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MINUTES – FIRST STAKEHOLDER MEETING, Brussels, 25 June 2010

DG ENTR Eco-design preparatory study Lot 4: Industrial and Laboratory Furnaces and Ovens – Tasks 1 – 3

Note all materials presented at the meeting are either attached to the minutes or are uploaded to the project website, http://www.eco-furnace.org/meetings.php.

1. Attendees

Please see attached list.

2. Introductions

Chris Robertson (CR) welcomed the stakeholders to the meeting after which everyone briefly introduced themselves.

3. Ecodesign directive and background

Laure Baillargeon (LB) presented slides explaining the objectives and requirements of the Ecodesign Directive, the structure of preparatory studies which are used to assess product groups, and the content of implementing measures which may arise. CR followed with an overview of the wider environmental context which is driving policy towards major reductions in energy use and carbon emissions. Furnaces and ovens have been identified as being the fourth largest energy user in the EU responsible for 7.5% of energy consumption. As such they have been prioritised for consideration for implementing measures under the Ecodesign Directive. The present preparatory study is designed to analyse the potential for reduction in environmental impact in this sector and provide policy makers with evidence they can use in determining what actions if any should be undertaken. As such this study provides a unique opportunity for stakeholders to engage with and provide input to this process to ensure that their wealth of know how is captured and properly taken into account in forming regulatory or other policy measures (e.g. mandating harmonised standards, input to BREFS etc.).

It was pointed out that slide 14 is incorrectly labelled as a steel continuous casting furnace. It is in fact a continuous caster and rolling mill.

Chris Robertson (CR) described the background behind the study.

4. Task 1 – definition and classification

Paul Goodman (PG) explained the methodology prescribed by the contract and went on to present the results of Task 1 to date as per the draft Tasks 1-3 report (published on the project website). The main requirements for task 1 are to provide definitions of furnaces and ovens, classifications that can be used for the entire study and that may be used for specifying eco-design requirements and to identify relevant standards and legislation

Two possible definitions of scope were given slide 23. These may not be ideal and alternatives are requested from stakeholders. There were many points made regarding the scope of the study by stakeholders. (Note all numbered items below are points made by stakeholders unless otherwise stated):

1. Stakeholders said that many furnaces do not have the primary function of only heating materials; for example a blast furnace is a chemical reactor (carbon reduction of iron oxide) to produce steel.

2. Stakeholders said that the primary function of paint dryers in car production lines is drying not heating.

    - Cobham - post meeting note: This process dries paint by heating so is a type of oven.

3. Analytical instrumentation incorporating a furnace as a small part of the instrument (for example a gas chromatograph) should not be considered in scope as they do not consume much energy and heating materials is not their primary function.

4. Making an "insulated enclosure" part of the definition does not work in those applications where insulation is not feasible – for example where this would make the furnace overheat and damage it, or for rapidly cycling processes (e.g. autoclaves) where rapid cooling is needed. There are also furnace designs that have no insulation for functional reasons.

5. An "enclosed compartment" does not generally apply – for example with certain induction furnaces.

6. Several stakeholders suggested that furnaces which are regulated by ETS should be excluded from this study. ETS regulates all furnaces, old or new, that are part of in-scope installations.

7. Stakeholders said that there is improvement potential but ETS is the way forward (this potential may be the difference between existing stock and new products. Hence, this is not the same improvement potential that is considered by eco-design studies which is the difference between representative new furnaces and what is technically possible irrespective of cost). Best available technology criteria exist for energy in IPPC but are not mandatory and are often several years out of date. The cement industry is moving from wet to dry processing and is an industry initiative to reduce costs by reducing energy consumption.

8. No new cement kilns will be built in the EU so there is no point in including them (a widely supported point).

    - PG: However some will be refurbished and some EU States consider full refurbishment as building new installations.

9. The chemical industry uses a huge number of furnaces which are not covered in the report.

   - PG: There were no stakeholders present at the meeting for food production ovens, petrochemical or chemical industries although they are encouraged to contribute to this study

10. Several stakeholders claimed that the Ecodesign Directive is not intended to cover the industrial sector*. Carbon emissions and leakage are already addressed by ETS and IPPC which are pushing industry toward more appropriate performance.

    - LB - post meeting note: * The Ecodesign Directive is intended to cover all energy related products, both consumer and industrial goods. The Ecodesign Directive covers all environmental impacts of the products, including carbon emissions. But only environmental impacts with a significant improvement potential are addressed by Ecodesign requirements.

    It was also claimed that there may not be many new installations of large furnaces in the EU. A product in the industrial sector is in fact a system shaped by each end user. The Ecodesign Directive only covers products not systems or how to use systems.

    - LB - post meeting note: the Ecodesign Directive, indeed covers 'products' but everything depends on how these 'products' are defined.

11. Is it the purpose of the Ecodesign Directive to deal with such low volumes? For example there are about 500 glass furnaces in the EU – way below 200,000.

    - LB: The Ecodesign Directive uses 3 criteria: volumes of sales (*indicatively* 200,000), aggregated energy consumption and improvement potential. These 3 criteria are used *in combination*. For example, if low volumes of sales combine with very high individual energy consumption and significant improvement potential, the potential impact of an implementing measure may justify legislating. The worst case scenario is when a preparatory study overlooks a major sector of the scope. At the time of later stakeholder consultation and political decision, it may then be required to address this major sector (to reap the related improvement potential), but with less time and resources to investigate than during the preparatory study. The system boundaries defining what is the product is a question to be defined in each case. There is a distinction between standalone heating devices and industrial processes where heating is part of process.

12. AS: Decisions regarding payback time are a complex topic, be careful about getting too involved this area.

    - PG: It is understood that these decisions are made for good business reasons. It is to be expected that managers will choose the best return on investments and this does not always result in the most efficient furnaces.

13. PG: industry can help by identifying products that have no eco-design improvement potential. Hopefully these could then be excluded from further consideration.

Regarding design classification the following points were made by stakeholders:

14. There is no real distinction between ovens and furnaces.
15. (Re. slide 30): Several breakpoints between ovens and furnaces were suggested; 500°C, 650°C and 750°C (the latter as used in EN 746 parts 1 and 2).
16. (Re. slide 30): Other energy sources are used apart from those listed including solid fuels (e.g. coke).
17. (Re. slide 30): The distinction between batch and continuous is not meaningful because the energy efficiency of a batch process can under some circumstances be the same as a continuous process.
18. (Re. slide 31): Atmospheres use also include reactive and explosive (e.g. hydrogen).
19. (Re. slide 33): It would be better to classify using temperature, function or by application rather than shape.
    - PG: Currently we are examining all possible classifications to identify the most appropriate.
20. (Re. slide 34): Tunnel conveyors can also be heated externally.
21. Function is a better differentiator than shape and allows better comparison of efficiency.
22. Classification based on the end product (what the furnace produces) is a better differentiator.
23. The energy used by a furnace depends on the feed material being processed. For example, clays from different areas have different characteristics.
24. Defining the process boundary is crucial. For example, the energy used by the furnace itself can be reduced by grinding the feedstock finer first. Hence, the power consumed in grinding needs to be considered if a meaningful measure of process efficiency is to be realised.
25. There are sometimes wide variations in products made in furnaces for cultural reasons – for example roof tiles.
26. It is questionable if calculation of meaningful performance figures can be achieved given that it depends not so much on the product (furnace) but on how it is used.
    - PG: We would need to consider the design performance.
27. We need to distinguish between heating and where the main purpose is chemical change.
28. If it is not possible to classify, is it sensible to attempt to do so.
29. PG: There are many ways to classify – we need to identify a method that is useful for this study).
30. A stakeholder claimed that the low voltage directive is not relevant to furnaces.

- PG: This is true for industrial furnaces but it is applicable to laboratory equipment.

31. PG: we need to separate out emissions from the process from those of the oven itself.

32. Could slide 58 (a list of uses) be used for classification?

    - PG pointed out that the contract constrains the number of base cases that can be assessed to 5 or 6 so this is not feasible; also there are many types of furnace used for each market sector.

33. Klaus Kamps (KK) suggested a matrix of uses (one axis) versus technologies (second axis) to help with classification.

34. Is the draft ISO standard (WD13579-1) "industrial furnaces and associated thermal processing equipment – method of measuring energy balance and calculating efficiency" publicly available?

    - PG: No, only ISO committee members have access, Stakeholders should refer their national standardisation bodies if they wish to comment.

PG tabled a revision to Table 18 in the draft Task 1-3 report (this is attached) which attempts to quantify the reduction is energy consumption achievable by the type of design.

The following point was made re. Table 25:

35. Hans-Jörn Weddige (HJW): There are 64 blast furnaces in the world. The time between refurbishment is about 20 years.
    It was agreed that the contractors would have a bilateral meeting regarding blast furnaces.

5. Task 2 – Market information

Lorcan Lyons (LL) and PG presented market information received so far and thanked stakeholders for their contributions to date which are much appreciated. The following points were made:

36. Alessandro Colucci (AC): Agreed with the Italian industry figures which had been circulated by email yesterday.

37. PG: There are still major gaps in data particularly for agriculture and food production.

38. CR in response to a question from a participant: We are considering refurbishments in the study, though refurbishments are usually excluded from Eco-design requirements.

39. PG: Batch : continuous ratio of 6:1 is only an estimate.

40. Does cost include infrastructure (for example for blast furnace the cost including this is about €500m which would also include accommodation for workers).

    - PG: Yes, construction and support structure costs would be included as these are needed for any furnace and depend on the furnace design (worker accommodation should be excluded).

6. Task 3 – User requirements

41. Heinz Wimmer (HW): Efficiency is defined by the product specification not just the process equipment.

    - PG: We need data from users to ensure this is properly understood and analysed.

42. Gregoire Quere (GQ): Bodycote is one of the largest heat treatment companies worldwide is a key user since they are international and run facilities comprising 20 to 30 furnaces in each. Hence they are in a good position to provide information how furnaces are used and their various pros and cons. He suggested encouraging users to engage in study. Franz Beneke pointed out that Bodycote has furnaces covering a wide age range. ***GQ to provide contact details at Bodycote***

7. CECOF presentation

Note: slides number are those of CECOF's slides in this section.

Michel Debier (MD) and Karl Nolte (KN) presented the furnace industry's views on state of the art, improvement potential and the present study. A key issue is that users do not always buy BAT as the return on investment is too long (typically 3 years but can be as short as 6 months in the steel industry). The following points were made:

43. Heat Processing magazine is the leading journal in the field.

44. LB (to slide 9 regarding meeting Article 15 criteria of the ecodesign directive): These are legitimate questions. 200,000 units is an indicative figure, however, first conceived for consumer goods. The overall aim of the legislation is to reduce environmental impact where there is significant potential; for energy this added value is measured in TWh. To this end, it is checked whether the number of products x energy use per product is of significance. Regarding the fourth bullet, whether or not a product is custom built is not a criterion under the Directive however this does make analysis more difficult requiring creative thinking. The Ecodesign methodology (MEEuP) will be updated in the near future and the issue of customised products should be considered.

45. MD (to slide 15): Several of the standards in the Task 1-3 draft report may be superseded.
    MD to provide details

46. MD (to slide 17): While IPPC is pollution oriented this could be adapted as it deals with the whole process not an arbitrarily defined product within a system.

47. MD (to slide 18): Size and temperature are not sufficient to categorise furnaces. It is much more complex than that.

48. MD: CECOF wants to encourage companies to invest in more efficient furnaces.

49. PG: CECOF's slides indicate a potential 5 to 10% of savings for products in use. This estimate is significant and would be entirely sufficient to require action given the larger amount of energy used

by this sector. Hence we need to quantify this – and we need industry's help to do this to ensure policy is informed by sensible data.

8. Tasks 1 to 3 – Next steps

50. (Slide 73): Only users of furnaces have data on actual energy consumption. They must be asked.

51. (Slide 73): There is a crucial difference between design and use conditions.

52. HW: (Slide 74): What does "products where primary function is not heating materials" mean?

    - PG: This does not mean lab ovens but covers analysis instruments such as gas chromatography.

9. Task 4 – Assessment of Base Cases

Ana Maria Carreño (AC) presented Task 4. As most large industrial furnaces are custom designed, it is unrealistic to select real furnaces. However components and materials are standardised – burners, insulation, etc. – and so a modular approach is being proposed to determine the improvement potential from each design option; i.e. comparing the most commonly used burner type with the best available type.

There were many questions and comments regarding selection of base cases:

53. MD: Is the project intending to extrapolating from 5 base cases?

PG: Resources only exist for the project to consider 5 to 6 base cases. We may use 3 "virtual" furnaces using modular approach and 1 laboratory oven.

54. MD: Are base cases average existing or new products?

    - PG: Base cases are average new products you can buy today which we will compare with the best available you can buy today.

55. PG: We can change operating conditions while using virtual furnaces to study variability. We know that this approach is not perfect but we can think of nothing better. We welcome any alternative suggestion from stakeholders.

56. AC: Sensitivity analysis will be done in Task 6 which can help address variability concerns.

57. MD: The project should not compare existing stock but should start from best available technology (BAT).

    - PG: The project will compare typical new furnaces sold today, not old stock, with what could be sold today (i.e. BAT).

58. Tim Collins (TC): There are enough base cases even if one considers the lab sector alone; gas, vacuum, extraction by fan, steam sterilisers etc.

- PG: Lab ovens are the largest number and are often left on continuously. This where the biggest impact probably is, but will look at all products in detail (but not as base cases).

59. René Branders (RB): A "virtual" furnace is a dream. A furnace running the same process and the same material may be used very differently.

    - PG: It is possible to use one base case and input different operating conditions to measure the variability. (CR) Asked the meeting for ideas on a better approach for selecting base-cases. None were proposed. *(Post meeting note: but if you have any ideas do let the contractors know)*.

    - PG: Comparison is simplified by comparing current with future furnaces of the same or very similar design to minimise errors.

60. Why can't most products be covered under the ETS instead?: What steps must be taken to exclude industrial ovens and furnaces?

    - PG: The process is now underway. Our collective task (contractors and stakeholders together) is to carry out a good study. We would be able to exclude furnaces (from tasks 4 – 7) that are covered by ETS if either i) these have no improvement potential or ii) if ETS is fully adequate for regulating all significant environmental impacts. This needs to be a rigorous study and this may or may not provide what the questioner desires.

61. HW: We want a defensible output. Do not cover products covered by other legislation.

    - LB: all energy related products fall in the scope of the Ecodesign Directive. A methodology has been followed to select those with the highest impact for further investigation in the Working Plan (such as industrial ovens and furnaces). It is the contractor's task to consider as wide a scope in the study in the initial stages and to identify the areas with the greatest improvement potential. This initial screening may show with reasonable confidence that improvement potential is low in certain areas – but we have to have this evidence to show this first before excluding any products.

62. HW: Why is not possible to cut out products not meriting further consideration at once.

    - PG: The prescribed methodology requires us to consider all products up to Task 3. If done properly this may make it clear that no further action is warranted.

    - LB: there is an example from the commercial refrigeration study. The assumption had been that water coolers would be covered but in fact it was found that the market numbers were low - so they were not considered further. However, condensing units were originally thought to be insignificant but were included because they are used in surprisingly large numbers.

    - LB: Even if a product is included beyond Task 4 this does not guarantee that an implementing measure (e.g. regulation) would be adopted. Task 7 deals with policy recommendations, including impact assessment.

63. Andrew Somogyi (AS): Are the criteria you mentioned complete? Should it not also include uncertainty in being to provide meaningful analysis? Inaccurate numbers are almost as bad as no numbers (e.g. for process furnaces).
    - PG: Yes we will describe how inaccurate the data is.
    - AC: Yes we can take sensitivity into account (if you provide us with data).
    - HW: Agreed that 100,000 furnaces pa is an over estimate.
64. AS: Are we only looking at design improvement.
65. TC: Will get EU trade associations to contribute figures on the lab sector at least covering EU largest 6 states.
66. RB: Do you want to advise us on how to design?
    - AC: No, but to identify options for improvement on data provided by you.
67. It was pointed out that some of the units and kW calculation on pages 63 – 64 of the draft Tasks 1 to 3 report were incorrect.
    - PG: These will be corrected. Thanks for pointing it out.

10. Tasks 5 to 7

AC presented Tasks 5 to 7.

11. Next steps

68. (re. Slide 93). LB pointed out that a third stakeholder meeting is also planned for late 2011 after the working documents Tasks 1 to 7 was published.

12. Concluding remarks

PG asked that more manufacturers please return questionnaires or otherwise provide data to fill the gaps in the report.

CR thanked the Commission for providing the meeting venue and refreshments and the stakeholders for attending for the effort s they have been putting in to support the study. He emphasized the contractors are always open to discussion so please do contact us.

Meeting attendees

Project Team	
Ana Maria Carreño	BIO Intelligence Service
Lorcan Lyons	BIO Intelligence Service
Chris Robertson	Cobham Technical Services
Paul Goodman	Cobham Technical Services
Laure Baillargeon	European Commission, DG Enterprise
Stakeholders	
Michael Engelhardt	Bundesverband Glasindustrie e.V.
Mike Debier	CECOF
Claude Lorea	CEM Bureau
Astrid Volckaert	Cerame-Unie
Marta Olejnik	CEWEP
Johann Reichl	EBNER Industrieofenbau GmbH
Heinz Wimmer	ECFIA / Rath GmbH
Alessandro Colucci	ECTS
Wilfried Linke	EHI and BDH-Koeln
Guillaume Perron-Piché	ESWET
Patrick Clerens	ESWET
Reinhard Albert	Federal Environment Agency, Germany
Maya de Groot	Federal public service health, food chain safety and environment, Belgium
Andrew Somogyi	FEVE
Rene Branders	FIB
Didier Delaunay	Fives Stein
Tim Collins	Gambica
Frank Appel	Hans Lingl Anlagenbau und Verfahrenstechnik GmbH & Co. KG
Rob van der Meer	Heidelberg Cement
Anthony Joe Cottam	Invensys-Eurotherm
Gregoire Quere	Invensys-Eurotherm
Peter Wübben	Linn
Karl Nolte	LOI Thermoprocess
Naemi Denz	ORGALIME
Igor Spierenburg	Sanyo E & E Europe BV
Catharina Lindgren	Sarlin Furnaces AB
Francis Liebens	Solo Swiss Group
Bernd Butterhof	Thermo Fisher Scientific
Konrad Knauss	Thermo Fisher Scientific
Sandra Gröger	ThyssenKrupp Steel Europe (TKSE)
Hans-Jörn Weddige	ThyssenKrupp Steel Europe (TKSE)
Klaus Kamps	Unifrax
Franz Beneke	VDMA
Gutmann Habig	VDMA / CECOF
Jürgen Kellers	Zenergy Power
Suzan Arici	Zenergy Power
Ursula Kollenbach	Zenergy Power

Table 18a. Sales, stock energy consumption and estimated improvement potential for main industry sectors – v1 updated from report

Oven / furnace sector (design types)	Sales 2009 new units	Stock 2009 units	Average energy consumption (MWh/Yr)	Total sales energy consumption (GWh/Yr)	Total stock energy consumption (TWh/Yr)	Improvement potential (by 2020)	Estimated EU energy savings TWh/yr by 2020 based on stock
Cement kiln (4)		437			277	0 - 7.7%	21.3
Steel production (1 – 3)	no new blast (~10 refurbished/yr), others ?	538		None, no sales of new blast furnaces	1100	0 - 7.2%	80 (refurbishment of stock only)
Glass – total (1, 2)		>>787			64	Up to 20%	0 - 12.8
Container glass (1, 2)	17	~250			40	5%	2.0
Flat glass melt (1, 2)	3 – 4	58			22	5%	1.1
Ceramics total (1, 2)		>1800			113	20%	0 - 22.6
Bricks (ceramics) (1, 2)		>1200			35	0 - 20%	
Decorative tiles (ceramics) (1, 2)		>>450			39	~20%	
Oil refining (1,2?)		1800			329 – 1050		
Incinerators WtE (3)	<10	430 (inst)	12,500			0%	0
Other incinerators (1)							
Metal smelting & melting (1, 3, 4)					Scrap Al = ~3 Cu total = ~ 15 Others ?	20 – 40%	Al = 0.6 – 1.2 Cu = ~ 3
Metals heat treatment (1, 2)	18,000	600,000				~20%	
Laboratory (1 mainly)	~50,000	765,000	1 – 2?	178	2.85	5 - 20%	Up to 0.6
Food production (1, 2)							
Medical sterilizers (1)	~5000 (580 lab)	~50,000 (10,000 lab)	2.5		0.125	5%	0.006
Laboratory analysis instruments (1 mainly)	17,000	170,000	3.6	62	0.62	<5%	<0.05 (1 year sales) <0.5 (stock)
Totals (estimated from incomplete data)	**100,000**	**1,000,000**			**1200 - ~2000**	**10 – 20%**	**~100**

Table 18b. Sales, stock energy consumption and estimated improvement potential for main industry sectors – v2 initial estimates

	Oven / furnace sector (design types)	Sales 2009 new units	Stock 2009 units	Average energy consumption (MWh/Yr)	Total stock energy consumption (TWh/Yr)	Improvement potential (by 2020)	Estimated EU energy savings TWh/yr by 2020 based on stock
Laboratory batch	Laboratory ovens (1)	25,000	400,000	6.4 (most popular)	2.56	20%	0.5
	Laboratory furnaces (1)	9,000	140,000	1.04 (most popular)	0.15	20%	0.03
	Incubators (1)	15,000	225,000	0.6 (most popular)	0.14	5 %	0.007
	Steam sterilisers (1)	~5000 (580 lab)	~50,000 (10,000 lab)	2.5	0.125	5%	0.006
	Laboratory analysis instruments (1 mainly)	17,000	170,000	3.6	0.62	<5%	<0.05 (1 year sales) <0.5 (stock)
Industrial	Batch heating furnaces (1)						
	Batch melting furnaces (1)						
	Batch drying oven (1)						
Industrial continuou	Continuous tunnel kilns (2)						
	Continuous ovens (2)						
	Metal melting shaft (continuous) (3)						
Others - industrial	Glass melting – continuous (2)						
	Cement kiln (4)		437		277	0 - 7.7%	21.3
	Electric arc furnace (1)						
	Oil refining (1,2?)		1800		329 – 1050		
	Incinerators WtE** (3)	<10	430	12,500 h		0%	0
	Plasma	50 – 200?	1000 – 4000?	150	>0.3?	1 – 2%?	

Further sub-divisions (industrial):

Gas / electric (resistance, infrared, induction, plasma, etc.) / other

Ceramic / glass / non-ferrous metals / steel / others

Drying / curing / heat treatment / melting / smelting / others

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AGENDA

DG ENTR Eco-design preparatory study Lot 4: Industrial and Laboratory Furnaces and Ovens – Tasks 1 – 3

First Stakeholder Meeting

24th June 2010 Albert Borschette Conference Centre, Room 2B, 36, rue Froissart B-1049 Brussels.

09:30 – 10:00	Arrival and registration	
10:00 – 10:05	Housekeeping Arrangements	Laure Baillargeon (EC)
10:05 – 10:10	Introductions	All
10:10 – 10:20	Eco-design directive	Laure Baillargeon (EC)
10:20 – 10:35	Introduction to study	Chris Robertson (Cobham)
10:35 – 11:05	**COFFEE**	
11:05 – 11:45	Task 1	Paul Goodman (Cobham)
11:45 – 12:00	Classification and definition of scope and possible overlap with EU ETS	Paul Goodman (Cobham)
12:00 – 12:30	Q & A	
12:30 – 13:00	Task 2 then Q & A task 2	Lorcan Lyons (BIO)
13:00 – 14:00	**LUNCH**	
14:00 – 14:30	Task 3 then Q & A task 3	Paul Goodman (Cobham)
14:30 – 15:30	Contributions from stakeholders	CECOF (& others)
15:30 – 16:00	**COFFEE**	
16:00 – 16:30	Next steps in project	Paul Goodman + Ana Maria Carreño
16:30 – 17:00	Final questions & discussion	All