

Stakeholders Comments to end July 2010	Study team's responses
Economic and market data are rather confusing. PRODCOM data are presented in a too aggregated level and foresees of the future stock are not clear.	PRODCOM data is not useful so we cannot use it for determining EU consumption of each type of furnace / oven.
An analysis of possible significant positive environmental impacts to provide users with information regarding the product's sustainable use and ecological profile should be addressed. In addition, further information about the real life efficiency of the products, best practice in sustainable product use and repair and maintenance related to the global environmental impact and the user behaviour are lacked.	True, we will need to ask manufacturers for this information
Classification based on the basic design is considered not the most suitable one and we recommend following service classification.	Classification based on basic design is one option only and we agree is not ideal. It is being considered here because all other approaches give far too many different types for base-case analysis in task 4 – we are limited to a maximum of six representative furnaces / ovens and so also a maximum of six classification classes.
Moreover, a wide summary of the current standards and legislation in Europe is presented. However, there is no conclusions drawn from this section and an identification of the gaps in the legislation and standards would be desirable. Standards and legislation of third countries should be completed.	Further data being sought from stakeholders, this section in the draft report is incomplete.
Page 19: Carbon capture and storage would be excluded from the functional unit. However, at present furnaces and ovens were chemical reactions take place are been developed within a carbon capture system in itself, for example the reforming reactors with chemical looping technologies. CCS would be a separate process to the furnace that emits CO2.	CCS is a separate process to the main function of a furnace that emits CO2 and so including it in the functional unit makes assessment of the furnace's energy efficiency much too complex. It would be better to consider CCS separately.
Page 20: Not only do nitrous oxides play an important role as GWG, but also other gases such as methane, ozone or CFC. We consider better named these gases as just written "other gases".	We agree and will amend report
Page 23: Product classification is focused on two aspects: the basic design or the industry sector. Classifications in the open literature classified the furnaces depending on the type of fuel used, mode of charging materials (batch- or continuous type), mode of heat transfer and mode of waste heat recovery, if any. We consider that the classification according to the basic model does not play any important role.	There are many ways to classify and several of these are described in the report – see comment above. Batch / continuous and energy type are significant but there are others. We are open to suggestions from stakeholders.
Page 33: The classification following the insulation is not presented in these pages.	Many types of furnace have more than one type of insulation, often used as several separate layers and so I think classification of ovens and furnaces by insulation type is inappropriate and we will move discussion of insulation to tasks 4 & 5.
Page 23 or page 40: Large combustion plants for electricity generation are, according to page 23, excluded from this study. However, they are included into Table 10 in page 40. Are these equipments excluded or included into the study?? If they are included, they will be an important issue to deal with, as environmental impact associated with them is generally enormous.	I will remove LCP from table 10 as these are not furnaces or ovens as these are normally understood.
Page 43: Explanation of the power rating is recommended to be written. The power rating of a device is a guideline set by the manufacturer as a maximum power to be used with that device.	We will amend report
Page 63-64: Which is the reference for the operation time of a laboratory furnace or oven? We consider that only 12h/day and 30days/year is extremely low. We should keep in mind that in most of the small laboratories ovens for drying the samples are kept on, although they are not used.	When the draft was written we had no data so this was no more than a guess to encourage stakeholders to provide their data. I now have more data and expect more so we will change this section of the report.
Generally speaking, it is difficult to get a general idea of the current and future stock of furnaces and ovens in EU-27 and moreover of the forecast for future stock, sales and apparent production	Stock and annual sales data is currently not clear as PRODCOM data is not useful and we are still waiting for data from stakeholders
Page 68: The new aggregated classification widely differs from the classification proposed in Task 1 and based on the basic design. However, we find that a classification of furnaces and ovens referring to the use is better approach than to the basic design.	We need to finalise the most suitable classification before task 4. However this must not include too many categories for the base case calculations to be useful
Page 70: The sub-categorization industrial/laboratory furnace and ovens is really broad. A high number of different furnaces and ovens are included in this group. The further sub-categorization proposed in Table 21, is encouraged to be taken into account in the following tasks.	These are PRODCOM Eurostat classifications and each sub-category includes too many different types of furnace so cannot be used for base case selection
Page 74: Section 2.2.2 called "Industry financial estimates of EU oven and future production and consumption" is difficult to be understood. There are no explanations related to the Tables presented and a lack of units in them. Moreover, below Table 23 estimations for the year 2005/6 is stated while Table 24 reported data from 2008	Since writing this, we have received better data so we can amend these tables.
Page 80: we suggest changing the order to the list related to the total lifetime costs to follow a chronologic order. Therefore, installation costs	We will do this

should be placed before operating costs.	
Page 81: Which is the unit of the installation costs in Table 29? Are they average costs in €/unit or €/kWh or are they installation costs in €/year as a total cost for all these equipments? This table's title is misleading.	The term "installation" used here refers to the entire production facility and is the word used by the IPPC directive and the ETS regulation, it is not the cost of constructing (installing) a furnace. I will amend the table so that this is clear.
Page 82: Second paragraph is difficult to be understood	We will amend
Page 86. In general, total equipment costs are not directly proportional to the characteristic capacity of the equipment but they follow a 0.6 factor rule	Thank you for this suggestion, this will be useful
Maintenance costs were in the previous section stated as a different cost and not part of the operating costs. Coherence in the cost classification is desirable	The MEEUP methodology requires us to input maintenance and operating costs separately so we are asking stakeholders for these costs to be separated
Which is the aim of reporting Table 32? Do the taxes play a key role for the following Tasks?	The table title should read "electricity rates", the figures quoted are not taxes only.
Page 92: The estimation of the water price is based on the prices of urban water. Urban water has usually a higher price than the industrial one. Thus we suggest that the average water price will be slightly lower. Anyway we agree that the price of water is to be higher in the following years, therefore this estimation can be acceptable.	We are looking for commercial water prices but these are not available from Eurostat
Page 93: How is the interest-inflation rate in Table 41 calculated?	It is normal to use a figure specified by the Commission and so we will discuss this with DG ENTR
Task 3 user requirements	This task is incomplete, more information is needed from stakeholders
p22. BS 4642 definition of incinerator - suggest deletion as from 1970 and does not represent WtE incinerators. Replacement with definition from 2000/76/EC	I expect that in 1970 there were no WtE incinerators so this definition does not apply to these but would apply to the incinerators that pyrolyse materials only. I will include in the report the WtE definitions from 2000/76/EC
p23. Note that no WtE installation consumes primary heat energy and are net producers and exporters of energy.	I agree but the energy recovery part of the installation is not a furnace or oven and the energy produced is not re-used within the furnace and so will not be covered by this study. The scope is furnaces and ovens only, not entire installations that include these.
P32. Most of the residual Municipal Waste that is treated thermally (i.e. not in landfills) is sent to Waste-to-Energy Incinerators. Co-Incineration plants, most of them Cement Kilns, use mostly Hazardous, Commercial or Industrial waste as an energy source.	Thank you for this clarification which is useful. I will amend the report
P 39. Many installations perform a recovery, not a disposal operation. "Organic" is an unnecessary restriction of the definition because Incinerators can process other wastes than organic ones (i.e plastics).	Energy recovery is carried out by the installation but is not a function of the combustion process (the "furnace") but a separate stage which is outside the scope of this study. As a chemist I regard plastics as being "organic", i.e. not inorganic, however I will amend the report for non-chemists
p 39 Talking only of "Municipal waste disposal" is too narrow, as many facilities perform a "recovery" operation. The second part: "either with or without energy recovery" is not accurate, as virtually all (existing and new) Municipal Waste Incinerators dispose of methods to recover energy, although to varying extents. Some energy is also used at shut down.	WtE incinerators are completely different to incinerators that pyrolyze materials only and we are considering both types. I accept that all municipal waste is disposed of in WtE incinerators and that energy is also recovered but there are some types of new incinerators being sold in EU that do not have energy recovery
p39 The waste contains several pollutants which we also mention here. Some of them are destroyed during combustion and the remaining ones are transferred to the Flue Gases upon combustion. Therefore they must be removed by the Flue Gas Cleaning system. The operation of the incineration process in Waste-to-Energy plants is strictly monitored by Competent Authorities and is based on the Best Available Techniques, both for the combustion chamber and for Flue Gas Cleaning.	Thanks you, this is helpful and I will amend the report
p39 For wording reasons, it is better to refer to "climate change" than to "global warming", as warming is only a part of the complex climate change phenomenon. For example, the EU has named its DG "Climate Action" to encompass all the associated dynamics. We do not understand what "global carbon" means but we assume it is a way of referring to global CO2 concentrations or to global Greenhouse Gases concentrations, which is described more simply as "contribute towards climate change", reducing the number of times "carbon" is written in the sentence. For reference, the IPCC's 4th Assessment Report, WG III, Chapter 10.1, (http://www.ipcc.ch/publications_and_data/ar4/wg3/en/ch10s10-1.html) defines the carbon-neutrality of incinerated and combusted biomass. Finally, the offset of the use of fossil fuels to generate energy must be taken into account, as recovering the waste's energy reduces the use of other primary energy sources.	Thanks you, this is helpful and I will amend the report. We understand your point about offsetting the use of fossil fuels to generate energy but We do not think this is within scope of the furnace study.
p 49 The IPPC is under review not the Waste Incineration Directive. It is more consistent to use wording of the Directive when speaking about the scope.	This is helpful, I will amend the report

<p>p 50 2004/107/EC . This Directive's recitals say: 5. The target values would not require any measures entailing disproportionate costs. Regarding industrial installations, they would not involve measures beyond the application of best available techniques (BAT) as required by Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control (5) and in particular would not lead to the closure of installations. However, they would require Member States to take all cost effective abatement measures in the relevant sectors. 6. In particular, the target values of this Directive are not to be considered as environmental quality standards as defined in Article 2(7) of Directive 96/61/EC and which, according to Article 10 of that Directive, require stricter conditions than those achievable by the use of BAT. Therefore we do not think that this Directive was intended to regulate pollutant emissions from "large furnaces including incinerators", which are already much better regulated by the IPPC's mandatory use of Best Available Techniques and legally-binding Emission Limit Values. Mentioning that "these need to be designed to minimise these emissions" is a matter of the IPPC, BATs and the new IED (Industrial Emissions Directive), not of this Directive. We suggest deleting the reference to this Directive as it does not match the scope of this paper and does not bring any added value</p>	<p>I agree with your assessment of this directive and I will amend the report.</p>
<p>P 65 - 67, table 18. What is "unit" (here it equals plant)? In the table the number of Waste-to-Energy plants is given but this doesn't mean that each plant has one incineration unit. What is the exact large number of waste incinerators with no energy recovery? In Europe there are mainly incinerators with energy recovery. Please give reference for these assumptions</p>	<p>We had assumed that most installations have one incinerator, if this is not correct please provide data on the number of incinerators in EU. Source IPPC BREF, line below table gives reference</p>
<p>Table 22. What is "stock" (here it equals plant)? In the table the number of Waste-to-Energy plants is given but this doesn't mean that each plant has one incineration unit. Reference from where the data are coming from is missing.</p>	<p>I assumed that most installations have one incinerator, if this is not correct please provide data on the number of incinerators in EU</p>
<p>p 76 Table 25 This is a number of plants, not incineration lines. Reference year should be given.</p>	<p>I assumed that most installations have one incinerator, if this is not correct please provide data on the number of incinerators in EU.</p>
<p>p 77 Data not from CEWEP</p>	<p>Ref 42 stated in report, this was provided by CEWEP. 38TWh is WtE heat + electricity taken from slide 15. 12.5GWh is not from this document but we have calculated this from the electricity consumption / tonne of waste treated by WtE (provided by ESWET multiplied by the total tonnage of waste treated in WtE incinerators in EU). I will amend report to explain this.</p>
<p>p 95 As stated before, municipal waste thermal treatment is not only "disposal", many Waste Incineration plants perform a "recovery" operation. Furthermore, "organic" waste is confusing, it is better to talk of waste in general as Waste-to-Energy plants also process plastics and metals.</p>	<p>Disposal and recovery are both carried out by the installation but the "furnace" part is disposal only. I will amend the report to explain this.</p>
<p>p101 The presence of PVC has little influence on the formation of Dioxins, as even if there is no PVC, Dioxins can be formed and significant amounts of PVC do not mean significantly more Dioxins. During incineration, many Dioxins are destroyed. Afterwards, both Dioxins and PAH are captured by the Flue Gas Cleaning Systems. Therefore it is not a matter of operating the system correctly (which is mandatory by law) OR using Flue Gas Cleaning, both processes are required. We also believe that other pollutants embedded in the waste, such as heavy metals, acids or NOx, should be mentioned as they also require removal systems.</p>	<p>Thank you for this explanation which is useful. I will amend the report to explain this.</p>
<p>Page 14, par. 3: Pollutant emissions into the air as well as other environmental aspects are far from being comprehensively regulated within the EU. Certain standards are implemented according to the IPPC directive (including sector directives) for installations that are subject to licensing, but for many smaller installations no requirements exist at all. Hence we consider a thorough analysis of the overall environmental impact of furnaces and ovens necessary. Considering energy consumption alone is not sufficient</p>	<p>This is useful. I have looked again at the EU legislation and i agree that pollutant emissions are not well regulated, particularly for smaller installations. We have always intended to consider all environmental impacts in this study which will include air pollutant emissions.</p>
<p>The scope of the directive is the definition of ecodesign requirements for energy related products "with the aim of ensuring the free movement of such products within the internal market." In consequence only more or less "standardised" products, not installations planned and assembled for the specific use can be reasonably considered under the ecodesign directive. However, it should be strived for at least to regulate standardized components, like burners.</p>	<p>The scope of the study is all industrial and laboratory ovens and furnaces and so will include custom designed products. Custom designed furnaces can be built and supplied in the same way as standard-designs. Custom designs can also be constructed in-situ and are subject to the same free movement of goods requirements as any other product. Besides, the inclusion or exclusion of given equipment from the scope of the study is base only on the 3 criteria stated in Article 15 of the Ecodesign Directive: volumes of sales and trade (indicative</p>

	threshold of 200,000 units); aggregated environmental impacts and improvement potential. We would be pleased to receive any information that UBA have available on environmental impacts and improvement potential of furnaces. This study is of furnaces and ovens and so we cannot consider standardised components only. However these are important for energy efficiency and so will be considered as possible policy options in task 7.
It is our position that industrial installations that are not standardised shall not be regulated under the ecodesign directive. In the course of the amendment of the IPPC directive regulations for installations below the current thresholds have been discussed. The correspondent extension of the scope has then been rejected. However this would be the appropriate way to tackle those installations. Based on the insight that not standardized installations can not be regulated under the ecodesign directive we ask the commission to take the initiative again and to reduce the thresholds of the IPPC directive	This preparatory study is required to consider all ovens and furnaces including those covered by IPPC. Our initial investigations indicate that the IPPC directive controls hazardous emissions from installations but does not appear to control effectively the energy efficiency of individual furnaces and so we need to determine whether there are significant opportunities for reduction in energy consumption. We would of course assess any overlaps or conflicts between IPPC and possible ecodesign requirements. We would be pleased to receive input on these issues.
Page 23, par. 2: According to our preliminary comments we propose to exclude all installations that are generally tailor-made for the specific use. Indicatively it could be assumed that this is the case for furnaces with a higher thermal input than ~400 – 500 kW (in line with lot DG TREN 1, 2 and 15).	We will need to consider whether there are opportunities for significant eco-design improvements and the impact of possible eco-design requirements. One option is to consider furnaces that consume <500kW and >500kW separately if there is evidence that this is beneficial overall
At least LCA analyses should be carried out for these types - laboratory ovens and furnaces plus six industrial types. In addition, it should be considered to include: • small scale agricultural dryers. • It should especially be considered to include standardised components of installations, like burners sold without furnace or oven, into the scope of the study.	We are limited to a maximum of six base cases and we are currently considering what these should be and so your suggestions are helpful So far we have very little data on agricultural driers although it appears that these are relatively energy efficient and are not large energy consumers. We would appreciate your help with obtaining more information on these types of oven.
In the case of ovens for the manufacture of food a clear cut between lot TREN 22 and lot ENTR 4 is necessary as well as a harmonised approach if similar products are considered in LOT TREN 22 and LOT ENTR 4.	Bio and Cobham are also carrying out the DG TREN Lot 22 study and so we are aware that it will be necessary to differentiate between the scope of these two studies. We would be pleased to receive your suggestions.
The definitions of industrial ovens and product categories covered by this study, and the relation to other lots (particularly ENER Lot 22) should be revised after the scope of the study has been redefined, and should take into account state-of-the-art definitions in literature and norms.	We are looking for state of the art definitions and we would be pleased to hear your suggestions.
Page 24, table 3: Regarding the general categorisation of products, the classification of furnaces and ovens into the four main design types (typical shapes) given in table 3 of the preparatory study is not relevant, because the main criterion is the "thermal process" conducted in an industrial furnace. The respective categorisation is shown in the following table. The result of heating a material (variation of temperature) will be e.g. a melting process, homogenisation of materials (for metals this includes a long time annealing process at high temperatures - near solidus temperature - to initialise a diffusion process), etc.. The main task of industrial furnaces, laboratory furnaces and ovens is to run one or more of the thermal processes (exemplarily) presented in the following table in parallel or in sequence for the treatment of materials with the aim to reach the aspired properties.	The technical input on thermal processes is helpful and it is also a useful suggestion that the primary function is a thermal process. For this eco-design study we will need to consider a manageable number of classification categories and 22 is too many. The four basic design types has been suggested as each of these has different energy efficiency and there are important differences in their function. Of course there are many other classifications but we are limited to a maximum of six base-cases so need to decide on a simpler classification with a limited number of main categories.
Page 43, Nr. 1.3: The preparatory study just gives some general idea on possible performance criteria. Based on a revised and specified scope and list of product categories, specific performance criteria should be identified. Criteria with respect to the function of the ovens should be preferred, if possible after the scope has been narrowed down.	We agree and we intend to do this.
Page 49, table 15: Directive 2001/81/EC (NEC-directive) should be mentioned as relevant legislation. The directive sets emission ceilings for member states. Room for national requirements is necessary to comply with these emission ceilings, this may be in contradiction to a comprehensive harmonization concerning emissions into the air. Concerning Directive 2008/50/EC (air quality directive) is at least relevant for all furnaces burning liquid, gaseous or solid fuels, not only for larger ones.	We will add details of 2001/81/EC to the report. I note that this covers only the EU15 Member States and only a few substances. I note your correction that 2008/50/EC can potentially affect all furnaces.
Page 51, IPPC directive: The content of the IPPC directive and the sector directives is described from the point of view of energy efficiency, although the description is valid for all environmental impacts. As the scope of the ecodesign directive is the environmental impact of a product and not only energy efficiency, this should be described accordingly. As discussions on the IPPC recast are ongoing and will probably be finished before the implementing measure on furnaces and ovens, the planned changes should be described in more	We plan to discuss IPPC in more detail in the next version of the report especially as the recast IPPC directive has recently been agreed. There are very few eco-design directives that directly affect ovens and furnaces however I accept that we should discuss this in the report

<p>detail. Other implementing measures to the ecodesign directive are not yet mentioned. We propose to add a chapter on other relevant implementing measures specifying the cut points between the lots and needs for harmonised approaches for similar products. Relevant DG TREN lots are 1, 2, 15, 20, 21, 22, 23</p>	
<p>Page 53 – Scheme for greenhouse gas emission allowance trading - 2003/87/EC Furthermore, there is the EU Greenhouse Gas Emissions Trading Scheme (GHG ETS) affecting over 11,000 installations in the EU-27 including several that rely on large furnace and oven processes such as steel and cement production. The preparatory study just refers to the original Directive 2003/87/EC of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC. It neglects the amendments by Directive 2003/87/EC. Moreover, a thorough discussion of possible links and overlaps between this Directive and a possible ecodesign implementing measure is missing. However, the GHG ETS will not be relevant if the scope of the study is narrowed to smaller installations.</p>	<p>We plan to update this section of the report. Possible overlaps and conflicts between eco-design requirements and EU ETS are on the agenda for the first stakeholder meeting and so this will be discussed in the next version of the report.</p>
<p>Page 55, Legislation at Member state level: The described legislation at member state level is by far incomplete, although an implementing measure based on Art 95 of the EC treaty may well affect national legislation. For Germany at least the following regulations should be mentioned: • 1.BlmSchV (ordinance on small and medium size combustion installations): Sets requirements for fuels, emissions and energy efficiency of combustion installations that are not subject to licensing; • As long as large installations are considered, TA Luft (Technical instruction on air quality) in connection to 4. BlmSchV (ordinance on installations requiring a permit) needs to be mentioned: it regulates emissions of installations that are subject to licensing via limit values considering air quality; thresholds are often lower than according to the IPPC directive; For large combustion installations 13.BlmSchV (ordinance on large combustion installations) is applicable.</p>	<p>Thank you for details of German national legislation. I have reviewed 1.BlmSchV and this appears to regulate heating equipment in buildings which we would regard as boilers and so outside the scope of this study. Would this ordinance in your opinion also regulate industrial and laboratory furnaces and ovens?</p>
<p>Page 73, Table 22: Market and stock data (2.2) as well as annual sales (2.2.1) are not contained, due to missing data required from stakeholders. For this reason, the shown table of the current EU stock of furnaces and ovens and their (estimated and current) sales is incomplete (p. 73). Some data used for task 2 (e.g. purchase costs) are UK Prodcom averages and do not reflect EU prices. The missing data is needed for future calculations and the final report. Therefore, stakeholders are asked for their contribution. So far the sum of sales in the Task 2 table on page 73 is lower than 200,000. Data gaps have to be filled in to approximate real total sums. However, the sum strongly depends on the final scope and classification of product groups in Task 1. Anyway, the threshold of 200,000 products per year should only be seen as indicative, it should be considered to propose implementing measures even if the sum of sales is lower, if an implementing measure is feasible and leads to considerable improvements.</p>	<p>We welcome more data from stakeholders. Our initial estimate is that there are about 100,000 furnaces and ovens placed on the EU market annually. Although this is lower than the 200,000 indicative threshold, early indications are that there is significant potential for reductions in environmental impacts, especially energy consumption and so we agree that implementing measures may be justified.</p>
<p>Page 78, Table 27 of the preparatory study is very short and very incomplete. Large, medium and small size companies producing all types of equipment are missing. Good sources are the lists from trade fairs, a buyer's guide published by Vulkan-Verlag, and further available information in the market.</p>	<p>I agree, this is incomplete and we will correct this in the next version of the report.</p>
<p>Page 94, No. 3.1. The preparatory study differentiates between a large number of different applications for furnaces and ovens, resulting in a wide variety of user types and requirements they have regarding size, throughput, maximum temperature, temperature uniformity and control, price and running costs of the oven: Goodman et al. (2010) only provide general qualitative information on user requirements in the use phase. Quantitative data and information on user patterns and requirements for the different product categories is missing and should be added after redefinition of the scope and the relevant product categories. In general, maintenance and repair are very important for lifetime and life cycle impacts. Therefore, they should not be neglected in the preparatory study. It should be focused on the influence a producer can exert on real life performance of the furnaces.</p>	<p>At the time of writing, we had very little data on user requirements in the use phase as there is nothing published. We now have some data from stakeholders provided in questionnaire responses and we hope for more and so we would be able to complete this section of the report.</p>
<p>For several reasons it is surprising that blast furnaces are categorised as furnaces in the meaning of the project. On page 19 of the May report it states "Equipment whose primary aim is not heating materials should also not be considered as being an oven or furnace". Even outside of metallurgist circles, it is well understood that a blast furnace</p>	<p>The scope of the study is its title which is "industrial and laboratory furnaces and ovens". This is the only scope we have to work with. We therefore have to consider, initially at least, all types of "furnace" and "oven". We could not therefore omit blast furnaces, basic oxygen furnaces and coke ovens. In</p>

<p>"employs carbon, mainly in the form of coke, to reduce iron from its oxide ores" (J.G. Peacey, .G.Davenport, The Iron Blast Furnace - Theory and Practice). The May report itself highlights this fact when citing BS 4642:1970 that a blast furnace is "used for the reduction of ores to metal". In addition the draft report provides an unusual interpretation of the role heat plays in a blast furnace by claiming that "heat energy input is used ... to cause chemical reactions" (page 15). In fact carbon input (in the form of fuels as coke or coal or oil) is used to run reduction reactions whose kinetics are then improved by using the calorific potential of these fuels. Furthermore, it is difficult to see a blast furnace as a "product" like a dryer, because a blast furnace is usually considered as an installation consisting of many different technical units. A blast furnace is designed on the basis of complex customer requirements and operated on the basis of process considerations and raw materials choice. A blast furnace is thereby more comparable to a construction than a product (a point which is highlighted, for example, by the need to obtain a construction permit when erecting a blast furnace).</p>	<p>task 1 we need to identify suitable definitions. There are two definitions in our draft report but neither is ideal and we are asking stakeholders for their suggestions. I agree with you that a blast furnace cannot be considered in the same way as a drier and I have tried to explain this in the report. I also agree that carbon input is as a reducing agent although I believe that more carbon is used than the stoichiometric quantity needed for iron oxide reduction.</p>
<p>I mention these aspects as they give rise to the assumption that whilst it seems possible to define energy recovery technologies applicable to blast furnace installation and operation, it will be difficult to define useful energy related design features in the framework of the Eco-design Directive. Such activities are already covered by a series of policy measures, most importantly the Industrial Emissions Directive. I would assume that the Eco Design initiative should focus, as a priority, on parts of the economy that are not currently so tightly regulated. Thus, the work on ovens and furnaces might benefit from a more focussed definition of scope.</p>	<p>My opinion is that the only way to realistically consider very large furnace systems is to establish the percentage of energy that is lost (and not utilised) and whether this can be decreased. Clearly relatively little energy is lost during steel production but we do not know whether there is existing technology available that could reduce this further but is not utilised in EU when furnaces are refurbished, possibly due to cost. Can you help,us with this question?</p>
<p>At least one remark can be made ad-hoc to the short discussion of energy efficiencies of the Japanese steel industry, namely that Japanese steel makers tend to operate with a view to maximise energy production by process gas production and heat recovery. In this they achieve better energy balances than European steel makers but have to use more carbon, whilst European producers tend to reduce carbon consumption to the minimum and thus optimise the metallurgical processes. This difference in approach is most likely due to the geographical isolation of Japan, which tends to emphasise energy supply security issues by all available means</p>	<p>Thank you for your comments about Japanese steel production, this is helpful.</p>
<p>Categorizing a mass product and working with virtual items is a classical way of economics science. In this special case the good is a complex item and consists of many other products. This means we can not look at a single furnace. We always have to consider a furnace plant, which is individually designed and manufactured according to client wishes or due to process requirements. The market value of series products is very small compared to process or client designed plants. For this reason the above method can not be applied to furnace plants and leads to completely wrong decisions which may lead to obstruct the business of furnace manufacturers.</p>	<p>We are required to carry out task 4 "base-case" as we explained at the meeting. We accept that it is not possible to use a typical product as larger industrial furnaces are too complex and are custom designed. Therefore we plan to consider medium size furnaces by inputting data for the important parts. This is not very different to mass produced equipment that consist of many individual parts which would all be included in a base-case calculation. We plan to include for the base case calculation, representative insulation, heat sources, control equipment, fans, etc. These would be selected to be as representative (average) as possible and this will give us a calculation on eco-design impacts. Then we would repeat the calculation with different parts (such as more energy efficient burners) to see what effect this has. For example, we would see what impact a change in insulation type or gas burner type would have on all ecodesign impacts. I appreciate that this will need estimates of energy input in the use phase and this would need to be estimated. The only alternative approach that I am aware is to choose a real furnace but no manufacturer of a large furnace has yet been willing to provide the information we need. We would be pleased if Linn could help or if you can suggest an alternative approach but we do need to carry out task 4 to calculate all environmental impacts in the furnace life cycle (this is not only energy consumption).</p>
<p>Forecasts about the future of the furnace market or number of sales of a certain type of furnace plant are very difficult to make. The business of furnace manufacturers depends on the economical growth of a lot of different industrial branches</p>	<p>I understand.</p>
<p>It has to be found a clear definition for ovens, furnace and kilns. The last item even was not mentioned until now</p>	<p>I agree, so far we do not have a good definition. At the meeting I asked for suggestions from stakeholders.</p>
<p>The existing definitions do not cover all products manufactured by furnace manufacturers, i.e. furnaces for chemical reactions are not included. Cold wall furnaces which have no insulation (which is not available for very high temperatures), but radiation screens, are also not covered.</p>	<p>Definition is important as it will be used to defines the scope of any future eco-design requirements. The scope of the study is "furnaces and ovens". However, it is not all thermoprocessing equipment. Furnaces that are designed for processes with chemical reactions would in my opinion be included if the chemical reaction was a source of heat and as long as the</p>

	<p>primary function of the equipment (the furnace) is to contain the materials which are heated. If heating is only one of several functions and so not the primary function, then perhaps these types of equipment should be excluded. I would be pleased to hear your suggestions for a definition.</p>
<p>At design classification - item atmosphere: reducing, oxidizing and chemical reactive atmospheres are not listed.</p>	<p>Thank you, I will add these to the report.</p>
<p>The study until now does not cover industrial branches like chemical or food industry.</p>	<p>We have asked for data from these sectors. CECOF represent both of these sectors but so far we have received very little information from stakeholders from these industries. Furnaces and ovens used by these industries are included in this study and so we would encourage manufacturers of furnaces and ovens used by these industries to contribute.</p>
<p>From the design power of a furnace plant it can not be concluded to the potential savings or future efficiency improvements. The design power covers everything and includes reserves for typical machine and operation behaviour, i.e. furnace plants which do not operate 7 days per week are regularly heated up. For shorten the heating up time they have up to 100 % more power then required for the normal process. Fans operated at high temperature do not need much power at their design working point. For start-up at ambient temperature they need much more power, i.e. at normal operation at 600 °C a fan needs 1 kW but at cold start-up 11 kW. This value is included in the total power of a furnace plant and gives a wrong picture particularly at a higher number of fans.</p>	<p>This is very useful information and we will need to take these issues into account. It would be useful for us if we could discuss this in more detail.</p>
<p>Cost analysis: furnace manufacturers do not know the maintenance or operating costs of a furnace plant because they even do not know often in detail what the client produces with the equipment. For accurate information about these items operators of furnace plants have to be registered as stakeholders!</p>	<p>Thank you, We are asking users for this information and so far have a limited amount of data</p>
<p>Energy recovery should be considered in the study. Even if the energy recovery is done in a distant location, the total energy consumption will be reduced and consequently also the carbon dioxide emissions. If this is not considered no furnace plant operator will invest in improvement of energy efficiency. At this time every operator of furnace plant is looking to improve efficiency due to high energy prices. This behaviour can be encouraged by an energy policy which supports investments in measures to improve energy efficiency.</p>	<p>I agree with you and this is stated in the report. Any eco-design requirement must consider all energy recovery and reuse, even if this is not within the furnace or process.</p>
<p>Categorizing furnace plants by process or kind of heat transfer is much easier to handle then categorizing by geometric shape. Drying processes i.e. performed via microwave heating is the most effective way for heat transfer compared to heat transfer by convection where always a transport medium has to be heated and the drying process runs opposite to the heat input direction</p>	<p>Classification is still undecided. As you know, there are many ways to classify furnaces, size and shape being only two of many. We are currently considering two parallel approaches:- size so consider separately (i) furnaces within scope of IPPC and ETS, (ii) smaller furnaces not covered by this legislation and (iii) laboratory furnaces and ovens. In parallel, we are considering whether to classify furnaces by process such as:- chemical reactions with solid/liquids (such as metal smelting), heating solids (such as ceramics manufacture), melting (e.g. metals), etc. Energy source is another type of classification. Drying by electric resistance heating is less energy efficient than microwave and we would regard microwave drying as best available technology, however I agree that comparing these two techniques is not straightforward.</p>
<p>Industrial Furnaces are not single products similar to the ones treated by the other EuP lots. They are assemblies of products some of which handled by other lots (fan, pumps). Also Industrial furnaces are part of a (sometimes very complex and long) process lines with feed-back interactions of the energy.</p>	<p>I agree but this does not necessarily exclude them from the scope of the eco-design directive although it makes them more difficult to study using the 7 task approach used for all eco-design studies</p>
<p>Industrial Furnaces cannot be easily categorized and certainly not by their chamber geometry as proposed. Suggestion: categorization by type of process. In anyway, limiting the amount of categories to 4 or 5 would be totally useless (IPPC already has more than 30 BREFs each one of them covering the full spectrum of the furnaces from the process).</p>	<p>Arguments presented at the meeting on this issue were helpful. I know that design shape is not ideal but we need an approach that we can use. From the suggestions made at the meeting, it seems that a better alternative would be (these are just preliminary ideas):</p> <ol style="list-style-type: none"> i. Very large covered by ETS and IPPC ii. Chemical reactors where these main function is not heating materials – e.g. blast furnaces, metal smelters, possibly cement kilns (but not ceramic kilns, glass melting) iii. Processes where melting occurs (metals, glass, etc.) excluding those covered by ETS & IPPC iv. Processes where solid parts are heated (dryers, metals heat treatment, ceramics, etc.), excluding those covered by ETS & IPPC v. Laboratory furnaces and ovens (we would need to define this as, for example an internal chamber volume of <1000 litres). <p>Hopefully industry can provide enough evidence to prove that</p>

	there is no need to consider either i or ii from above beyond task 3 and we would then have three main classifications left to study
Industrial Furnace manufacturers in general and CECOF members in particular have the know-how and the technology to produce energy efficient furnaces. Paybacks are big issues (Arcelor Mittal is not accepting an investment that is paidback in more than 6 months). Suggestion: An Incentives policy should be organized by the Commission and the Member States to help the USERS to invest in Energy Efficient Industrial Furnaces and/or to replace their existing furnaces by more efficient ones.	I agree and we will include this in task 7 but we will need industry to provide the data on costs and benefits for our report.
Virtual base cases will not represent actual furnaces. A number limited to 4 or 5 will be too limitative to be used as a base for extrapolation. Again here the BREFs of IPPC is showing the good examples: the environmental BAT of the IPPC should be enlarged to cover Energy Efficiency instead of handling this issue by the EuP.	What if we are able consider only classifications iii – v in section 2 above for base-cases? If we chose the most common designs using the modular approach we should be able to calculate the eco-design impact difference between currently sold furnace designs and BAT furnaces. This approach would need data on the main parts that are different in standard designs to BAT designs (excluding any common parts). A full BOM should not be needed except for small and lab furnaces.
The methodology for the calculation of Energy consumption and Energy Efficiency should be based on the future ISO 13579. BOM (bills of material) should not be used (as proposed) in the calculations of energy: the incidence of the energy from the BOM will not be significant as the life-cycles of Industrial Furnaces are very long.	There is a misunderstanding here. We need to know materials used for the base-cases to calculate all environmental impacts not only energy consumption. EuP eco-design studies have to consider all environmental impacts, for example toxic substance emissions to air and water in the manufacturing of the furnace or at end of life, etc. and these may be affected by changing from currently sold furnaces to BAT designs. The Commission need to know what impact there would be if they introduced legislation that forced changes in design. I think you have said that you think these impacts will be insignificant compared to energy consumption in the use phase and you may be correct but we need to show this using real data in our report.
CO2 is not a good representation of energy consumptions: this would be penalizing fossil fuel heating and will be useless with 'the fuel of the future': H2.	It is EU policy to reduce carbon emissions as well as to tackle energy security and so are expected to consider both total energy consumption and carbon emissions. This is why I explained the difference in carbon emissions between gas heating and electric heating to show that gas is usually better in terms of carbon emissions.
Many processes considered by the report will have very little chance to be installed in the EU in the next future (e.g. blast furnace, ceramic lines...).	If no new furnaces are likely to be installed in the EU, this is a good reason (but not the only one) to exclude these from tasks 4 – 7. This is one reason why we ask for future sales data with as much detail as possible. If CECOF can provide this data, we can consider excluding any furnace types that will not be sold in EU in future years.
I feel that if it would have been a ballot on the proposed document after the meeting, it would have been rejected by a large majority of the stakeholders.	I am sure you are correct but this is only the first meeting to discuss the study. No final decisions have yet been made on any aspect of the study including definitions, classifications or what to include after task 3.
p101 The presence of PVC has little influence on the formation of Dioxins, as even if there is no PVC, Dioxins can be formed and significant amounts of PVC do not mean significantly more Dioxins. During incineration, many Dioxins are destroyed. Afterwards, both Dioxins and PAH are captured by the Flue Gas Cleaning Systems. Therefore it is not a matter of operating the system correctly (which is mandatory by law) OR using Flue Gas Cleaning, both processes are required. We also believe that other pollutants embedded in the waste, such as heavy metals, acids or NOx, should be mentioned as they also require removal systems.	Thank you for this explanation which is useful. I will amend the report to explain this.