceramic enterprises of different EU- countries (calculated from CO2-emissions)	22

Abbreviations

CERAMIN	Acronym of the Project
EEE	Extraordinary Energy Efficient OR Energy Efficiency Enhancement
BREF	Best available Techniques REFerence document
SEC	Specific Energy Consumption
EUTS	European Union Emission Trading Scheme
GHG	Green House Gas (e.g. CO ₂)
UK	United Kingdom
I	Italy
PL	Poland
F	France
E	Spain
D	Germany

Basic project data

Full title of the Project: Energy saving concepts for the European ceramic industry

Acronym of the Project: CERAMIN

Agreement Duration: 36 month

Starting date: 01.11.2006

End date: 31.10.2009

Coordinator: Leipziger Institut für Energie GmbH
Torgauer Str. 116
D 04347 Leipzig

Project-Partner:

Participant name	Participant short name	Country
Instytut Szkła, Ceramiki, Materialow Ogniotrwalych i Budowlanych (E)	ISIC	Poland
CERAM Research Ltd.(E)	CR	United Kingdom
Societe Francaise de Ceramique (E)	SFC	France
ETA – Energia, Trasporti, Agricoltura srl	ETA	Italy
Centre recursos d'iniciatives i autocupacio, s.l.	CRIA	Spain
KI Keramik-Institut Meißen GmbH (E)	KI	Germany

Table 1: Project-Partner data
(E) ...Expert Partner



Executive summary

The CERAMIN project was created to encourage the European ceramics industry to decrease their specific energy consumption (SEC) by means of a competition and by a “Tutorial about energy saving” for the ones who haven’t won. The ceramics industry was divided into sub branches that are as similar as possible to the BREF *Ceramic Manufacturing Industry*. Focus is laid on items of mass-production with a high-energy input.

The procedure of the championship was similar to a round robin that is executed to evaluate e.g. laboratories: Producers of ceramics from 6 European countries were invited to report energy consumption data to their national partner. This partner reported anonymous data to the KI Keramik-Institut GmbH, who was responsible to calculate energy consumption data as well as energy mitigation data by the comparison of energy consumption from two years (page 34). The results were sorted within each sub branch. The awarding rules were:

1. An Extraordinary Efficiency Energy award for a ceramic sub branch will be given if at least 6 companies from at least 2 European countries apply within one sub branch. The (one!) company with the lowest specific energy consumption per branch can be awarded.
2. An Energy Efficiency Enhancement award for a ceramic sub branch will be given if at least 6 companies from at least 2 European countries apply within that branch. The round down quarter (25%) with the greatest energy mitigation of the applying companies can be awarded.

If a company has won the national partner was informed. He informed the respective company and verified their data if not already done by the EUTS. After the national partner had the data of the respective company confirmed, the company could be awarded if it wanted. Then it got a certificate (Annex 4) and the name of the company was published.



In total nine companies were awarded in 2009 (page 39).



- ↪ Only Polish and UK-partners were winners of the „Triple-E-Label” awarding in 2009.
- ↪ In four sub branches industries partners were awarded.
- ↪ Three awards on the base of absolute figures were handed out
- ↪ Six awards of energy efficiency enhancement were established.

Another main results of the CERAMIN-project is the “Tutorial about energy saving”. The recommendations or remarks collected in the “Tutorial about energy saving” are based on remarks of the winning companies, on general experiences and on a lot of references marked in the tutorial’s text and the references list at the end of this tutorial. All knowledge was given or collected by the expert partners. The tutorial about energy saving is divided into chapters covering the ceramic sub branches except refractories and technical ceramics. Each chapter of the covered sub branches gives advice for the technological steps of the respective sub branch. There are tutorials in 6 European languages, which can be found on: <http://www.ceramin.eu/Ceramin/downloads.htm>.

The championship will continue from 2010 to 2015. The rules of the championship are unchanged. New awards can be given if at least new data from 3 industry partners are collected within one sub-branch until the 31st of October each year. The calculation of new energy data and the update of the order concerning energy consumption or mitigation will be free of charge. Companies who could newly be awarded have to agree themselves and have to accept a fee for the efforts of the awarding and certificate.



0 Introduction

The CERAMIN project was created to encourage the European Ceramics industry to decrease their specific energy consumption (SEC) by means of a competition and by a tutorial about energy saving for the ones who haven't won. Focus is laid on items of mass-production with a high-energy input.

The whole producers of ceramics will be subdivided into the following subgroups (sub branches) of producers or enterprises in accordance to the main products produced. The division of the ceramic branch into sub branches refers mostly to BREF Ceramic Manufacturing Industry, December 2006 (*BREF... Best available Techniques REFerence document*) as shown below:

- Masonry bricks, lightweight bricks, (kiln temperature mostly < 1000 °C)
- Facing bricks, paving bricks (kiln temperature mostly > 1050 °C)
- Roofing tiles

BREF summarizes these sub branches to

- *“Bricks and roof tiles”.*

For the objectives of CERAMIN it is necessary to divide them into the above written sub branches. Sometimes, when no divided data are available, this class will be used as sum.

- Vitrified clay pipes
- Refractory products
- Expanded clay aggregates
- Wall and floor tiles
- Table- and ornamental ware (household ceramics)
- Sanitary ware
- Technical ceramics
- Inorganic bounded abrasives

The target group are key market players. They will benefit in different manners. Information on “Best Available Technologies” show possible developments and strategies for more efficient production. The applied benchmarks indicate the possible improvements for the different production processes. Due to a high percentage of energy input and overall rising energy costs, reducing the specific energy input per product, will result in decreasing production costs and therefore will strengthen the position of the company. Market players are highly depended on consumers. Lower possible prices on products and an improved image will strengthen the position in the market furthermore.

The project partners involved in the project come from the major ceramic producing countries in Europe. They represent nearly all of the key players in this market and are directly involved into the results of this project, due to workshops, meetings and the setting of benchmarks. Among them are enterprises that deal with energy and energy-efficiency. Other ceramic enterprises federations, research establishments and institutions, not directly involved, were invited to national and international workshops. They are encouraged to discuss and disseminate information as well as to exchange experiences.

The first step of work was to identify the ceramic sub branches that have a high-energy consumption compared to the other ones. Chapter 1 shows the results of this investigation.

Parallel to the identification of huge energy consumers within the ceramic sub branches the presence similar rewards, tests, logos or championships, concerning low energy consumption, was checked. This has been done to learn from the experiences of the other examples. The ones with the greatest importance for the project are shown in Chapter 2. From the experiences and knowledge of the examined labels the criteria of the CERAMIN Label are derived respectively adjusted.



Chapter 3 deals with the procedures of data collection from ceramic producers about their energy consumption, with validation of the data and with the criteria for the championship about energy saving.

Chapter 4 shows the results of data collection and the winners of the championship about energy saving.

In Chapter 5 a short overview about the Tutorial of energy saving is given. This tutorial is one of the main outcomes of the project and therefore available in 6 languages on www.ceramin.eu.

Chapter 6 summarizes the results and experiences of the project.

Chapter 7 describes the rules to award ceramic producers that save energy in their production for the years 2010 to 2015



1 Energy consumption figures of different ceramic branches and EU-countries

The objective of this chapter is to give a brief report about the collected data on energy consumption of the EU ceramic-industry and to identify the ceramic branches and sub-branches with the highest energy consumption. The complete report is available on http://www.ceramin.eu/Ceramin/downloads/Report_on_energy_consumption.pdf

For this report mainly the partner-countries of CERAMIN

Poland, Germany, France, United Kingdom, Italy and Spain

are taken into consideration.

Further countries (e.g. Netherlands, Austria and Portugal) will be considered as far as data are available.

1.1 Procedure for data collecting and data from the partner -countries

All partners of the CERAMIN project had a template table available with the request to fill it in with all reachable data. Objective of the request was to get a lot of data that can be analysed by general ceramic knowledge.

The origin of the collected data varies from 2002 to 2006. If different years from the same source were considered, average data were calculated.

In a lot of cases only data for CO₂-emissions were available. For these numbers the energy consumption was calculated by the assumption that only natural gas is used and the assumption that this gas is responsible for 0,05 tonsCO₂ per GJ.

The data are mostly originated from the national authority responsible for CO₂-trading. For that reason it has to be taken into consideration which companies have to take part in CO₂-trading in which country. The European decree demands: All companies that

1. Have a production of more than 75 tons of ceramic products per day

AND/OR

2. Have a firing aggregate (kiln) with more than 4 cubic meters volume and have more than 300 kg ceramic products per cubic meter.

have to take part in CO₂-trading.

According to the AND/OR written in capitals different EU-countries have different national rules for CO₂-trading. These rules influence the number of companies (and the data) reported by the respective country. In table 2 the four possibilities and the rules of each country are listed for the period 2002-2006 if available. Possibility 2 is among this possibilities the strongest one and possibility 1 the weakest.

Possibility 1	companies that fulfil item 1 AND 2 have to take part	UK, I, PL
Possibility 2	companies that fulfil item 1 OR 2 have to take part	F
Possibility 3	companies that fulfil item 1 have to take part	
Possibility 4	companies that fulfil item 2 have to take part	D

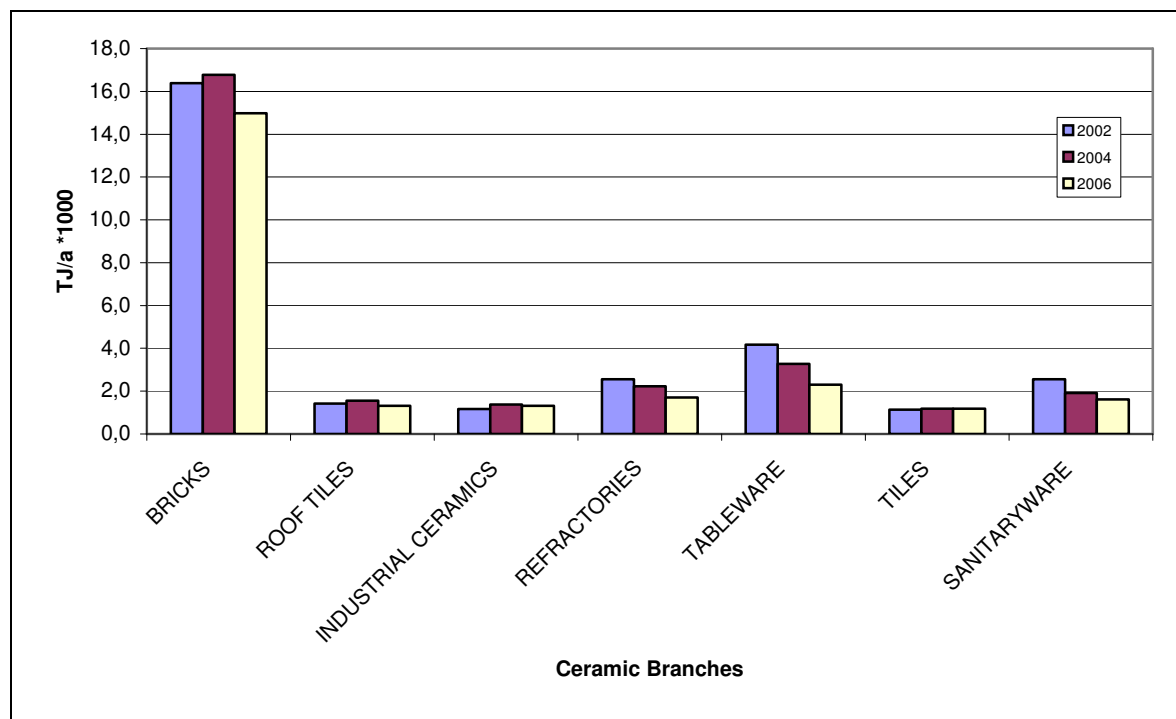
Table 2: Different use of the European decree about EUTS in the partner – countries for the years 2002-2006

The classification of the companies from the general classification “Ceramics” to the sub-branches defined in Chapter 2 was done by the knowledge of the respective company, by checking their Internet site or by a personal phone call.

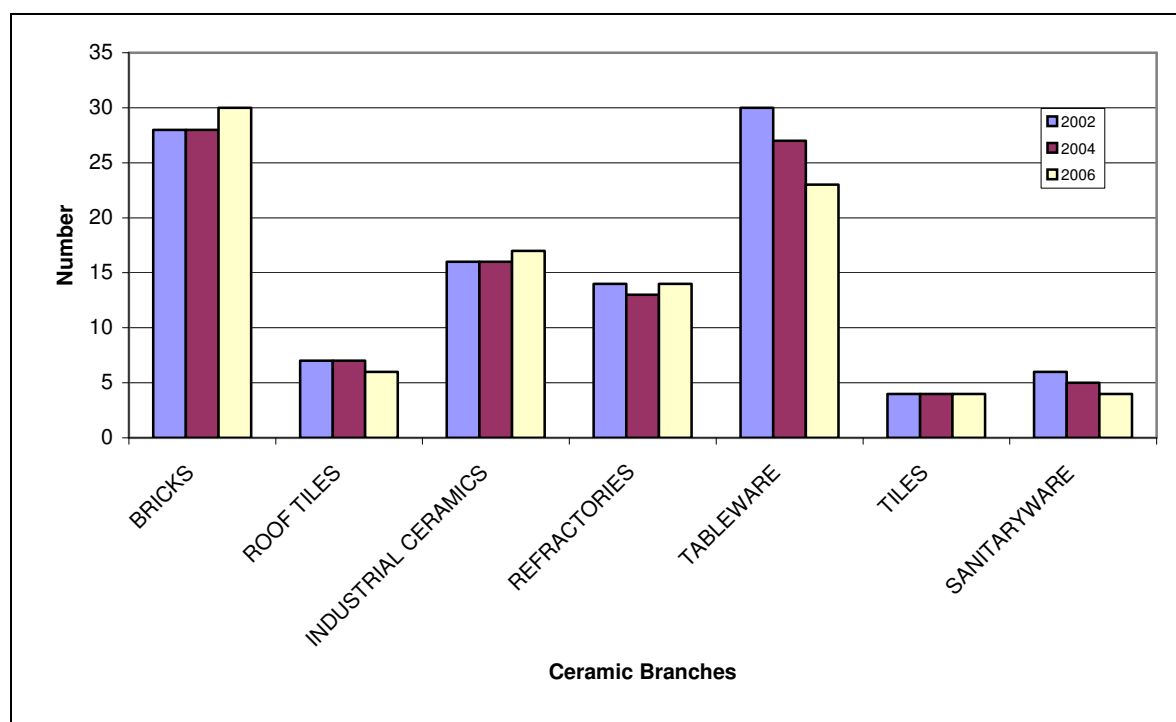
1.2 Energy consumption figures - United Kingdom

Pictures 1 and 2 show the (fuel-) energy consumption level of the British ceramic industry. For tableware, sanitary ware and refractories a decreasing energy consumption level is shown. Especially for tableware the decreasing level of energy consumption is due to a decreasing production level. The decreasing energy consumption level of refractories branch could be due to technical improvements. Because of a not decreasing European market for refractories, it is assumed that the British production level of refractories remained on at least the same level from 2002 to 2006.

The brick production uses among the British ceramic branches by far the most fuel energy followed by sanitary ware and refractories, taking into account that the European table ware production, as the British, will further decrease their production capacities.



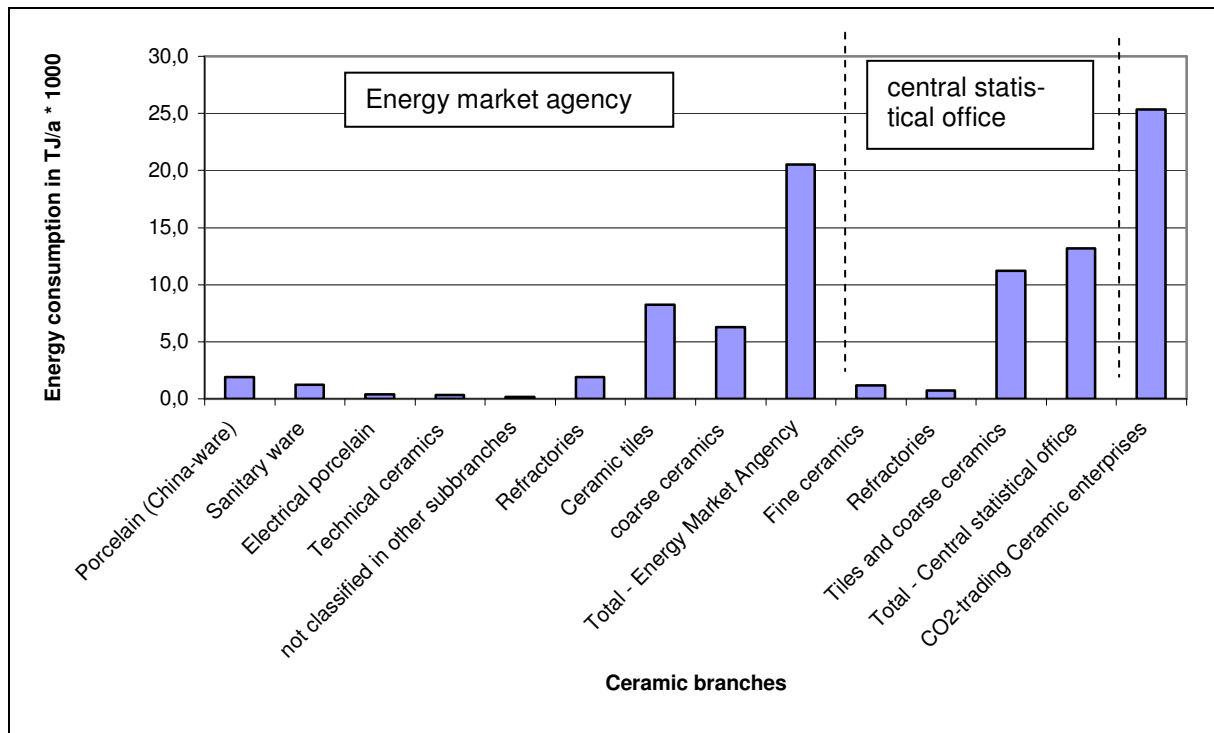
Picture 1: Energy consumption of the ceramic industry in the UK in 2002-2006



Picture 2: Number of enterprises of British ceramic industry in 2002-2006

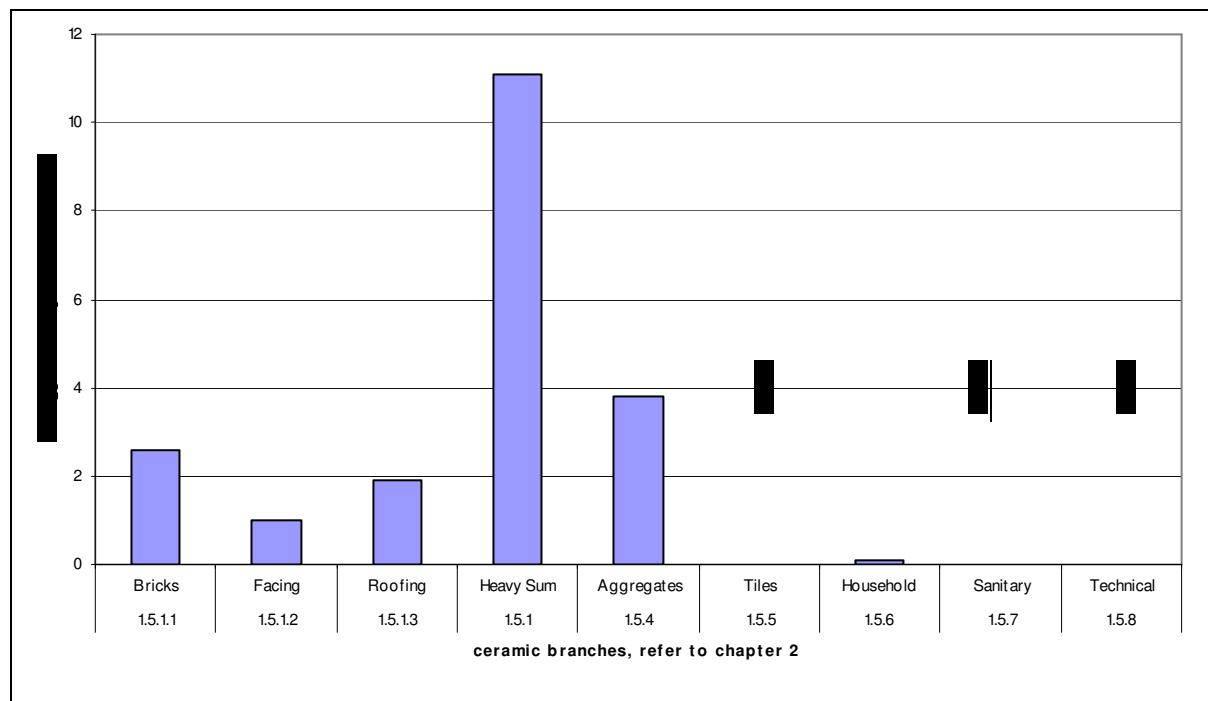
1.3 Energy consumption figures - Poland

Only data from 2005 are available. The best subdivision into sub branches was done by the Energy Market Agency. This data represent a lot of Polish ceramic production, although not all, as the last bar in picture 3 shows. According to picture 3 tiles and coarse ceramics production are the main consumers of energy in the ceramics industry of Poland.



Picture 3: Energy consumption of Polish ceramic sub branches in 2005

1.4 Energy consumption figures - Italy



Picture 4: Energy consumption in some Italian ceramic sub branches 2002-2004

For Italy only data about companies that have to take part in EUTS are available (possibility #1, refer to table 2). The CO₂-values allocated for 2005 and 2006 are reported. Normally these data are originated from the CO₂-emissions and therefore they represent the energy consumption of the reporting period from 2002-2004. For a lot of enterprises no clear classification into the coarse ceramic sub-branches defined in chapter 0 is possible because of their broad production spectrum. The expanded clay aggregates industry has a surprisingly high share of energy compared to coarse ceramics. The very well developed and strong Italian tile industry is according to the rules of EUTS unfortunately not reported, although this branch could share a high amount of energy compared to the other branches.



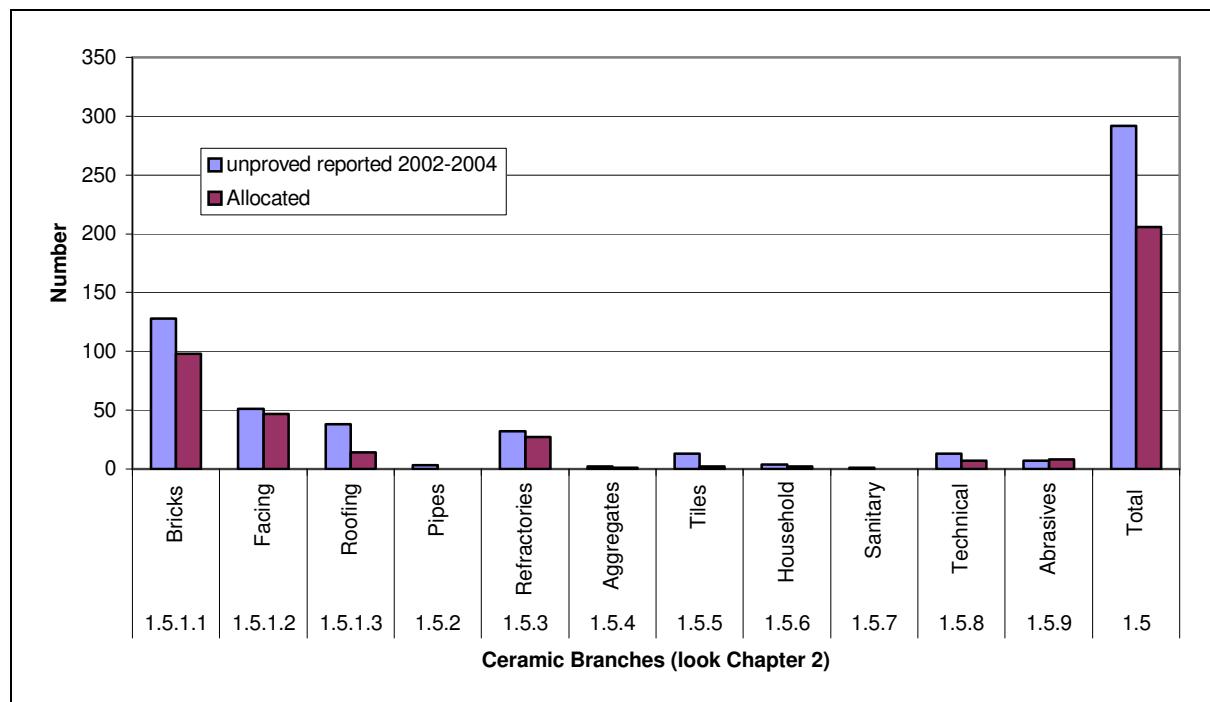
1.5 Energy consumption figures - Germany

The German data have their origin mostly in data published by the Deutsche Emissionshandelsstelle (www.dehst.de). In Germany only companies that fulfil *Possibility 4* according to table 2 have to take part in CO₂-trading.

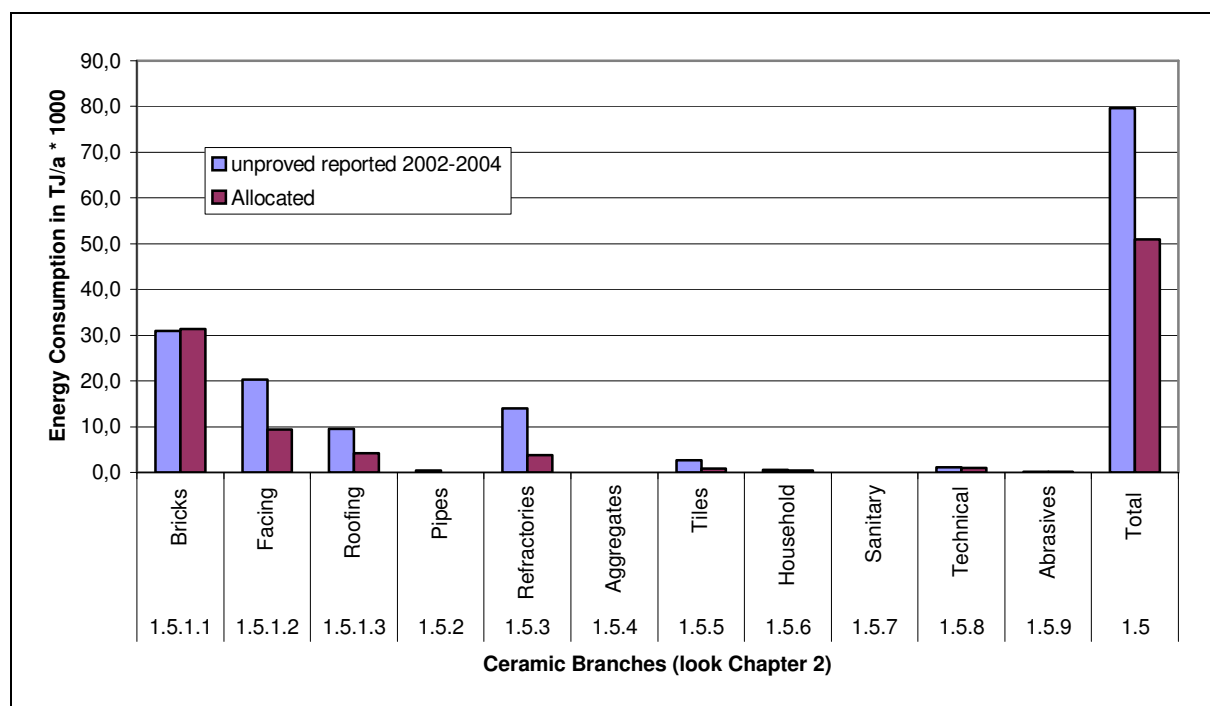
The 2002 to 2004 data are originated by an unproved data collection initiated in 2004 to get information about the companies that have to take part in EUTS and to allocate the free of charge emission rights. The information given by the respective companies was published without prove. For that reason some CO₂-emission-numbers are wrong and what is important as well, a lot of companies, which are not forced to take part in CO₂-trading, report their CO₂-emissions. In numbers: 292 companies report their data and only 206 are forced to take part in CO₂-trading. According to the EU and the German regulations about CO₂-trading some branches are completely not considered (and allocated) for CO₂-trading (e.g. a big share of the roof tile production, all of tile production).

Pictures 5 and 6 show the comparison of the unproved and later allocated CO₂-emissions. The unproved numbers were used for the table and figures that show the whole European situation (Chapter 1.9), because of the broader spectrum of branches considered.

The differences between allocated and verified CO₂-emissions are due to companies not operating at full (or allocated) capacity, with a slow increase from 2005 to 2006 and presumable with further increase to 2007 due to the economical development in Germany.



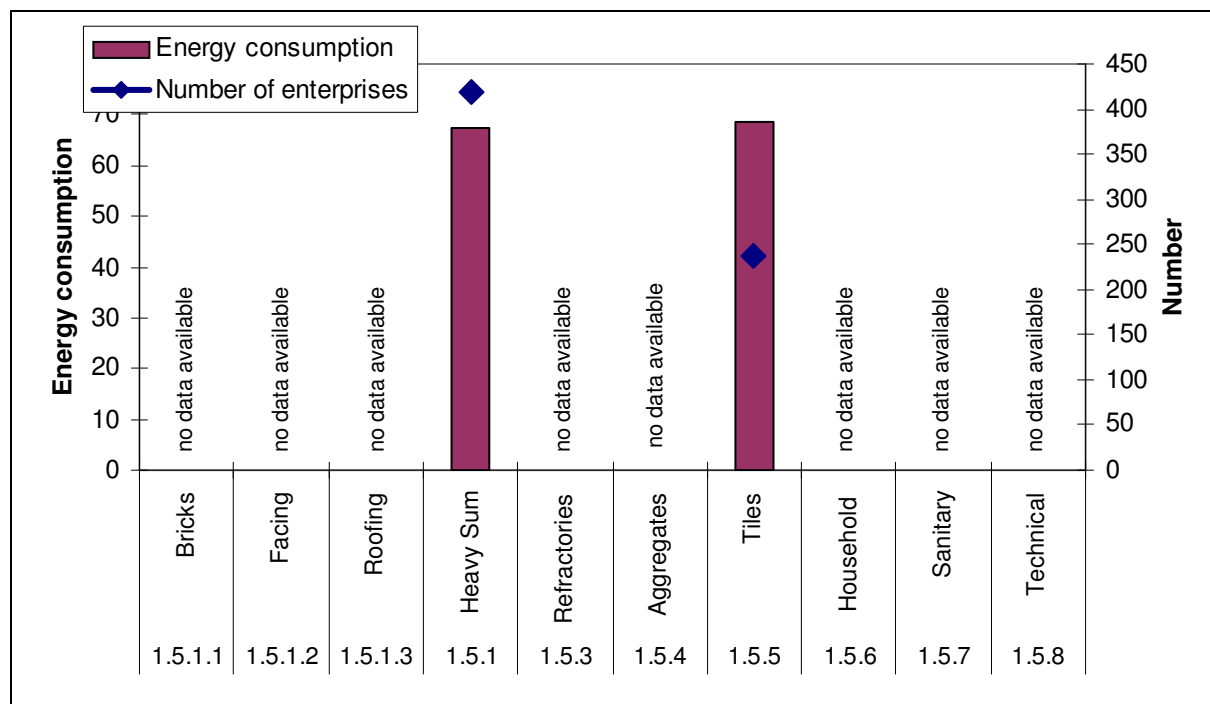
Picture 5: Number of German ceramic companies, divided into sub-branches



Picture 6: Energy consumption of German ceramic companies, divided into sub-branches

1.6 Energy consumption figures - Spain

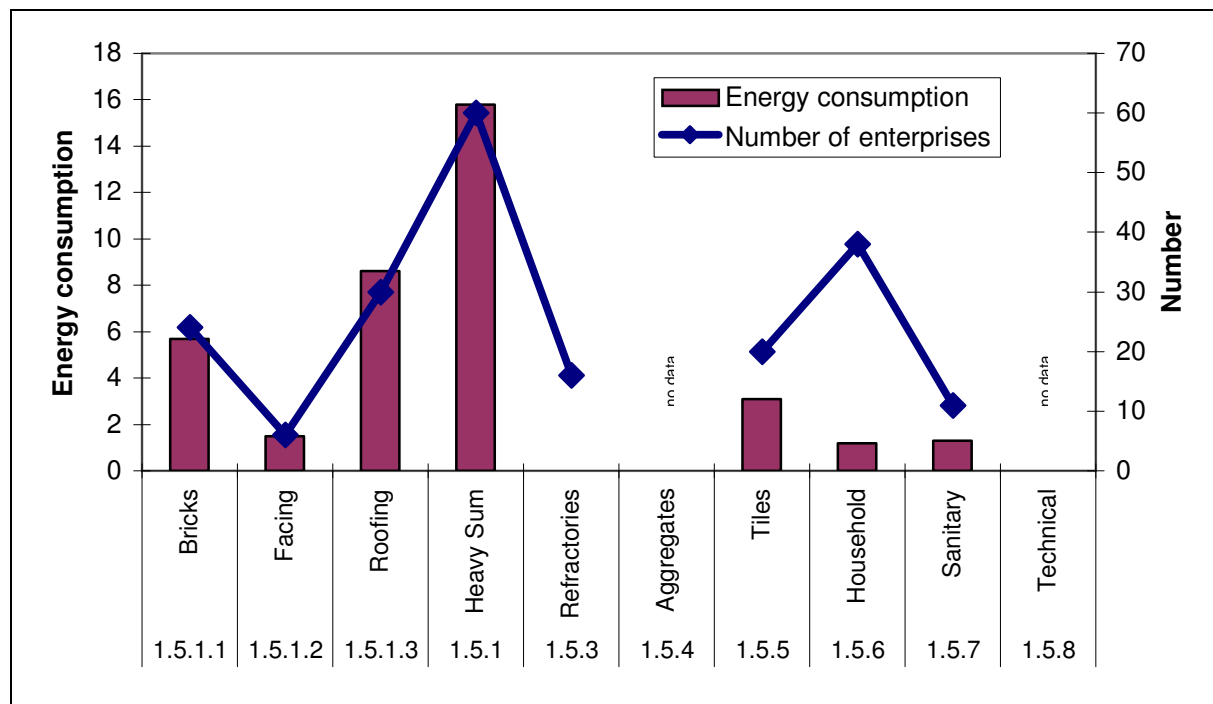
Picture 7 shows the energy consumption data for Spain. For the heavy ceramics industry and the tile producing industry the greatest amounts of energy consumption are reported compared with the other considered EU-countries. That is due to the really strong Spanish ceramic industry but it can also be due to the source of data: the Spanish brick manufactures association and the Spanish tile manufactures association respectively. The data of these both authorities cover the whole branch and not only the huge manufactures. Unfortunately there are no data available, that divide the heavy ceramics products into their sub groups and there are no data available for the other – but presumable smaller- sub branches.



Picture 7: Energy consumption of Spanish ceramic companies, divided into sub-branches

1.7 Energy consumption figures - France

Picture 8 shows the energy consumption data for the ceramic sub branches of France. The data are calculated from real production data and estimated (average) specific energy consumption data for each sub branch.



Picture 8: Energy consumption of French ceramic companies, divided into sub-branches

1.8 Energy consumption figures - Austria, Netherlands, Portugal and further countries

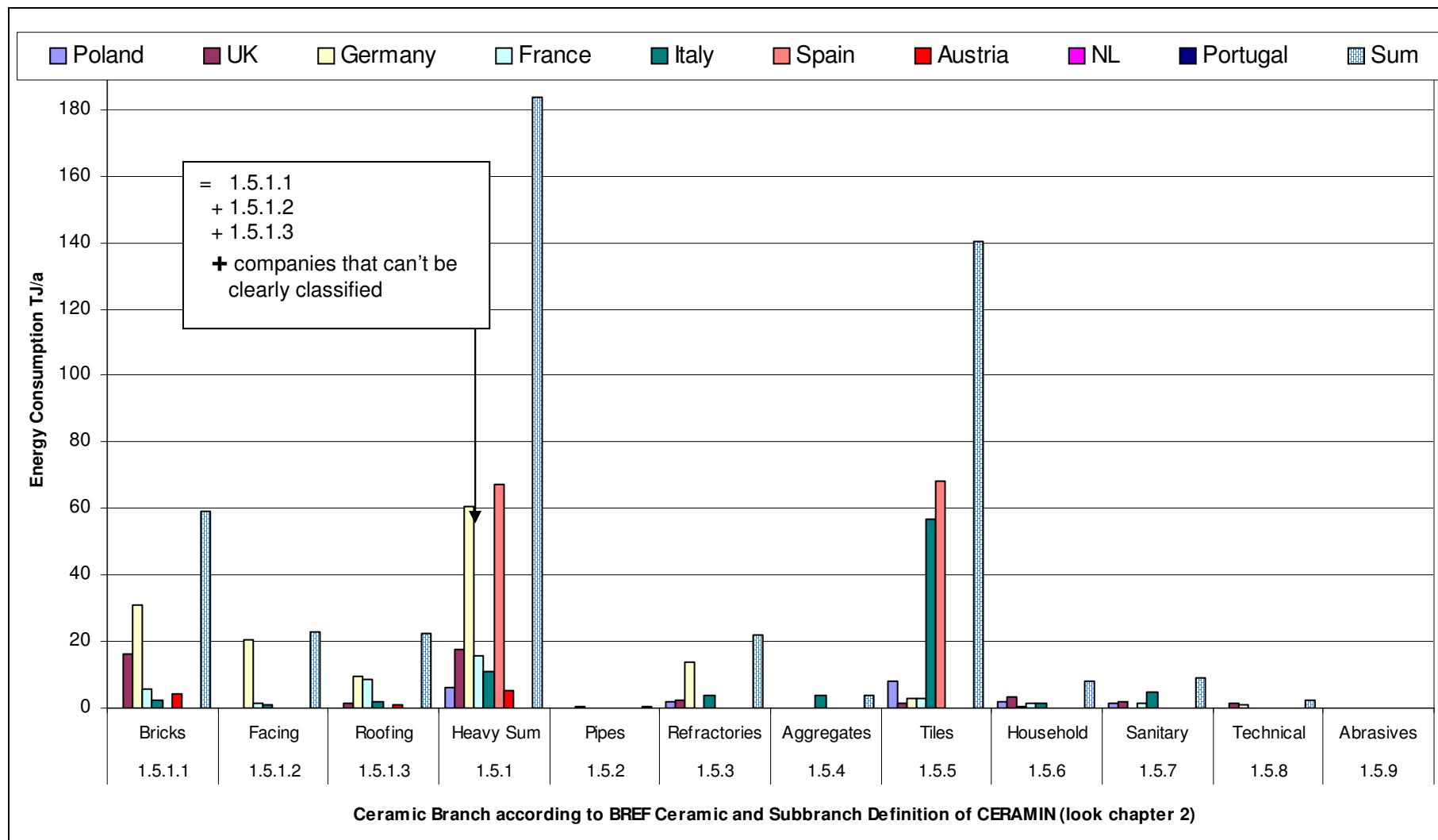
For Austria, the Netherlands and Portugal the data of verified emissions for 2005 and 2006 were used. These data are published on the European-CO₂-Register ([Community Independent Transaction Log \(CITL\)](#)). Only for Austria the respective companies could be classified according to chapter 0. Due to only native language Internet-sites of the Dutch and Portuguese companies no classification was possible – only the sums are listed in Summery of Energy consumption of the European ceramics industry (Chapter 1.9)

1.9 Summary of European Energy consumption in the ceramic industry divided into sub branches

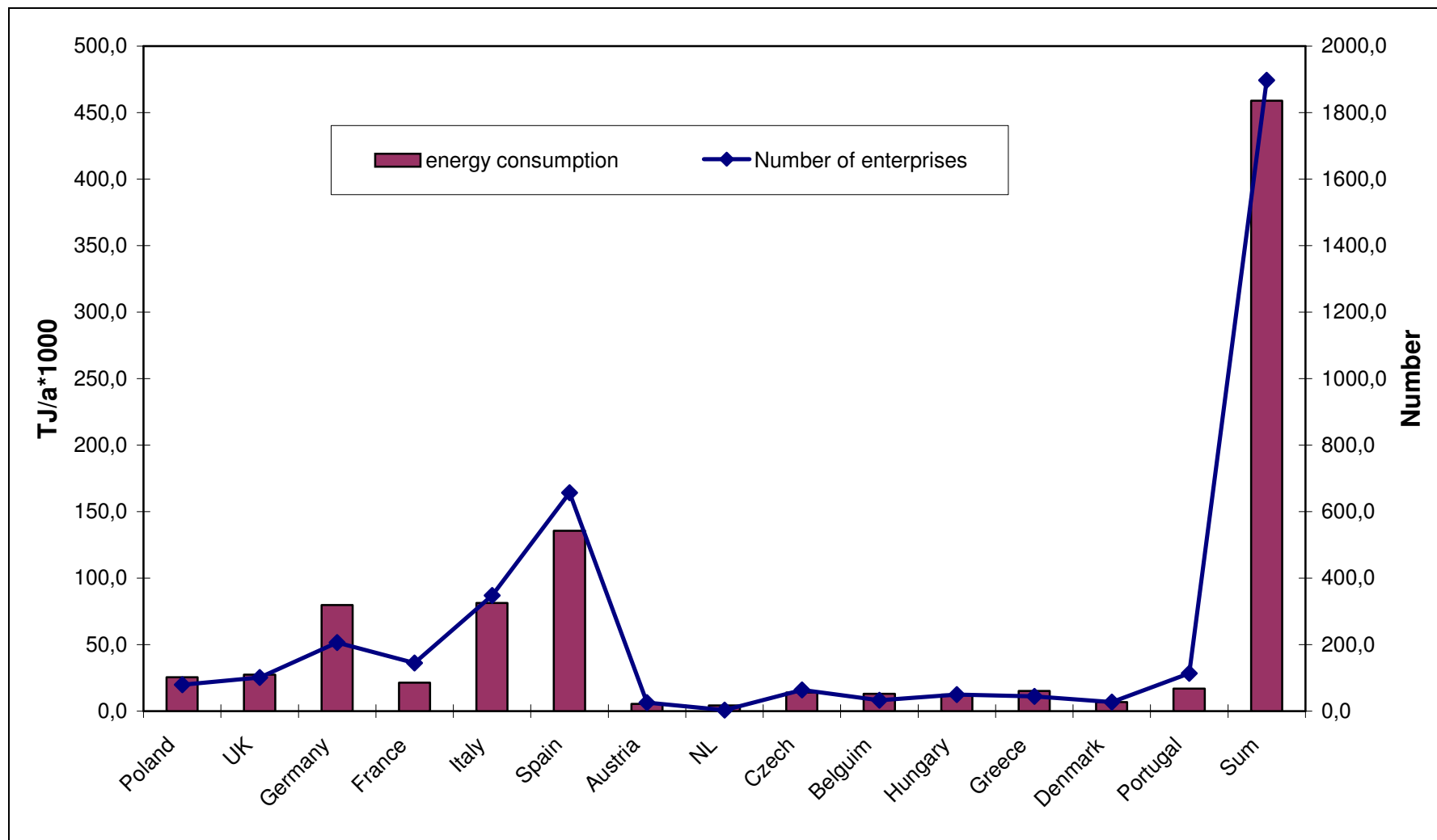
According to the Picture 9 the tiles and heavy ceramics sub branches are the ones with the greatest energy consumption. The difference between these two sub branches is smaller than expected. The very strong tile industries of Italy and Spain are responsible for that. Beside these two branches the refractories have mentionable energy consumption, mainly due to German factories. The numbers of this sub branch might be much higher if the strong French refractories branch could be also taken in account (16 French companies, but no energy consumption data available). Additionally the dividing between refractories and technical ceramics is sometimes a bit mixed up, because differences are mainly defined by the application of the product (refractory: support high temperature processes, technical ceramics: electrical, medicine, engineering use).

From the technical point of view the energy consumption for heavy ceramics products and tiles are high due to huge production amounts and the fair high-energy consumption of refractories is due to high kiln temperatures. That means a small decrease of energy consumption per unit of heavy ceramics or tiles has great effects on the whole energy consumption of the sub branch. For refractories respectively technical ceramics the situation is more complicated due to mostly sophisticated and special products.

According to picture 10 Italy, Spain and Germany consume the greatest part of energy used for ceramics production in Europe, followed by Poland, the UK and France. From that point of view and by the number of enterprises the consortia of the CERAMIN project consist of the main European “ceramic countries”.



Picture 9: Energy consumption of European ceramic industries sub branches



Picture10: Energy consumption and number of ceramic enterprises of different EU-countries (calculated from CO2-emissions)

2 Judgement of existing labels supporting low energy consumption in relation to the “Triple-E-Label”

This chapter describes main principles and rules for a label and trophy awarding of intelligent energy use (low(er) energy consumption) in the European ceramic industry. Therefore general possibilities of influence on energy use are discussed briefly and existing labels or trophies are analysed further on.

The name of the proposed label is: “Triple-E-Label” – which shall award and stimulate

1. Extraordinary Energy Efficient
2. Energy Efficiency Enhancement

ceramic products and production

Possible ways to reach these objectives vary:

1. Benchmarks or regulations created and forced by national or EU-authorities (e.g. CO₂-limits for branches or countries)

Advantage:

- The objectives will be reached for sure

Disadvantage:

- Distortion of competition with regions or countries who are not under the power of the regulations
- All companies will be treated mostly the same, with no consideration about specialities of their situation.
- Takes money to force the regulation
- Strong and/or modern companies do not do as much as they could and weaker ones might be overtaxed.

2. Voluntary self obligation of whole industry branches, worked out by associations or representatives (e.g. obligation of producers of passenger vehicles to decrease the average CO₂-emissions of cars to 140 g/km until 2008)

Advantage:

- The respective branch will not take any damage by this obligation. The power, the annual turnover or the jobs are not endangered

Disadvantage:

- The public can not be sure that the obligation represents the best possible figures for the whole branch
- Some or more companies will not join the voluntary obligation and will not change anything for this reason

3. EU-Authorities or representatives of the EU or private associations create labels for low energy consumption. (similar to ISO 9001 regulations)

Advantage:

- Participation is optional
- The companies that apply for the label or the ones that are awarded are well controlled. It is approved for these companies, that the objective numbers are reached.
- Getting or keeping the label could be part of the marketing strategy of the companies.

Disadvantage:

- Only a limited number of companies will take part
- The “black sheep” can waste energy as before
- Success of such a label depends on the choice of not too restrictive criteria.

4. Organizing championships for low energy consumption together with labels and/or trophies.

Advantage:

- Participation is optional
- The companies that apply for the label/trophy or are awarded are well controlled. For these companies it is approved that the objective numbers are reached
- Getting or keeping the label/trophy could be part of marketing strategy of the companies

- One can be sure that the companies among the top ten or top twenty of the intelligent energy use competition do their best to become the champion
- No criteria necessary
- Information about the smartest energy use can be collected.

Disadvantage:

- Only a limited number of companies will take part
- The “black sheep” can waste energy as before
- Organising a championship takes more effort than simple label awarding

In the following some labels/trophies used in Europe that reward intelligent energy use are listed and analysed. Main view will be on the principles of the labels/trophies regarding their advantages and disadvantages, if used in the European ceramics industry.

2.1 Existing labels - *ECO-Label*

Established in 1992, the EU Eco-label "Flower" is a **unique certification scheme aimed** to help European consumers distinguish **greener**, more **environmentally friendly**, products and services (not including food and medicine).

According to <http://www.eco-label.com/default.htm>: "There are currently twenty-three different product groups, and already more than 250 licences have been awarded for several hundred products."

The *Eco-Label* is given by EU-Authorities on a voluntary obligation, with fixed regulations for each product or process or branch.



Characteristics

- The Label is organized and accepted on a EU-basis
- Same regulations for all companies that want to apply
- Clear published criteria for products and processes.

- Energy consumption limitation for hard floor coverings (=floor tiles) are ambitious compared to BREF Ceramics Industry.
- Long term effects if the regulations are updated regularly
- The regulations (paper and hard floor coverings were checked) are difficult to understand for end users

Conclusion

CERAMIN should take the advantages of *ECO label*, but make sure that national specialities are taken into consideration and that the public dissemination is better.

2.2 Existing labels - Energy Star

According to <http://www.energystar.gov>: “ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping us all save money and protect the environment through energy efficient products and practices.”



In 1992 the US Environmental Protection Agency (EPA) introduced ENERGY STAR as a voluntary labelling program designed to identify and promote energy-efficient products to reduce greenhouse gas emissions. Computers and monitors were the first labelled products. Through 1995, EPA expanded the label to additional office equipment products and residential heating and cooling equipment. In 1996, EPA partnered with the US Department of Energy for particular product categories. The ENERGY STAR label is now on major appliances, office equipment, lighting, home electronics, and more. EPA has also extended the label to cover new homes and commercial and industrial buildings.

Characteristics

- Well known all over the world
- End-user and product orientated

- Same regulations for all companies that want to apply
- Clear published criteria for products and processes.
- Available for a broad range of products, that is steadily enlarged
- Concerning temperature insulation in buildings quite weak regulations, all other regulations can't be judged
- No regulations for production processes

Conclusion

The *Energy Star* is a successful label concerning its spreading over the world. There is a poor transparency for end-users. It can't give an example for CERAMIN label, because of its dimensions the governmental organization and product orientation

2.3 Existing labels - *European Union energy label*

“*European Union energy label* is given by EU-Authorities with a governmental, urgent obligation for fixed types of products (e.g. washing machines, refrigerators), with fixed testing principles for each product group.

“According to several different EU Directives (92/75/CEE, 94/2/CE, 95/12/CE, 96/89/CE, 2003/66/CE, et alia) most white goods, light bulb packaging and cars must have an EU Energy Label clearly displayed when offered for sale or rent.” The energy efficiency of the appliance is rated in terms of a set of energy efficiency classes from A to G on the label, A being the most energy efficient, G the least efficient. The labels also give other useful information to the customer as they choose between various models. The information should also be given in catalogues and included by Internet retailers on their websites” from Wikipedia, the free encyclopaedia. Between 1995 and 2000 0,75 Mill tons CO₂ were saved by new techniques used for whiteware.



Characteristics

- The Label is organized and accepted on a EU-basis
- Well known by end users, high transparency due to classification into groups of energy-consumption
- Same regulations for all products that have been applied for
- Clear published criteria for products, makes it easy for producers to define objectives of further product development
- Producers are able to justify higher prices if their product has a low energy consumption
- The testing costs increase costs of all products
- Regular need for updating Label-regulations to cover the technical progress
- Due to the status of a fixed European decree, the Label is presumable not as flexible as non governmental labels or labels on voluntary obligation might be

Conclusion

The *European Union energy label* is a very effective tool to increase the awareness of energy consumption. Organized on European decree basis – for that reason not comparable with CERAMIN. It is expensive to define the parameters for the different classes to compare products.

2.4 Existing labels - The European Energy Trophy

The *European Energy-Trophy* award is organised by European NGO's as championship between the participants about saving the highest amount of energy in office buildings. According to <http://www.energytrophy.org/en-home>: “The *European Energy Trophy* is an EU-wide





competition of companies and public administrations for saving energy in office buildings. ...The aim was to award the Energy Trophy to participants who saved the most energy in one office building in one year using cost-free measures only

Characteristics

- Companies and public administrations are addressed
- The Label is organized and accepted on a EU-basis
- Companies with the highest energy consumption have the best chance to win the championship, if they are engaged because the highest amount of energy saving is awarded
- No negotiations about limits of e.g. CO₂-waste rights necessary.
- Easy to handle, because of simple rules
- Possibility to have national and international winners of the championships at the same time
- Short term effects, after winning the championship there is no guarantee that the low energy consumption remains
- Sponsors for the trophy are necessary
- It is only proofed that the energy consumption (or CO₂-emission) are lowered, it is not proofed that they are lowered the most possible amount
- The winning company has cost saving effects and the honour of winning, but it has no marketing effects for their products.

Conclusion

The principle of *European Energy Trophy* is quite near to the objectives of CERAMIN, the missing label weakens the tool concerning his long-term effects and concerning the marketing benefits for the participating companies.



2.5 Existing labels - KlimaHaus/CasaClima

KlimaHaus/CasaClima is organised by a regional governmental organisation, labelling the energy consumption of houses in 3 Levels on voluntary obligation. According to <http://www.klimahauseragentur.it/en/casaclima/klimahausercasaclima.html>:

“*KlimaHaus/CasaClima* is a term developed to describe energy-saving construction and dynamic living. In a time when oil and gas reserves are being depleted, economic factors are increasingly important in building and renovation.

KlimaHaus/CasaClima has found a way to fuse well-being and savings. The category of energy saving, rather than architectural style, determines whether a building is classified as a *KlimaHaus/CasaClima*. A practical calculation system is used to determine a building's energy requirement, making the *KlimaHaus/CasaClima* programme simple and user-friendly.



The energy index and *KlimaHaus/CasaClima* placard are the fundamental pillars of the organisation, and the positive image associated with *KlimaHaus/CasaClima* has inspired builders' imitation. Significantly, *KlimaHaus/CasaClima* not only focuses on new construction, but also on the lasting renovation. Furthermore the Label itself defines the degree it is awarded for: All buildings certified with *KlimaHaus/CasaClima* categories Gold, A or B may display the corresponding *KlimaHaus/CasaClima* placard directly at the entrance, testifying to its low energy class. This increases the image, not to mention the value, of the property. The placard is provided by an independent authority, namely the *KlimaHaus/CasaClima* Agency!”

Characteristics

- The Label is organized and accepted on governmental regional Basis
- Label awarding by proofed specialists
- Clients can be sure to get an energy efficient building
- Offer is been completed with championships to architects and technicians to erect the building with lowest energy consumption and with education offers.
- High level of public dissemination e.g. testing and betting of how long a block of ice will exist in a well temperature insulated building

- The label has to adapt from time to time to cover the momentarily available techniques.
- The organisers of the championships or bets need prizes for the winning company or person

Conclusion

KlimaHaus/CasaClima is a perfect mixture of labelling, championship and dissemination to promote low energy consumption of complex and complicated products. CERAMIN can learn a lot from this label.

2.6 Summary about existing labels

Successful labels need a lot of effort to disseminate them. The most successful label is presumably the European Union energy label and the Energy Star. The European Union energy label is successful because it is obligatory in all EU-countries for whiteware – and it has a good level of valued information for end users about energy consumption. Due to its obligatory basis also products with poor energy consumption have to be labelled.

The Energy Star is well known all over the world from the use of computer equipment. The criteria are not really transparent, therefore the end user can only trust the EPA or not. The European-Eco-label is similar to the Energy Star, concerning its criteria, but it is not as well known as the Energy Star. All three labels cannot give an example for CERAMIN because of its governmental basis. The transparency of the European Union energy label is exemplary.

Energy Trophy and Klimahaus are two labels that shall give example for the CERAMIN label. The character of a championship of both labels can be easily used in CERAMIN in a national and a EU-wide championship.

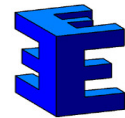
The idea of CERAMIN label to award only the top-third or the top-quarter of products of enterprises could not be found in use by another label: This procedure should be as



transparent as the European Union energy label is. One advantage of the Energy Trophy had to be kept in mind in the CERAMIN project. It is to create championships in 2 disciplines:

1. Absolute lowest specific energy consumption per product or branch
2. Greatest decrease of specific energy consumption per product or branch

3 The CERAMIN-Label: Characteristics, awarding and verification procedures



The CERAMIN-Label is given as “Triple-E-Label” in two categories:

1. Absolute lowest specific energy consumption per product and branch

Extraordinary Energy Efficient

2. Greatest decrease of specific energy consumption per product and branch – comparing two years

Energy Efficiency Enhancement

Each category has its own rules about awarding but the same rules about data collection and data verification.

3.1 Course of data collection at each national partner

The course of data collection is agreed from all Partners as follows

1. Every enterprise that takes part provides a data collection for the base year
 2. Every enterprise that takes part provides a data collection for the comparison year
- Both data collections of the respective enterprise contain at least all information marked as mandatory in Annex 1. The respective national partner archives both data collections by one NUMBER OF ENTERPRISE, which allocates the respective enterprise.

↳ The respective national partner is responsible, that the allocation of an enterprise and the NUMBER OF ENTERPRISE is dealt as confidential. The national partner

is only allowed to inform third parties after getting a written permission by the respective enterprise.

↪ The reported data should (if not **CASE 2** applies) fulfil the following directives, proved by verification

- DIRECTIVE 2003/87/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC [[Link](#)]
- COMMISSION DECISION of 29 January 2004 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council [[Link](#)]

Both of these directives have to have a pendant in the national right and legislative of each partner country

CASE 1: The data **are verified** by national or rather European rules:

The enterprise has the possibility of getting the „Triple-E-Label“ without further proving.

CASE 2: The data **are NOT verified** by national or rather European rules.

The respective enterprise has to accept a **verifying procedure** by his national partner before getting the „Triple-E-Label“ (-if it is among the enterprises who are invited to get the label). This procedure is defined by a “Verification Questionnaire” described in Chapter 3.3 and Annex 2.

The national partner collects data presented in Annex 1 from the reports or the companies and transmits them to the project coordinator. At least two sets per company (*base* and *comparison* year) have to be transmitted.



3.2 Rules for calculation from collected data

3.2.1. Absolute specific energy consumption

$$\text{specific energy used} = \frac{\text{energy used [MJ / a]}}{\text{net Production [tons / a]}} \left[\frac{\text{MJ}}{\text{ton}} \right]$$

Net Production: saleable products without scrap.

Energy used: total amount of yearly energy input, scrap or saleable products being produced

3.2.2. Specific energy mitigation

$$\text{Energy Mitigation} = \frac{\text{SpecificEnergyuse}_{\text{baseyear}} - \text{SpecificEnergyuse}_{\text{comp.year}} [\text{MJ / ton}]}{\Omega} [\text{MJ / ton}]$$

Definition of Omega Ω

The same amount of energy saved has a higher value if the compared years are closer to each other. Ω shall never be smaller than 1.

The expert team has agreed on the **Quotient Ω** . All stated definitions have to apply.

Difference between compared years	1	2	3	4	5	6	7	8	9	10	11	12
Omega Ω	1	1,5	2	2,5	3	3,5	3,6	3,7	3,8	3,9	4	4

Calculation example

Base year: 1998
 Comp. year: 2005
 Omega: from 7 years = 3,6

$$\text{Energy Mitigation} = \frac{2.500[\text{MJ / ton}] - 2.000[\text{MJ / ton}]}{\Omega (2005 - 1998)} = \frac{500}{3,6} [\text{MJ / ton}] = 138,8 [\text{MJ / ton}]$$

3.3 Rules for awarding

There is no right to get an award. The national partner is allowed to award a company from his country if it fulfils the rules described in the following chapters 3.3.1 and 3.3.2. The national partner can decline to award a national company. The national partner should give reason for declining to the company that isn't awarded. A declining is definite, until the company delivers changed or new data.

3.3.1 Rules for Extraordinary Energy Efficient awarding

An award for a ceramic sub branch will be given if at least 6 companies from at least 2 European countries apply within that branch. The (one!) company with the lowest specific energy consumption (*specific energy used* according to chapter 3.2.1.) per branch can be awarded.

3.3.2 Rules for Energy Efficiency Enhancement awarding

An award for a ceramic sub branch will be given if at least 6 companies from at least 2 European countries apply within that branch. The round down quarter with the greatest energy mitigation (according to chapter 3.2.2) of the applying companies can be awarded.

3.4 Verification of data

Each company that wants to be awarded has to allow a verification of the reported data by the national partner. A verification questionnaire can be found in Annex 2. In case of data taken from an already verified EUTS report (Annex 1, case 1) a separate verification isn't necessary, but it is strongly recommended to check the correct transfer of data from the EUTS report to the data collection sheet. The national partners confirm on the award (certificate) the correctness of the reported data.

4 Results of the championship

According to the rules of chapter 3 ceramic producing companies from the 6 partner countries were invited to share their energy consumption data with the respective partner.

Table 3 shows the number of participating companies per branch and country per 31st of October 2009, it shows all branches that were covered and it shows the partner countries.

The branches with the most participating companies are the pavements and wall bricks branch as well as the refractories and tableware branch. Unfortunately there was no reported data from Italy and only a few from Spain and France.

	UK	E	F	I	D	PL	Sum of branches
Select		1					1
Masonry bricks					1	5	6
Pavement and wall bricks	9				13	2	24
Roof tiles						1	1
Refractories	2	2	1			2	7
Wall and floor tiles	1		1			1	3
Wall tiles (only)			1				1
Floor tiles (only)							0
Sanitary ware			1		1	1	3
Table ware	4		1			2	7
Technical ceramics							0
Sum of Countries	16	3	5	0	15	14	53

Table 3: Number of companies per branch and country that take part in the CERAMIN project until 31.10.2009

Table 4 shows the results of the competition. The rules for calculation of energy mitigation are described in chapter 3.2. According to the rules, at least two years of production of one company had to be covered. From these two years, only one result of mitigation per company is calculated. For this reason both last columns of table 4 are empty for the base year. The participating companies are sorted by branch and the level of energy mitigation. Only the data of the winners of energy mitigation and absolute energy consumption per branch are listed in table 4 (without notice of the rules of chapter 3.3.1). The whole table of all participants will be found in Annex 3. According to chapter 3.4. only the data of the winners are verified (proofed). All other data was not verified initially with the exception of the heavy ceramics branches where verification according to EUTS was available for most of the companies.

	Number of Enterprise	Number of Plant	Branch	Sum of energy consumption [GJ]	specific energy use [GJ/t]	Place-ment absolut	Energy mitigation	Placement mitigation
PL	PL-10	PL-10	Masonry...	1.548.350	14,02	11	2,66	1
PL	PL-12	PL-12	Masonry...	65.850	0,99	1	0,18	6
PL	PL-10	PL-10	Masonry...	1.509.927	16,68	12		
UK	5	1	Pavement...	56.609	10,63	42	3,81	1
UK	3	1	Pavement...	21.388	4,24	32	1,63	2
UK	8	1	Pavement...	9.768	3,16	25	1,10	3
UK	1	1	Pavement...	4.024	1,37	1		
UK	8	1	Pavement...	13.168	4,26	33		
UK	3	1	Pavement...	35.812	5,88	39		
UK	5	1	Pavement...	62.746	14,45	46		
PL	PL-5	PL-5-1	roof...	78.481	4,27	1	12,08	
UK	9	1	refractories	90.397	16,31	14	6,27	1
PL	PL-9	PL-9	refractories	225.906	4,11	4	-0,37	7
PL	PL-9	PL-9	refractories	204.396	3,75	2	-0,84	8
PL	PL-9	PL-9	refractories	144.576	2,90	1	not awarded, look text	
UK	13	1	tiles	475.346	8,80	7	0,67	1
F	B	1	tiles	349.200	5,00	1		
UK	13	1	tiles	491.282	9,46	8		
F	A	1	sanitary...	176.090	20,79	5	3,02	1
PL	PL-7	PL-7	sanitary...	118.560	10,68	1	1,03	2
UK	11	1	table...	131.907	56,35	11	13,18	1
PL	PL-2	PL-2	table...	454.358	31,21	1	9,30	3
UK	11	1	table...	169.593	76,12	13		

Table 4: Companies with lowest absolute energy consumption and largest energy mitigation per ceramic sub branch.

Red bold: Energy mitigation winners



Green bold: Absolute energy consumption winners

Black bold: Winner, but not awarded, because of “6 companies rule”
(Look chapter 3.3.1)

The company PL9 from the refractories branch has the lowest specific energy consumption (SEC) in 2003. From 2003 to 2005 the SEC has increased. That might be due to new or different products. Generally exist a strong dependency between the kind of products and the SEC in the refractories branch, which makes it difficult to award SEC. The consortia together with the national partner decided that no SEC-award will be given for the refractories branch.

Table 5 lists the companies that have been awarded. Annex 4 shows an example of a certificate.

Coincidentally when the collecting of data for table 4 was about to be completed, the economic problems of the years 2008/2009 arose. As a result of these problems, the willingness of companies to participate decreased in an unpredictable manner. For this reason only very few companies were ready to give data about their own success of energy saving to the respective project expert partners.

The consortium decided that additionally to the awarding of „Triple-E-Labels”, every participating industry partner will receive an official document, which certifies their participation in the CERAMIN project (2009) and allows the use of the “Triple-E” logo for advertisement and promotion. This on the other hand will promote the „Triple-E-Label” and its awarding procedure.







Country – No.	Name of Company	Type of award / Branch	Web
UK-1	Michelmersh Brick Group	Winner absolute energy consumption / Pavement and wall bricks branch	www.michelmersh.com
UK-5	Cheshire Brick Makers	Winner energy mitigation / Pavement and wall bricks branch	
UK-3	Raeburn Brick Ltd	2 nd energy mitigation / Pavement and wall bricks branch	www.raeburnbrick.co.uk
UK-8	Phoenix Brick Company Ltd	3 rd energy mitigation / Pavement and wall bricks branch	www.bricksfromphoenix.co.uk
PL-10	Przedsiębiorstwo Ceramiki Budowlanej PLECEWICE S.A	Winner energy mitigation / Masonry bricks	http://pcb-plecewice.pl/
PL-12	Zakład Ceramiki Budowlanej MARKOWICZE S.A.	Winner absolute energy consumption / Masonry bricks	www.markowicze.com.pl
UK-11	Portmerion Potteries Ltd	Winner energy mitigation / Tableware	www.portmeirion.co.uk/
PL-2	Zakłady Porcelany Stołowej „LUBIANA” S.A.	Winner absolute energy consumption / Tableware	www.lubiana.com.pl

Table 5: Winners of CERAMIN

5 Tutorial about energy saving

One of the main results of the CERAMIN-project is the “Tutorial about energy saving”. When the CERAMIN project started, the idea of the tutorial was to cover the knowledge and the experiences of the participating companies and especially the winning companies to spread it over the whole branch. In the course of the project even before the economical crises arose all partners had to learn that knowledge about energy saving is part of the know-how of the companies. For that reason technologies or experiences of energy saving are dealt confidential in nearly all cases. This behaviour can be explained by the immense energy costs of each ceramic product. With the arising of the economic difficulties the willingness to share knowledge decreased even further. The consequence is that most of the recommendations or remarks collected in the “Tutorial about energy saving” are based on remarks of the winning companies, on general experiences and on a lot of references marked in the text and the references list at the end of this tutorial. All knowledge were given or collected by the expert partners.

The tutorial about energy saving is divided into chapters covering the sub branches of table 3 except refractories and technical ceramics. The refractories and technical ceramics branch wasn't taken into account because of its broad range of products and technologies. For the technical ceramics branch were, in addition, no companies found that want to share their energy data. In each of the covered sub-branches is given advice for the technological steps

-  Body and raw materials
-  Shaping
-  Drying
-  Firing (Kiln and kiln car design, Fuel and firing technology)

The tutorial about energy saving refers to older companies and very modern ones, as well. For that reason: Please bear in mind: Only a few recommendations of the tutorial will fit your respective production or your needs about costs and benefits, exactly.



The tutorial was translated into the languages of the CERAMIN-Partners. The tutorial is available on <http://www.ceramin.eu/Ceramin/downloads.htm> in

↪ [English](#) (Authorized by the 4 Expert-Partners, according to table 1)

↪ [Polish](#)

↪ [French](#)

↪ [Italian](#) (the Italian “Tutorial about Energy saving” differs particularly from the authorized English tutorial)

↪ [Spanish](#)

↪ [German](#)

6 Individual final reports from the partner countries

The Annexes 6 to 8 show the short final reports from United Kingdom, Poland and Italy. Especially the reports from the UK and Poland confirm the general awareness of energy consumption in their countries but they also confirm that the readiness of sharing energy consumption data or technological know-how is low.

From Spain and France no individual short final report is available; the same applies for Germany where this present report was written.

7 Summary

The main outcome of the project is the awarding of 9 enterprises from the ceramics branch in the categories:

- ↳ Extraordinary Energy Efficient - Lowest absolute energy consumption, without electric energy
- ↳ Energy Efficiency Enhancement – Greatest energy mitigation between a base and a comparison year

This awarding shall encourage the whole branch to decrease their energy consumption. An example of the award is been shown in annex 4.

At the beginning of the project a survey about energy consumption of the European ceramic industry was executed. In the result of that survey the masonry bricks branch and the tiles branch were identified as the branches with the greatest energy consumption, followed by other heavy ceramics branches and the refractories branch. The main ceramic energy consumers are situated in Italy and Spain according to their strong tile industry. The ceramic industries of Poland, Germany and the United Kingdom are also quite great consumers compared to other European countries mainly driven by their heavy ceramics companies.

10 different labels that have objectives similarly to the “Triple-E-Label” were examined to adjust the rules and characteristics of the awarding procedure. The so-called Klimahaus (<http://www.klimahausagentur.it/en/casaclima/klimahauscasaclima.html>;) and the energy trophy (<http://www.energytrophy.org/en-home>) were used to give example for the CERAMIN-“Triple-E-Label”.

The data to be collected from a company that wants to be awarded are fuel consumption data and production data (without scrap) from a base year and a comparison year (for details look chapter 3). From this data and the before agreed calculation rules (chapter 3) an energy consumption per mass [GJ/t] is calculated and



used to compare the companies within their branch. The awarding rules are also listed in chapter 3.

In total nine certificate documents have been distributed to the national partners. Only Polish and UK-partners were winners of the „Triple-E-Label” awarding in 2009. In four sub branches industries partners were awarded: Three awards on the base of absolute figures were handed out. Six awards of energy efficiency enhancement were established.

The consortium decided that additionally to the awarding of „Triple-E-Labels”, every participating industry partner will receive an official document, which certifies their participation in the CERAMIN project (2009) and allows the use of the “Triple-E-Label” for advertisement and promotion. This on the other hand will promote the „Triple-E-Label” and its awarding procedure.

8 Prospect, „Triple-E-Label” awarding from 2010 to 2015

In total 52 industry partners from 7 sub-branches of the ceramic industry in 5 partner countries are participating, at present state. The finalisation of the Tutorial on energy saving, the national workshops in the partner countries and other dissemination activities show the effect that further industry partners are interested and that, especially in the partner countries where only little response was witnessed so far, the development is seen more optimistic. Here more positive response is foreseen and the „Triple-E-Label” awarding in 2010 might be of greater interest.

The course and rules of data collection during the time after the project duration are as follows:

1. The project partners will be ready to collect data from industry partners during the next years free of charge (2010 to 2015).
2. In autumn of the years from 2010 to 2015 each project partner reports new companies, that want to apply (deadline: 31.10. each year)

3. The calculation of energy consumption data respectively energy mitigation data and the reporting of a new order per sub branch will be done by the KI Keramik-Institut GmbH free of charge as well, if at least new data from 3 industry partners is collected within one sub-branch at the deadline.
4. The results will be communicated to all partners until the 30.11. each year. Together with the results a suggestion about awarding for the respective year will be presented.
5. New awards can be given if rules of „Triple-E-Label” awarding described in chapter 3 are fulfilled. That means each national partner has to decide finally, whether a company is awarded or not.
6. In addition to the rules of chapter 3 the awarding will only take place if the respective company accepts an awarding fee, which has to be applied from 2010 onward. This awarding fee is 250,- Euro per award. The fee has to be paid once per award and before the award is handed out



Annex 1: Data to be collected from companies, who want to apply for one of the „Triple-E-Labels”

COUNTRY

NUMBER OF ENTERPRISE

NUMBER OF PLANT

(if an enterprise consists of more than one plant, and distinctive numbers of net production and energy consumption are available you should enter these data in different data records. Then the following data refer to the NUMBER OF PLANT.)

DESCRIPTION OF PLANT (e.g. “whole enterprise”-if the enterprise consists of only one plant or “roof tile production”, “extruded tiles line”, “plant 2”)

YEAR OF REPORT

BRANCH (choice from a list)

TYPE OF YEAR OF REPORT (Base or Comp)

NETTO-PRODUCTION in [t * 1000/a]

TYPE OF FUEL 1

QUANTITY OF FUEL 1 in [t/a or 1000 Nm³/a]

LOWER CALORIFIC VALUE 1 in [GJ/t] or [GJ/1000Nm³]

ENERGY-CONSUMPTION 1 in [GJ*1000/a] -*calculated*

TYPE OF FUEL 2

QUANTITY OF FUEL 2 in [t/a or 1000 Nm³/a]

LOWER CALORIFIC VALUE 2 in [GJ/t or GJ/1000Nm³]

ENERGY-CONSUMPTION 2 in [GJ*1000/a] -*calculated*

TYPE OF FUEL 3

QUANTITY OF FUEL 3 in [t/a or 1000 Nm³/a]

LOWER CALORIFIC VALUE 3 in [GJ/t or GJ/1000Nm³]

ENERGY-CONSUMPTION 3 in [GJ*1000/a] -*calculated*

TYPE OF FUEL 4

QUANTITY OF FUEL 4 in [t/a or 1000 Nm³/a]

LOWER CALORIFIC VALUE 4 in [GJ/t or GJ/1000Nm³]

ENERGY-CONSUMPTION 4 in [GJ*1000/a] -*calculated*

TYPE OF FUEL 5

QUANTITY OF FUEL 5 in [t/a or 1000 Nm³/a]

LOWER CALORIFIC VALUE 5 in [GJ/t or GJ/1000Nm³]

ENERGY-CONSUMPTION 5 in [GJ*1000/a] -*calculated*

QUANTITY OF ORGANIC CARBON IN THE BODY (TOC) in [t/a]
ENERGY-BENEFIT from **TOC** in [GJ*1000/a] –calculated with a calorific value of
32,9 GJ/t_[TOC]

TYPE OF KILN (Choice from a list of kiln types, e.g. “roller kiln”, “tunnel kiln” or “more then one”, “not in list”)

DESCRIPTION OF THE KILN(S) (free text to describe the kiln(s) – mandatory if you have chosen for TYPE OF KILN; “more then one” or “not in list”)

LAST_UPDATE_CONCERNING_ENERGY_CONSUMPTION (List of Years)

MAXIMUM TEMPERATURE in [°C]

TIME_COLD_TO_COLD in [h]

DAYS_OF_PRODUCTION_PER_YEAR

DESCRIPTION OF TECHNOLOGY (Please give a short description about the technology used in the plant)



Underlined fields are mandatory



the red marked fields define each data record



Each plant (in most cases an enterprise will just consists of one plant!) needs at least one data record with the TYPE OF YEAR OF REPORT „Base“ and one data record with the TYPE OF YEAR OF REPORT „Comp“.

Annex 2: Verification questionnaire

Page 1 of 1	
Verification Questionnaire	
Country :	Number of Enterprise :
Number of plant:	Year of Report:
<p>Please attach a copy of the “document to verify” to the verifying Questionnaire! Please transfer at first the data demanded in the header from the “document to verify”!</p>	
1. Address of verifying institution:	
2. Name of verifying person:	
3. Date of visiting of applicant of EEE-Label:	
4. Which person was interviewed?	
5. Which person showed the production?	
6. The Company belongs to “Installations for the manufacture of ceramic products by firing, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain”. correct / not correct	
7. The address data of the installation are correct / not correct	
8. The contact data of responsible person concerning the installation are correct / not correct	
9. The contact data of contact person concerning the installation are correct / not correct	
10. The description of plant is correct / not correct	
11. The allocation of branch is correct / not correct	

Verification Questionnaire

Country :	Number of Enterprise :
Number of plant:	Year of Report:

12. The quantity of net production = sellable Products (without scrap or waste)

correct / not correct

13. The quantity of net production is traceable by production documents

OR

Proved by a signed copy of the juristic responsible person

correct / not correct

14. Year of production is consistent with the year of report.

correct / not correct

15. The quantity of fuel 1 was checked by bills for the whole year of reporting.

correct / not correct

16. The lower caloric value of fuel 1 was checked by bills for the whole year of reporting.

correct / not correct

17. The energy consumption from fuel 1 was calculated correctly.

correct / not correct

18. The quantity of fuel 2 was checked by bills for the whole year of reporting.

correct / not correct

19. The lower caloric value of fuel 2 was checked by bills for the whole year of reporting.

correct / not correct

20. The energy consumption from fuel 2 was calculated correctly.

correct / not correct

21. The quantity of fuel 3 was checked by bills for the whole year of reporting.

correct / not correct

22. The lower caloric value of fuel 3 was checked by bills for the whole year of reporting.

correct / not correct

23. The energy consumption from fuel 3 was calculated correctly.

correct / not correct

24. The quantity of fuel 4 was checked by bills for the whole year of reporting.

correct / not correct

Verification Questionnaire**Country :****Number of Enterprise :****Number of plant:****Year of Report:**

25. The lower caloric value of fuel 4 was checked by bills for the whole year of reporting.
correct / not correct

26. The energy consumption from fuel 4 was calculated correctly.
correct / not correct

27. The quantity of fuel 5 was checked by bills for the whole year of reporting.
correct / not correct

28. The lower caloric value of fuel 5 was checked by bills for the whole year of reporting.
correct / not correct

29. The energy consumption from fuel 5 was calculated correctly.
correct / not correct

30. Is the TOC content determined on (a) representative sample(s)?
yes/no

31. Is the method of determining TOC-content correct?
yes/no

32. Is the calculation of TOC-quantity per year from TOC-content correct?
yes/no

33. Is the calculation of the energy benefit from TOC –quantity correct?
yes/no

34. Is the reported type of kiln correct?
yes/no
If “no” – please revise!

35. Is the description of the kiln(s) correct?
yes/no
If “no” – please revise!

Verification Questionnaire

Country :	Number of Enterprise :
Number of plant:	Year of Report:

36. Is the maximum temperature correct?

yes/no

If “no” – please revise!

37. Is the “Time from Cold to Cold” correct?

yes/no

If “no” – please revise!

38. Are the “Days of production” correct?

yes/no

If “no” – please revise!

39. Is the “Description of Technology” correct?

yes/no

If “no” – please revise!

I declare that the net-production and energy consumption by the listed fuels 1 to 5 are as written in “document to verify” - specified in the headline. The mistake for the whole for net production is less than 2,5 percent and a mistake for the whole of all listed fuels is less than 5 percent.

Signature of verifier

Stamp of verifier

Annex 3: Results of data collection of energy consumption

The whole list with all data are available on www.ceramin.eu. For explanation look Chapter 4 of the report.

	Number of Enterprise	Number of Plant	Branch	Sum of energy consumption [GJ]	specific energy use [GJ/t]	Place-ment absolut	Energy mitigation	Placement mitigation
E	1	1	not assignable	50.731	5,12		0,93	
E	1	1	not assignable	36.669	6,98			
PL	PL-10	PL-10	Masonry bricks	1.548.350	14,02	11	2,66	1
D	1	1	Masonry bricks	15.308	2,69	6	0,92	2
PL	PL-3	PL-3	Masonry bricks	181.290	1,34	2	0,38	3
PL	PL-5	PL-5-2	Masonry bricks	145.052	2,17	4	0,29	4
PL	PL-11	PL-11	Masonry bricks	102.312	3,78	9	0,20	5
PL	PL-12	PL-12	Masonry bricks	65.850	0,99	1	0,18	6
PL	PL-12	PL-12	Masonry bricks	83.599	1,53	3		
PL	PL-5	PL-5-2	Masonry bricks	138.090	2,61	5		
PL	PL-3	PL-3	Masonry bricks	287.464	2,76	7		
D	1	1	Masonry bricks	20.885	3,60	8		
PL	PL-11	PL-11	Masonry bricks	123.069	4,07	10		
PL	PL-10	PL-10	Masonry bricks	1.509.927	16,68	12		
UK	5	1	Pavement/wall	56.609	10,63	42	3,81	1
UK	3	1	Pavement/wall	21.388	4,24	32	1,63	2
UK	8	1	Pavement/wall	9.768	3,16	25	1,10	3
UK	6	1	Pavement/wall	19.413	5,83	38	0,97	4
D	6	1	Pavement/wall	90.670	4,72	35	0,40	5
D	4	2	Pavement/wall	76.105	2,41	15	0,26	6
D	7	1	Pavement/wall	112.318	2,60	20	0,21	7
PL	PL-6	PL-6	Pavement/wall	159.715	2,41	16	0,17	8
PL	PL-5	PL-5-3	Pavement/wall	55.007	2,22	9	0,17	9
D	5	1	Pavement/wall	103.324	2,32	13	0,15	10
D	11	1	Pavement/wall	53.612	2,26	10	0,04	11
D	2	1	Pavement/wall	27.440	2,16	7	0,02	12
D	8	1	Pavement/wall	153.260	2,60	21	0,01	13
D	12	1	Pavement/wall	57.340	3,31	27	-0,02	14
D	5	2	Pavement/wall	81.191	1,92	6	-0,03	15
UK	1	1	Pavement/wall	4.135	1,43	2	-0,05	16
D	4	1	Pavement/wall	64.694	1,67	4	-0,07	17
D	9	1	Pavement/wall	151.609	2,37	14	-0,07	18
UK	14	1	Pavement/wall	171.116	3,78	30	-0,20	19
UK	7	1	Pavement/wall	36.716	11,36	44	-0,21	20
D	10	1	Pavement/wall	30.765	4,33	34	-0,70	21
UK	4	1	Pavement/wall	195.518	5,04	36	-0,81	22
UK	2	1	Pavement/wall	142.367	15,42	48	-0,91	23
D	3	1	Pavement/wall	16.056	12,35	45	-1,27	24
UK	1	1	Pavement/wall	4.024	1,37	1		
D	4	1	Pavement/wall	56.722	1,60	3		



D	5	2	Pavement/wall	95.331	1,88	5		
D	2	1	Pavement/wall	27.442	2,18	8		
D	11	1	Pavement/wall	54.716	2,30	11		
D	9	1	Pavement/wall	146.616	2,30	12		
PL	PL-5	PL-5-3	Pavement/wall	38.293	2,47	17		
D	5	1	Pavement/wall	105.437	2,54	18		
PL	PL-6	PL-6	Pavement/wall	170.985	2,58	19		
D	8	1	Pavement/wall	192.608	2,62	22		
D	4	2	Pavement/wall	81.834	2,67	23		
D	7	1	Pavement/wall	119.668	2,81	24		
D	12	1	Pavement/wall	55.593	3,29	26		
UK	14	1	Pavement/wall	171.478	3,59	28		
D	10	1	Pavement/wall	30.846	3,63	29		
UK	4	1	Pavement/wall	206.573	4,23	31		
UK	8	1	Pavement/wall	13.168	4,26	33		
D	6	1	Pavement/wall	99.921	5,12	37		
UK	3	1	Pavement/wall	35.812	5,88	39		
UK	6	1	Pavement/wall	21.743	6,80	40		
D	3	1	Pavement/wall	20.887	10,44	41		
UK	7	1	Pavement/wall	33.227	11,15	43		
UK	5	1	Pavement/wall	62.746	14,45	46		
UK	2	1	Pavement/wall	135.379	14,51	47		
PL	PL-5	PL-5-1	roof tiles	78.481	4,27		12,08	
PL	PL-5	PL-5-1	roof tiles	34.822	22,38			
UK	9	1	refractories	90.397	16,31	14	6,27	1
E	2	2	refractories	44.031	8,16	10	1,72	2
PL	PL-4	PL-4	refractories	304.986	4,91	6	1,13	3
F	D	1	refractories	50.026	10,88	11	0,51	4
E	2	1	refractories	57.675	3,77	3	0,24	5
UK	15	1	refractories	260.154	7,70	8	0,12	6
PL	PL-9	PL-9	refractories	225.906	4,11	4	-0,37	7
PL	PL-9	PL-9	refractories	204.396	3,75	2	-0,84	8
PL	PL-9	PL-9	refractories	144.576	2,90	1		
E	2	1	refractories	53.184	4,66	5		
PL	PL-4	PL-4	refractories	347.730	6,04	7		
UK	15	1	refractories	268.268	7,82	9		
F	D	1	refractories	45.543	11,39	12		
E	2	2	refractories	51.487	13,32	13		
UK	9	1	refractories	145.421	25,72	15		
UK	13	1	tiles	475.346	8,80	7	0,67	1
PL	PL-1	PL-1	tiles	505.728	5,13	3	0,28	2
F	C	1	tiles	212.677	8,33	5	0,13	3
F	B	1	tiles	300.240	5,12	2	-0,12	4
F	B	1	tiles	349.200	5,00	1		
PL	PL-1	PL-1	tiles	356.082	5,55	4		
F	C	1	tiles	196.815	8,73	6		
UK	13	1	tiles	491.282	9,46	8		
F	A	1	sanitary ware	176.090	20,79	5	3,02	1
PL	PL-7	PL-7	sanitary ware	118.560	10,68	1	1,03	2
D	13	1	sanitary ware	81.472	10,76	2	0,65	3



D	13	1	sanitary ware	82.198	12,07	3		
PL	PL-7	PL-7	sanitary ware	138.484	14,69	4		
F	A	1	sanitary ware	178.351	25,33	6		
UK	11	1	table ware	131.907	56,35	11	13,18	1
UK	16	1	table ware	18.788	54,46	8	12,34	2
PL	PL-2	PL-2	table ware	454.358	31,21	1	9,30	3
PL	PL-8	PL-8	table ware	259.203	44,57	5	4,96	4
F	E	1	table ware	125.536	52,39	6	3,90	5
UK	12	1	table ware	241.809	33,13	2	1,01	6
UK	10	1	table ware	212.099	56,59	12	-2,30	7
UK	12	1	table ware	277.784	34,65	3		
PL	PL-2	PL-2	table ware	475.088	36,10	4		
UK	10	1	table ware	263.633	54,29	7		
PL	PL-8	PL-8	table ware	287.050	54,50	9		
F	E	1	table ware	122.729	56,30	10		
UK	11	1	table ware	169.593	76,12	13		
UK	16	1	table ware	24.480	85,30	14		



Annex 5: Chapter “Masonry bricks” as example of “Tutorial about energy saving”

2 **Masonry bricks**

2.1 **Body and raw materials**

- *Additives for improving the insulation should be also energy sources. The combustion temperature of these additives has to overlap a broad temperature range. Waste graphite⁴⁷, Petroleum coke¹⁷ or coal-clays¹⁹ can help you to get sintering energy up to 800 °C.*
- *Sintering additives like ashes, waste glasses, glass and mineral wools or low sintering clays can help you to reduce the sintering temperature or to produce (dry and fire) lighter products with same mechanical properties.^{47, 29, 35, 65}*
- *Shaping needs plasticity, especially for modern lattice bricks. It is necessary that the right amount of water is used to get the correct plasticity. Saving water by using better clays that are easy to form or adding special additives that help to get the correct plasticity is a way to save drying energy.^{47,48,21,37}*

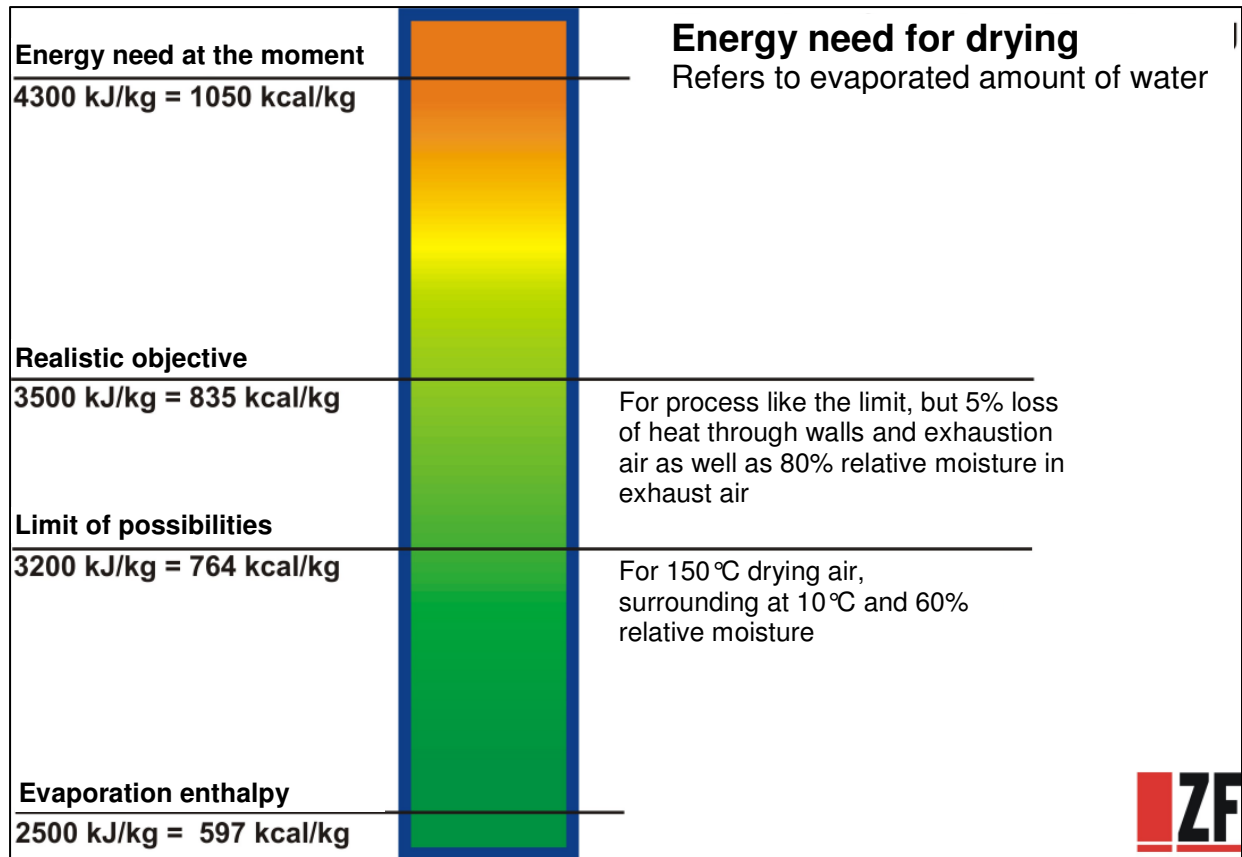
2.2 **Shaping**

- *It's possible to save energy by stiff pressing. However, not all body formulations are suitable, as sometimes the energy saving is consumed at the extruding press as electric energy and finishing.^{48, 1}*
- *Try to use the shaping (extruding) temperature while entering the dryer.^{36, 5, 6, 26}*

2.3 **Drying**

In the ceramic industry, drying generally means the evaporation or volatilisation of physically bound water. It is well known that water is characterised by a high specific thermal capacity (4.2 kJ/kg K) and a very high evaporation heat (2.500 kJ/kg). These material properties inevitably cause a high-energy consumption. The only objective can be to approach the theoretical (minimum) consumption as close as possible. Figure 1 shows: At the moment up to 50 % of thermal energy in ceramic production is used for

drying⁴⁹ however in the UK where a lot of stiff pressed bodies are used still 30% of thermal energy is used for drying.⁹



dryer and kiln.⁷

- Today the coupling of dryer and kiln is state of the art, however it is also important to modify working practices i.e. weekend breaks for shaping and drying need to be carefully controlled.⁴³
- Another method of modernising is to control the ventilation/burner system and the drying atmosphere.⁶
- The use of small amounts of high temperature air, decreases air loss due to exhaust gases.^{36, 45, 49}
- The air should flow through lattice bricks.⁴⁷
- Figure 2 shows that lowest energy costs (heat and electric) which can be reached at an optimum of heating energy and movement of drying air.

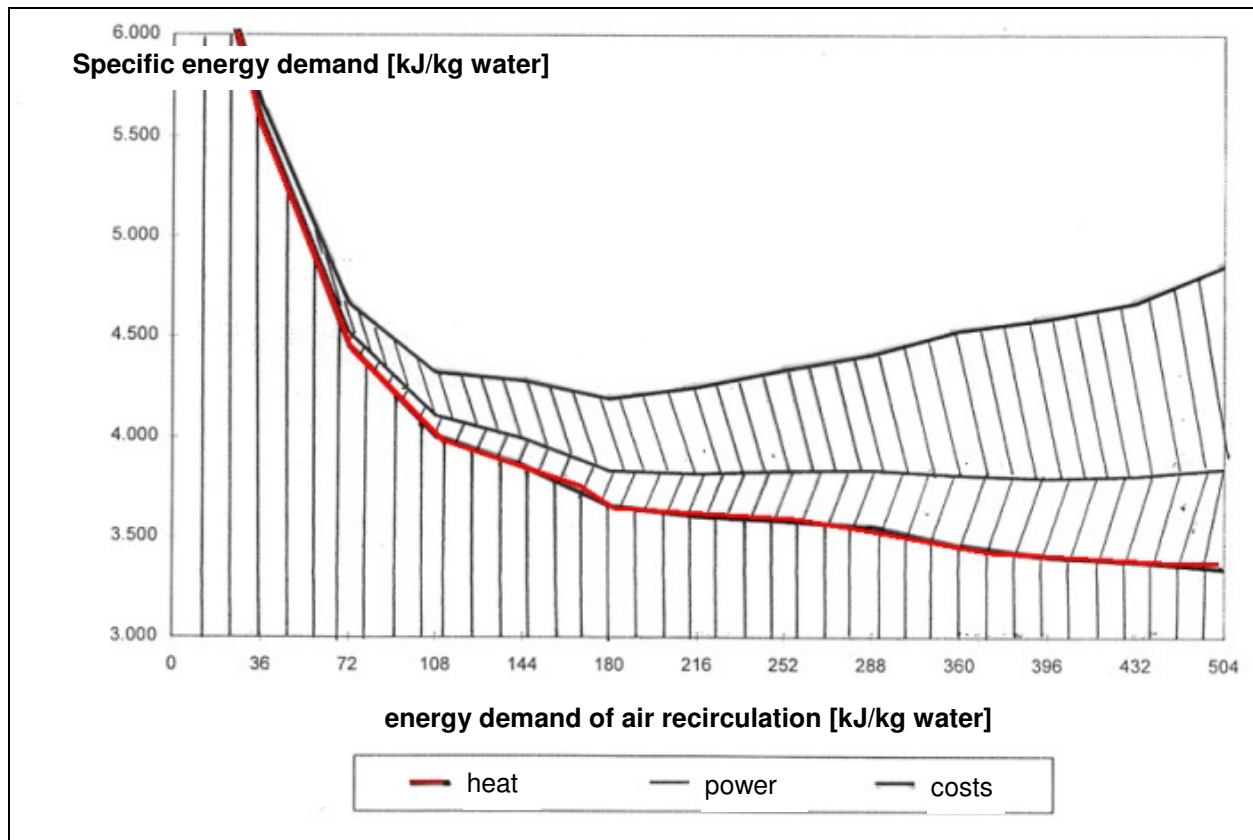


Figure 2: Energy demand of heat vs. energy demand of air recirculation in dryers

- The setters and the setting density should ensure that most of the surfaces are easy reached by the drying air.⁵
- Shorter drying times save energy.^{5, 6, 41, 44}
- To achieve the required humidity for drying avoid adding moisture and if required increase the setting density.⁹
- Redirecting airflows can improve consistency and reduce drying time; intermittent airflow patterns can reduce drying time and improve yield.⁹
- Software to simulate the drying process. Links to control data via specialized companies are a good way to optimise drying.³⁶
- In the case of a coupled system between dryer and kiln, the kilns energy supply and not the dryers demand determines the energy level that the dryer gets, otherwise poor energy use in the dryer causes a higher energy consumption for firing.^{36, 42}
- The system that connects the hot air from the kiln with the dryer should be well insulated.⁴⁷
- Most modern drying equipment and technology can save up to 90% of drying time compared to conventional drying.⁴⁹
- Alternative drying systems are available using a steam atmosphere, this is called 'airless drying' and is claimed to have reduced drying times up to 80%.⁶³

- *Alternative I/R burner systems are available using a mesh, these can be powered by a number of different gases are easy to control and are very energy efficient. These can be incorporated into existing dryer cabinets.⁶⁴*

2.4 Firing

The specific energy consumption for sintering ceramic products depends on the required firing temperature. The temperature is determined by the composition of the body, the processes of material formation and the intended properties. Figure 3 shows an exponential increase of the specific demand for energy with the temperature.

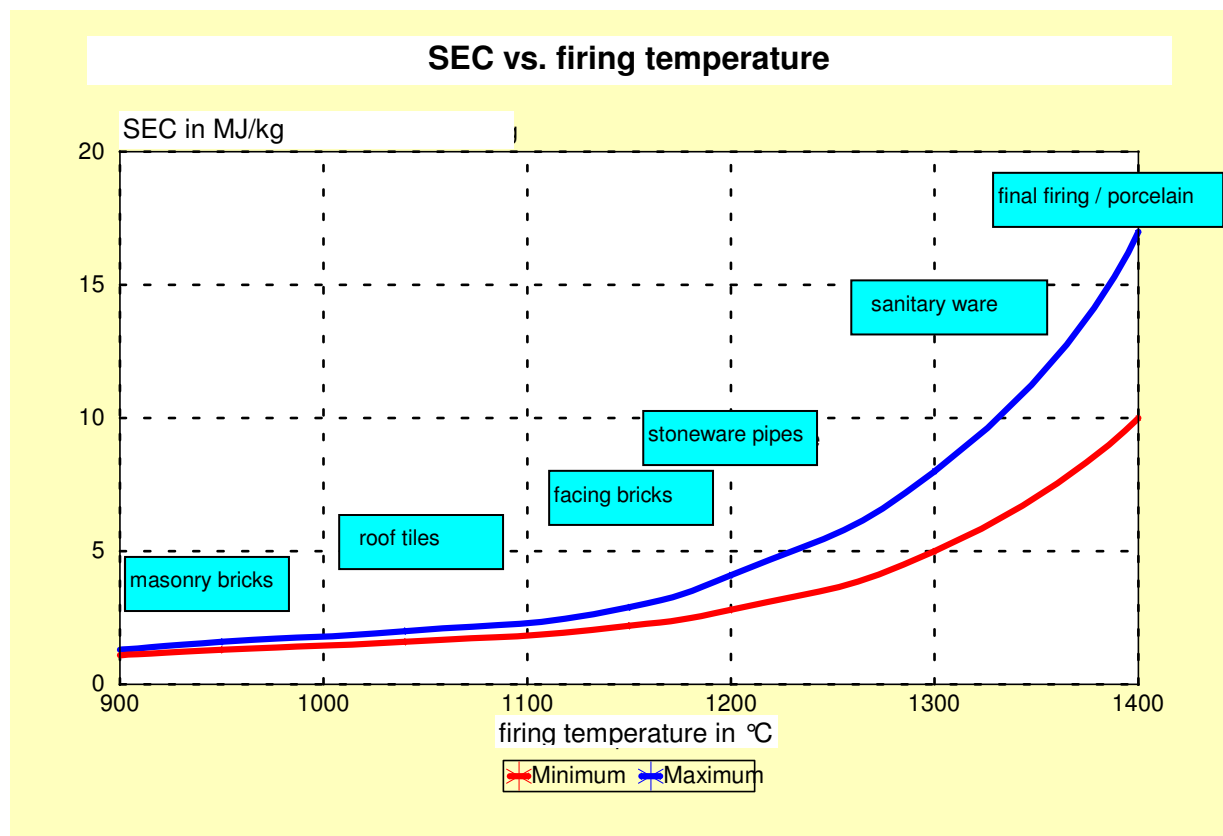


Figure 3: Energy consumption of different ceramic products with its different firing temperatures.⁴⁸

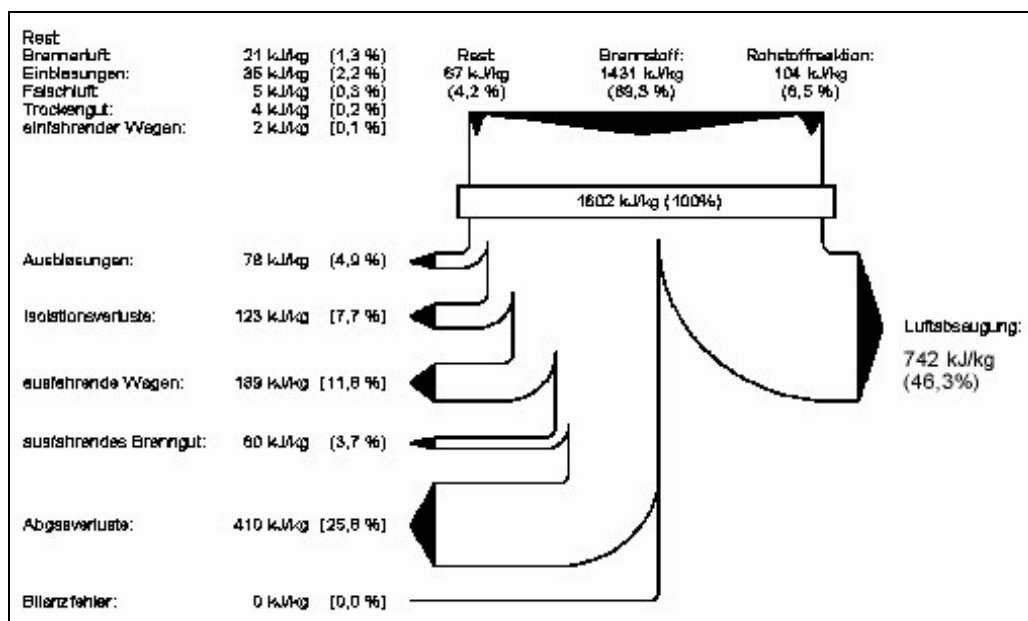


Figure 4: Balance of a tunnel kiln for masonry bricks (Sankey Figure)⁴⁷

Figure 4 shows the energy balance of a tunnel kiln for masonry bricks. The values of greatest energy loss are the different exhaust air streams partly used for drying.

2.4.1 Kiln and kiln car design

There are two general ways of energy loss influenced by the design of the kiln and the kiln cars:

1. Leakages from surrounding air into the kiln

"However one of the best possibilities to save energy is still to eliminate leakages" Don Denison, Denison Inc.²¹

2. Weight of kiln materials and kiln car materials that have to be heated

- "Wheel flanges of kiln car wheels should in principle should be located on the outside".²
- "The kiln car decks should consist of high quality and lightweight insulating materials with a minimum content of heavy chamotte. It is recommended that the layers from the bottom deck to the top deck should be adapted to cope for the different respective temperature stresses".^{2, 3, 20}
- A picture for calculating the optimum car deck thickness can be seen in ².
- Sand seals should be designed to avoid leakages over a long time, suggestions are made in ^{2, 33}.

- *Try to avoid self-supporting kiln sidewalls. Such walls tend to bend towards the firing channel because of the temperature differences over the cross section. It is important to consider the design very carefully and have a wall sustained by the kiln roof.²*
- *Special designed kiln roofs avoid leakages due to heat expansion and make roof cooling redundant.²*

2.4.2 Fuel and firing technology

- *In the main firing zone an excess pressure of 10-15 Pa is recommended.⁷⁴*
- *For some brick producers it is still a possibility to make energy savings by changing from solid fuel like coal to LPG or oil which will increase the energy efficiency.⁵¹*
- *Use of renewable energies, i.e. biogases produced by companies in their own reactors can save costs and CO₂ emissions¹¹; however biogases can't cover the whole energy need of a brick maker.⁴⁷*
- *Increasing control of firing with new burner systems and multi zone control.^{33,51,34}*
- *Impulse burners are more efficient than conventional ones.⁷⁴*
- *High velocity burners (velocity of heated gases > 100 m/s) are recommended for the preheating zone until 700 °C. At this lower temperature heating by convection mostly takes place. Kilns can be modernised with these modern burners, to save energy.⁷⁴*
- *Techniques already described for drying are also important for firing: allow the hot gases best heat transition to your working load.^{33,34}*
- *The combustion air should be preheated; at higher firing temperatures preheating saves energy. The preheating should be done by using kiln exhaust air.⁴⁰*
- *Use preheated working loads from the dryer, e.g. setting pallets for drying and firing or by direct setting on kiln cars for drying.^{1,23}*
- *The final development that some producers in the brick industry have used is emissivity coatings in certain sections of the kiln to reflect the heat to the required area thus reducing the temperature lag between 'part' and surrounding air. This in theory has reduced gas costs by up to 10%.⁵¹*
- *Reduce waste air losses by re-circulating them for heating over the whole length of kiln.³³*
- *The hot gases should pass through the holes of bricks to increase the area between load and hot gases called 'Perfusion firing'.⁴⁷*
- *Use heat recovery from waste gases and flue gas from post combustion.^{18,47}*

Annex 6: Short final report by CERAM – United Kingdom

Review of CERAMIN work carried out by CERAM

CERAM carried out a literature and internet search in an attempt to identify 2 national or international labels concerning energy efficiency in any industry sector. Unfortunately very little information was found in the UK apart for the carbon trust.

CERAM working in conjunction with British Ceramic Confederation (BCC) the UK trade association for the ceramic industry collected energy consumption data for each the Brick, Roof Tiles, Industrial Ceramics, Refractories, Tableware, Wall and Floor Tile, and Sanitaryware sectors.

Sector	Total Energy Use kWh		
	2002	2004	2006
Brick	4,550,630,538	4,659,605,596	4,160,949,376
Roof Tiles	396,455,569	433,223,119	365,731,802
Industrial Ceramics	323,048,779	380,824,493	364,361,643
Refractories	710,565,918	618,659,334	475,302,965
Tableware	1,160,651,290	910,745,581	641,092,910
Tiles	316,566,865	327,210,856	326,056,090
Total	8,169,192,453	7,863,288,562	6,782,313,749

CERAM also working BCC and CICS (Complete Integrated Certification Services Ltd) both companies who also specialise in CCA (Climate Change Agreement) and EUTS identified a number of companies in the UK, Eire and Scandinavia (the geographical location that CERAM had to work in) to speak to with regard to attracting them as members of the CERAMIN project.

In total 31 companies were identified across these countries covering 6 different ceramic sectors, and 50% of these agreed to join the project. The breakdown re country and sector is as follows:

	Participated	Non participation
Countries		



Eire	2	0
Scandinavia	0	2
UK	14	13

Sectors		
Bricks	9	4
Tiles	1	1
Tableware	4	6
Refractories	1	1
Sanitaryware	0	1
Roof tiles	1	2

CERAM worked with all the above participants and all of these were involved either in CCA or EUETS hence verification was made simpler; the only change required for the CCA companies was to remove any electricity information from their declared data.

The UK same as all the other European countries the ceramic sectors was heavily affected by the recession. CERAM were in discussion with the partners who did not initially participate in the project and all companies that we have been in discussion with stated that survival in was their main priority, and all are looking for cost reductions both in cash and resources, hence project work whether R&D or environmental is the least of their priorities. When discussions were all held re the energy related workshop we were told that in the current climate this was of very little interest despite the obvious energy saving information that may result from it, however they would be interested in any documentation that could be provided.

CERAM along with the other members of the expert group contributed to the 'Tutorial about Energy saving without electricity', and a number of new or alternative processes were put forward. Subsequently this document and general project dissemination was carried out at CERAM before the sector technical committees. This route was chosen as a number of workshops had previously been proposed by other sectors within the organisation, however uptake was very poor. The final tutorial was also sent to all of the CERAM membership (157) which is worldwide, BCC for circulation to their membership base as well being published on the CERAM website.

The dissemination to the technical committees was as follows:

Whiteware – 58

Brick sector – 6 (however these are the major companies who represent their group members as well)

CERAM has been actively involved in all of the project meetings.



Annex 7: Short final report by Institute of Glass, Ceramics, Refractory and Construction Materials – Poland

Description of action in CERAMIN project by the Institute of Glass, Ceramics, Refractory and Construction Materials

I. In the beginning of the project we collected and sent to coordinator general data of energy consumption, CO₂ emission and production quantities in sub-branches of polish ceramic industry. The data was acquired by contacts with polish statistical office and emission trading office. Two examples of the plant's CO₂ emission reports (mandatory in Poland) were submitted to the CERAMIN coordinator.

II. We were establishing the close contact with industrial partners and we collected their data concerning energy use. The following working procedure has been applied:

Stage 1:

- At first stage a list of potential industrial partners has been prepared and 18 companies from various ceramic branches were chosen which represent the highest importance and scale of production. A method of an individual contact with companies was accepted since in Poland there are no associations of ceramics producers that could be helpful by influencing the company decision and play an intermediating role at the contacts
- The first contacts were the phone talks with the responsible person at companies, that earlier cooperated with the Institute. Next step was to send the official informative and invitation letters. Similar letters explaining goals and description of cooperation were submitted to companies, which had no previous cooperation contacts with us.
- 4 companies were visited by our representatives in order to present personally ideas and goals of CERAMIN projects.
- Parallel, an information action was carried out in ceramic journals. Invitation to CERAMIN and information was published in 5 journals of all-Polish range. One company (CERRAD) reported to our institute as a result of this action.
- At the first stage of finding close contacts partners, 6 companies sent back the filled questionnaires.

Stage 2:

- The second stage was begun with telephone and mail inquiries directed to companies, to which official letters were sent earlier. Also renewed official letters were sent.
- A new list of potential industrial partners was made and new attempts were made to contact new companies.
- As a result of stage II of the action, 6 new companies delivered close contact sheets



- Out of 12 companies, which reported their readiness to cooperate by filling close contact sheet, 10 sent detailed data of production scale and energy consumption, 1 company has not decided because the owner still hesitates and 1 company resigned.

Stage 3:

Invitations to participate in the project along with CERAMIN handout were sent to the following Czech ceramic plants:

- Wienerberger cihlářský průmysl, a. s. Plachého 388/28, 370 46 České Budějovice
- Wienerberger ČESKÉ CIHELNY Josef Meindl, spol. s r.o. Sokolská 566, 333 44 Stod, Česká republika
- Laufen CZ V Tůních 3/1637, 120 00 Praha 2, Česká republika
- Karlovarský porcelán, a.s Nova Role Tovární 242, 362 25 Nová Role
- Karlovarský porcelán, a.s Concordia a.s. Sadov 119, 360 01 Sadov – Lesov Česká republika
- Karlovarský porcelán, a.s Klášterec n.O Pražská 394, 431 51 Klášterec nad Ohří
- G.BENEDIKT KARLOVY VARY S.R.O 1. máje 30, 360 06 Karlovy Vary,
- Porcelánová manufaktura Royal Dux Bohemia Sadová 1414, 419 42 Duchcov
- Elektroporcelán Louny a.s. Postoloprtská 2685, 440 15 Louny
- LASSELSBERGER, s.r.o. Adelova 2549/1, 320 00 Plzeň - Jižní Předměstí Česká republika
- LASSELSBERGER, s.r.o. RAKO a.s. Šamotka 246, 269 43 Rakovník
- LASSELSBERGER, s.r.o. Chlumčanské keramické závody a.s. U Keramičky 448
334 42 Chlumčany
- LASSELSBERGER, s.r.o. Horni Briza, 330 12 Horní Bríza, Czech Republic
- IDEAL STANDARD S.A. Zemska 623, 415 74 Teplice Republika Czeska

There was no one answer for these invitations!

Stage 4:

- The last attempt to contact the earlier informed potential partners and the new companies (rather small companies), because of unsatisfactory total number of industrial partners was resulted in sending the data of additional 4 enterprises.

Conclusions:

1. A considerable difficulty in successful contacting the polish companies is caused by missing of existing associations that could be an active mediator in contacts.
2. The largest difficulty was encountered in convincing the companies in usefulness of their participation and confidentiality in dealing with collected data.
3. More ready to participate are smaller firms than the large and known ones.
4. A convenient condition for collecting more data seems to be an extension of project duration.



IV. The Institute organized the meeting for the project partners in Warsaw

CERAMIN 3rd Meeting, Warsaw

Friday, 9th - 10th of November 2007

took place in The Institute of Glass, Ceramics, Refractory and Building Materials, Postepu Street 9, Warsaw

Agenda:

9.10.2007

- | | |
|---------------|---|
| 10:00 | - Start of the Meeting |
| 13:00 - 14:00 | - Lunch break |
| 16:00 - 16:15 | - Coffee break |
| 18:00 | - End of the session |
| 20:00 | - Dinner in the restaurant in Warsaw Old Town |

10.10.2007

- | | |
|--------------|---------------------------------------|
| 9:00 - 14:00 | - Warsaw sightseeing tour (voluntary) |
|--------------|---------------------------------------|

V. Representatives of the Institute were participating in all partners meeting within the project and were actively participating in elaborating of the energy mitigation calculation principles.

VI. We reported the situation of ceramic industry in Poland in the context of economic crisis 2009. Few remarks from telephone and e-mail surveys with representatives of several manufactures corresponding to different branches of ceramic industry are presented below:

Pavement and wall bricks

We contacted 3 partners. None of them reported reduction of working hours, but all of them are waiting for the “building season”. Now it is very difficult to predict the level of production even in the nearest future, as a result of the impact of the crisis.

Refractories

2 partners responded to inquiries. Both factories didn't reduce working hours so far, but the production now is 10-15% lower than in the same period of 2008. They report that the production level is closely related to steel industry orders, so the situation can change in any moment in the future. In opinion of our partners such a situation is typical in the majority of factories of polish refractory branch.

Wall and floor tiles

2 partners were inquired. In comparison to the level of production during the last year the production capacity in 2008 is only 50-60%. Only a part of technological lines are busy - some of them do not work now. Our partners expect that according to optimistic predictions their production might reach 75% of that of recent years.

Tableware

1 partner was contacted. For the moment as a consequence of the crisis one furnace for porcelain firing was turned off in the factory. The present production level corresponds to 75-78% of the one of the recent years and the manufacturer expects to maintain it.

Conclusion

1. Most of the partners inquired reported a decrease of production; the values depend on the branch.
2. All partners reported that the situation is very unstable and it can change in any moment.
3. We have informed our partners about the planned meeting, but we feel that they were not very interested in the information.

VII. Organization of National Workshop held in Warsaw on 27th of April 2009 for the industrial partners.

A. Statistics of the Meeting:

- | | |
|---|------------------------|
| 1. Number of sent invitations to enterprises | 46 invitations |
| 2. Number of participants from the industry reported before the meeting | 23 |
| 3. Number of participants present at the meeting from the Institute) | 18 (from 15 plants + 5 |
| 4. Number of completed questionnaires | 16 |
| 5. Amount of resources sent from Institute after the meeting | 11 |
| 6. During the meeting the preliminary contacts were established with 13 new plants. | |

B. Issues raised by participants:

- Lack of comparability of different plants in one branch, such as the production of hotel porcelain (thick and heavy) and China ware (thin and light) when comparing the energy consumption per tones of product
- Why project program did not take into account the consumption of electricity?
- Lack of representativeness of some industries such as tiles - why this happened?
- Almost all interlocutors stressed that the reduction of energy consumption is an important target at factories every day, but the budget for purchasing of new equipment and technology limits the improvement.

C. Material presented at this meeting was accepted with a great interest mainly because the problem of energy saving was presented in a complex, uniform and way for all ceramics factories using clear energy saving coefficients. The tutorial was also well evaluated by participants and was commonly taken in discussion as a base to comparison of actual technical state at factories and the tutorial recommendations

VIII. We have published an short information on main aims, methods and expected results coming from the CERAMIN project as well as the invitation for new industrial partners to join CERAMIN in the following branch periodicals:

Materialy Ceramiczne, LX, 1, 2008, 51

Materialy Budowlane, 426, 2, 2008, 80

Szkło i Ceramika, 59, 1, 2008, 26-27,

Ceramika Budowlana, LVI, 1, 2008, 29-30

PRACE Instytutu Szkła, Ceramiki, Materialow Ogniotrwalych i Budowlanych, 3, 2009, 259

IX. We have published articles summarizing partial results of the research conducted within the project and selected considerations and recommendations concerning energy saving in ceramic industry, based on the Tutorial About Energy Saving in the following branch periodicals:

Szkło i Ceramika, 60, 5, 2009, 14-21,

Ceramika Budowlana, LVII, 3, 2009, 11-16

X. We plan to publish 2-3 additional articles summarizing results of the research conducted within the project.

XI. We plan to keep contact with our industrial partners and encourage them to send new data in 2010. We are also planning to organize solemn ceremony for Polish winners of the competition for the EEE label and send to all partners the certificates of their participation in the project together with the full result list of competition. We will strongly encourage them to participate at the next year competition

Annex 8: Short final report by ETA – Italy

1.3 Identified problems and corrective actions taken during the action – *Comment on the most important problems during the action explaining also their impact and the corrective actions undertaken.*

In Italy, since the very beginning of the project, the general approach was to try to involve the most important representatives of the Italian ceramic industry: thus, ETA, being unable to involve the industrial partners individually, contacted directly the managers of the most important and influent trade associations and research centres of the Italian ceramic industry and namely:

- Dott. Luciano Galassini, Dott Andrea Canetti of Confindustria Ceramica (Confindustria Ceramica is the main Italian Association of Italian ceramic tile, refractory material, sanitary and table ware and technical ceramic manufacturers which is responsible for representing, supporting, informing and liaising between member companies)
- Ing. Giovanni D’Anna manager of the Energy/Environment sector of ANDIL (“Associazione Nazionale degli Industriali dei Laterizi” the main Italian Association of Italian pavement bricks, wall bricks and roof manufacturers which is responsible for representing, supporting, informing and liaising between member companies).
- Ing. Guido Nasseti e Dott. Arturo Salamoni of the Italian Ceramic centre “Centro Ceramico Bologna” (CCB is the main research centre on the ceramic materials in Italy, managed by a University Consortium).

During the first six months of the project both Confindustria Ceramica and ANDIL provided the annual statistical data of the different sub-sectors’ energy consumptions and demonstrated a positive interest and availability for discussing their participation in the Ceramin Project.

During the first meeting with Confindustria Ceramica organised the 21/03/2007 (Dott. Luciano Galassini, Dott Andrea Canetti) and Centro Ceramico Bologna (Ing. Nasseti), Confindustria was asked to select 15 of their associated partners to be involved in the Ceramin Project as industrial partners. Their interest in the project was positive but their main doubt, regarded the mechanism itself of participation: according to them, the definition of the performance criteria of the production processes, and therefore the EEE label, was somehow related to the quality, in terms of energy efficiency, of the selected industrial partners that agree to participate and share their data with the project partners: the competition, according to them, had the same limit because the decision to consider the 25%, in each ceramic sub branch, as deserving, is necessarily related to the overall quality of the voluntary participants.

Another concern was the worthiness of the EEE label after the project completion and how it could be compared with the Ecolabel considering that all products bearing the flower have been checked by “Independent Bodies” like TÜV for complying with strict ecological and performance criteria. The outcomes of this meeting were reported to the coordinator by email the 26th of March 2007.

The representative of ANDIL Ing. D’Anna, once contacted, even if positively interested, commented with a general scepticism regarding the participation of their associated partners in the Ceramin initiative: he reported that the general approach of the industrial partners was to participate in research activities promoted by the Association itself and only when a budget is foreseen for the development of the activities.

With the development of the activities by the project partners a new meeting with Ing. Guido Nassetti and Dott. Arturo Salamoni of the Centro Ceramico Bologna was organised the 6th of November 2008. Confindustria did not attend being represented by the Centro Ceramico Bologna acting as their energy efficiency consultant. According to their opinion the outcomes of this meeting were:

1. The presence of other well accepted product-labels (i.e. ECOLABEL) and Eco-Management and Audit Schemes (i.e. EMAS) based on European norms, already defining the products and the energy savings measures by using the best available technologies on the market, made, according to Confindustria, the EEE label redundant.
2. The dignity of the EEE Label was invalidated by a verification mechanism different from country to country and not managed by a single European Independent Body.
3. The awarding mechanism of the EEE label was based on the quality of the participants and it was not based on an absolute criteria so being part of the “winners” did not imply to represent the “state of the art” of the market.
4. With the decision to use the EU-ETS for the verification procedure, taken during the meeting in Paris, considering that in Italy not all the ceramic producers are forced to comply with the emission trading scheme but only the biggest ones (corresponding to only the 4% of the Italian market) and considering also that the small size companies potentially adhering to the project do not fall in the EU-ETS, a deep survey was carried out by ETA in order to verify the feasibility of this methodology. Three Italian verifiers of the EU-ETS, officially recognised by the Italian Ministry of the Environment, were contacted and three conference calls were organized with representatives of Lloyd’s Registered Quality Assurance Italy srl, PricewaterhouseCoopers S.p.a., and Ernst & Young Financial Business Advisors. The outcomes of these calls underlined the inadequacy in Italy of the EU-ETS for the Ceramin goals:
 - the purchased electric energy is not considered in the emission report (in Italy the tiles’ and refractories’ sectors have a consumption of 1.500 millions of cubic meter/year of natural gas but also an electric energy demand of 1.800 GWh/year with only 500 GWh/year auto-produced by CHP so, in the emission trading scheme, 1.300 GWh/year aren’t considered at all).
 - Ing. Francesco Sacchetto of PricewaterhouseCoopers reported that “*Companies adhering to the Project are below the EU ETS applicability threshold. According to Dir.2003/87/EC, an “opt-in option” exists by which entire sectors can apply for joining the EU ETS but no chance is offered to single companies below the threshold already belonging to trading sectors like ceramic*”).(For more detail please refer to Annex **ITA1**)

As discussed during the meeting in Stock on Trent the potentially interested Italian ceramic producers have been asked to report, on voluntary basis, their data verified by a new verification procedure set up as an alternative to the EU-ETS (CASE 2 of the “Course of data collection”): this has inevitably increased the scepticism of the Industrial partners.

Furthermore the Centro Ceramico Bologna was not interested in covering the role of verifier, like the Ceramin expert groups does in other European countries, for the above reported reasons (1,2,3) and the general difficulty and visibility that the EEE Label would have if compared with other well established labels.

- The recent economic crisis hit the ceramic tile industry: Confindustria reported that the Italian production and sales were down by 6%, the Italian market by 9%; costs have risen in 2008 (+4.6%) and a further, even if more limited, fall in production and expected personnel reduction of about 20% was expected in 2009. Energy efficiency was not a priority in this situation.

These remarks were reported in a formal letter, in Italian, by the Centro Ceramico Bologna issued after the meeting of November. The outcomes of this meeting were reported to the coordinator and the project partners during the project meeting in Florence (December 2008). (Annex **ITA2**)

In spite of ETA’s strong commitment, de facto, the main Italian associations decided not to involve their associated partners to the championship mechanism so the first round of the awarding phase does not include any Italian industrial partners.

1.4 Activities and impact after end of the action – *Give an overview on the activities planned after the end of the action; review the short/medium/long term impact of the action; demonstrate sustainability.*

In Italy the main trade associations (Confindustria Ceramica and ANDIL), although not interested to propose to their associated partners the championship mechanism, decided to present the main outcomes of the CERAMIN project:

- the Italian version of the “Tutorial on energy savings” based on the English version of the CERAMIN expert group, translated and revised by Ing. Guido Nassetti of the Centro Ceramico Bologna (CCB) in order to show the last technical solutions for the tile, refractories, and sanitary sectors, was disseminated to the entire Italian industrial world: the document was presented by the trade association responsible to about 190 associated enterprises with Confindustria Ceramica and to about 120 associated enterprises of ANDIL. (Annex **ITA3**)
- the first awarding, with the participation of German, French, British, and Polish enterprises was presented as a first initiatives that will be replicated in the following two years: the interested Italian industrial partners could see the E³ label, as a more solid initiative, already established in the European market and not a “feasibility study” like it could be considered before the first award came out.

- The Italian workshop held the 27th of October 2009 in Florence organised with the support of Confindustria (the Florentine department) and CEF (Florentine Energy Consortium) was attended by 18 participants some of them representing the famous ceramic Florentine district (well know for the “Cotto”, pavement bricks, earthenware, and hand worked ceramics). (Annex **ITA4**: invitation letter, agenda, registration form, list of participants, presentation)