Company/Institute	Task	Version	Date of commented version	Sub-section	Page	Comment	Answer / Action
INFORSE	3	v1	18/07/2008	3,1	5 and following	Regarding criteria considered by consumers: - within environmental issues local air pollutions is increasingly a concern for consumers, and should be included as a criteria (even though only 1/3 of consumers give it high priority according to fig. 3-3) - legal issues are important as consumers need to obtain a permission to install solid fuel installations, and this is sometimes limited because of environmental concerns (local air pollution concerns), because of priority of district heating and for other reasons.	Local air pollutions can be part of the "emission of pollutants" criteria, so no new criteria is added to figures. Yet, paragraph about this issue has been amended and text on legal issues added.
INFORSE	3	v1	18/07/2008	3,1	5 and following	In the discussion of purchases (3.1), we recommend to include an overview of the success of environmental labels (Nordic Swan, Blaue Engel) as they indicate the preferences of consumers for equipment with better environmental performance. This information is crucial for design of ecodesign labelling requirements.	Information on the market share of labelled SCI is not readily available. Furthermore, this information would not give a proper picture of the performance of the products . Discussion with industry has namely revealed that due to the annual costs of labels, plethora of national labels, etc. manufacturers often do not apply for a label even if they products meet the criteria. No change to report.
Interfocos	3	v1	18/07/2008	3.1.1	8	1st para: The fact is that a direct heating appliance is – in most cases – a luxury product, especially when it is not used a primary source for heat. Therefore price is less important than the design/aesthetics when purchasing it, compared to the purchasing of primary needed goods.	Accepted. The corresponding paragraph has been amended to give more details about price variation.
Schiedel	3	v1	18/07/2008	3.1.1	8	Add paragraph at the end (after "Because of longer life…") "In addition, it has to be noted that chimneys are a structural requirement and therefore are a pre-requisite for customers being able to decide on (new) appliances. Without that, the usage of solid fuel SCIs ist not possible."	Partially accepted. The criteria discussed in this section deals rather with parameters that make a customer to choose one SCI or the other. Hence, this is rather added to section 3.5 which discusses barriers due to local infrastructure.
Schiedel	3	v1	18/07/2008	3.1.2	9	Add paragraph at the end: "Besides incentive programmes, governments also act directly through legislative measures, with the effect of creating a favourable environment for solid fuel SCIs. In various European countries (Haidlmair, 2007: The Safety Chimney. Available on request) , at least one connection to a chimney for every dwelling is mandatory. This is a pre-requisite for consumers to choose e.g. environmental friendly biomass SCIs for their homes."	Accepted and paragraph added.
Interfocos	3	v1	18/07/2008	3.2.1	10	2nd para: Replace "turbulence ensure a good mixing of the fuel and combustion air" with "turbulence ensure a good mixing of the gasses from the fuel and combustion air".	Accepted and report modified accordingly.
Schiedel	3	v1	18/07/2008	3.2.1	10	Add new paragraph 3 (after "Table 3-1 below…"): "In general, 3 main factors can be identified as main parameters for real life efficiency and emissions. First, the appliance and its design and technical properties. Second, the fuel that is used and its characteristic (content of pollutants, humidity, etc.). And third, the chimney with its properties (correct dimensioning, insulation, supply of secondary air for appliance, etc.)."	Comment has been taken into account in the revised report.
Schiedel	3	v1	18/07/2008	3.2.1	10	Insert into table 3-1: Technical properties of building - chimney - Dimensioning : the diameter of the cross-section influences the behaviour and real-life efficiency of an appliance. This complex calculation is laid down in the European standards EN 13384-1 and -2. - Secondary air-intake: chimneys with an air-intake shaft allow for a stable supply of combustion air, which is a pre-requisite for efficient room-independent appliances. - Insulation: proper insulated chimneys with air-intake shaft increase the efficiency of appliances as combustion air for the appliance is pre-heated. - Sootfire-, water-, corrosion resistance: pre-requisite for using high-efficiency, solid fuel appliances like condensing biomass boilers.	Table has been amended as suggested.
Interfocos	3	v1	18/07/2008	3.2.1	11	Table3-1: The advice to use 3 or more pieces of wood is not useful for all types of closed appliances. (It may be useful in a campfire or an open fireplace) The number of woodlogs is dependent on the power output of the appliance and the size of fireplace area. In general one can say that for appliances upto 10 kW, 2 woodlogs placed flat on the bottom of the fireplace ensures a good fire. Above 10 kW 3 woodlogs can be sufficient. If you use 3 or more small woodlogs in an appliance with a power output of less than 10 kW, than the gasification of the volatiles goes too rapid, resulting in incomplete combustion, high emissions and a low efficiency. Basically woodlogs with a diameter of approx. 10 cm and a length of 25 to 50 cm is best suited for use in an appliance. The use of 1 big woodlog is also not recommended because it this case it will be quite difficult to maintain a good fire. Last row of the table: Insufficient cleaning of the grate and ashtray only leads to poor combustion when the appliance is fired with supply of primary air. Good firing practise includes firing the appliance without primary air (that is air supplied through the grate or through the bottom of the appliance).	Accepted, text on the first and last row has been modified.
Schiedel	3	v1	18/07/2008	3.2.1.1	12-13	Add paragraph at the end: "An important structural requirement is the existence of a chimney. Unlike with other fuels like gas, where it is possible (but not advisable) to install the appliance exhaust just through-the-wall, solid fuel SCIs require a proper chimney to safely convey flue gases. Due to the special characteristics of solid fuel burning, a proper chimney has to feature resistance to sootfire, vapour diffusion and corrosion. Only then, the safe conveying of flue gases and the efficient operation of the appliance is ensured. Efficiency is even higher if the chimney is equipped with an insulated air-intake shaft."	The suggested paragraph has been added to Section 3.5.
Interfocos	3	v1	18/07/2008	3.2.1.1	13	A room with a area of 60 m2 corresponds with a volume of approx. 150 m3. According to calculations performed by German notified bodies for testing solid fuel appliances a capacity of 7 kW heat output is necessary to heat a room with this size. Therefore a heat output of 3 kW for heating a room of 60 m2 is rather small.	Comment added as a footnote.
SBBA	3	v1	18/07/2008	3.2.1.1	17	Table 3-2: The intervals for excess air ratio are too narrow to be valid in practice.	Agreed, but this table serves to illustrate the need for combustion air in different solid fuel appliances fuelled by coal and biomass. Table has been modified.

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Interfocos	3	v1	18/07/2008	3.2.1.2	17	Table 3-2: After making some calculations with the data shown in table 3-2 it looks like the unit for the fuel load (kg/h) is erroneous, it should be kg/45 minutes (= 1 batch of woodlogs). As an example a wood fired stove was taken in which a batch of wood burns for 45 minutes, If one takes the fuel load of 2.8 kg/h and a power output of 10 kW calculation shows an efficiency of 98% with a flue gas temperature of 2 K above ambient, which is of course totally unrealistic. If, on the other hand the fuel load is 2.8 kg per batch of 45 minutes (= 3.7 kg/h), it shows that the efficiency is 74% with a flue gas temperature of 260K above ambient. The air requirement is strongly dependent on the composition of the fuel. In the table here under some results are shown for woodlog combustion (beech) in a stove and a fireplace.	It is right that the air requirement depends on the fuel but also on the type of combustion technology. It was described in the last paragraph of page no 17 of task 3 (v1) report. In the table 3-2 we presented calculations for efficiency 100%, thus there was no mistake in the table. However, the table has been changed and recalculated for typical efficiency values to allow a more clear presentation of the issue.
SBBA	3	v1	18/07/2008	3.2.1.1	18	First sentence on page 18: In coal combustion, most of the energy is released during coke combustion, i.e. not from gas combustion with light flames. This means a difference to biomass combustion.	Accepted. A footnote has been added to clarify this.
SBBA	3	v1	18/07/2008	3.2.1.1	18	The middle paragraph on page 18, second sentence (The power output…): To our knowledge there are no products which control the heat output by varying the square area of the flue gas channel. This is also said in the next sentence, but we think that this reasoning is confusing.	The paragraph has been modified to improve clarity.
SBBA	3	v1	18/07/2008	3.2.2.1	19	Volatile compounds content: 84-88 % is possibly relevant for some wood, not for other solid fuels. "Heat content" should be "Heating value"	Partly accepted. Precision has been given regarding VOC content. 'Heat content' has been changed to 'calorific value' based on stakeholder feedback.
Interfocos	3	v1	18/07/2008	3.2.2.1	19	A volatile compounds content of 84 to 88 % is typical for wood. For example lignite has a volatile content of 50 – 60% and anthracite has a volatile content of < 15%. A very good source for the composition of all kinds of biomass can be found on the ECN – Phyllis internet database for biomass and waste. (http://www.ecn.nl/phyllis/)	Precision has been given. Modified Table 3-4 (split into two separate tables) provides more detailed data about the composition of different fuels.
SBBA	3	v1	18/07/2008	3.2.2.1	20	Table 3-3: "Ash content" for "Biomass" should start at 0,5 %	Value has been modified in the table (the starting value has been set to 0.2%, reflecting the level of Austrian premium pellets).
Interfocos	3	v1	18/07/2008	3.2.2.1	20	2nd para: It makes no sense to compare the emission factors of pollutants from residential appliances with the emission factors of industrial installations. A very clear distinction should be made between these two type of combustion installations with respect to measures that can be done to increase efficiency and minimize emissions. For instance automatic and electronic control of a combustion process is more applicable to industrial processes whereas the use of new materials that improve combustion and minimize emission is more suitable for domestic appliances. Also the main difference between industrial and domestic appliances is that the latter is predominantly used continuously whereas domestic appliances are mainly used batch wise. This difference leads to two complete different approaches regarding to efficiency and emission.	It was a general remark on diversification of combustion process in LCPs and in SCIs. The comparison between these is made quite often when e.g. emission inventory is being developed and when possible improvement potential of air quality is being assesd. But we agree that such comparison is not pertinent here and it has been omitted.
SBBA	3	v1	18/07/2008	3.2.2.1	22	Table 3-9: m3 should be m. Why are there not any differences in drying times between different wood types and storage methods?	Accepted. The unit has been corrected as suggested. Text has been modified to highlight that the given drying times are only general guidelines and that in reality drying times vary.
Interfocos	3	v1	18/07/2008	3.2.2.1	23	The proper term is "calorific value" and can be expressed gross or net. It is not clear whether the values mentioned in the text and in the tables are gross or net values.	Accepted. Term changed and precision has been added regarding gross/net.
INFORSE	3	v1	18/07/2008	3.2.2.1	22-23	Table 3-8 gives very low water content: sawdust from wood industry can be as high as 50% and wood chips from willows have moisture content 25-50% with normal treatment without special drying.	Table 3-8 presents the moisture contents of solid biofuels that were used for combustion test in laboratory. These biofuels were seasoned - not straight from agriculture crops nor directly from forests. Indeed fresh wood - chips and sawdust contain about 50% of moisture. This has been clarified in the report.
INFORSE	3	v1	18/07/2008	3.2.2.1	22-23	In table 3-10 the comparison between dry and wet wood is based on total mass, which is misleading as a wet piece of wood is heavier than the same piece in dry condition. A better comparison would be on volume basis or on the basis of mass of dry matter.	Table 3-10 presents an example of change in net calorific value as well as efficiency losses due to high moisture contents, this is not meant for the comparison of wood pieces of different species. No changes in the report.
INFORSE	3	v1	18/07/2008	3.2.2.2	24	In table 3-14 for "Ash melting point" should be "B" instead of "E" as it is melting points below standard that gives problems.	Accepted and report modified accordingly.
Interfocos	3	v1	18/07/2008	3.2.2.2	24	Table 3-14: Fuel with a calorific value higher than recommended may also cause damage to the appliance in the form of deformation of steel parts caused by overheating.	Accepted. The table has been amended.
INFORSE	3	v1	18/07/2008	3.2.2.3	26	In the discussions on emissions, is missing other biomass than pellets in table 3-19. Further the differences in CO and VOC emissions between 3-9 and 3-10 are not explained.	Figure 3-9 has been replaced.
SBBA	3	v1	18/07/2008	3.2.2.3	26	Figure 3-9: Which is the reference of this and how has this been made? Is it relevant?	The original figure has been replaced.
Interfocos	3	v1	18/07/2008	3.2.2.3	26	1st graph (carbon dioxide emission): This graph shows the emission of fossil CO2. Pellets also emit CO2, but this emission can be considered as sustainable.	Agreed. Note added in the report.
SBBA	3	v1	18/07/2008	3.2.2.3	27	Table 3-15: Is this comparison generally relevant? More data would be beneficial (e.g. ref 17).	Yes it relevant in general . Some more on these dependencies will be presented in Task 4.
SBBA	3	v1	18/07/2008	3.3.2	34	It should be mentioned that ceramic grates or corresponding parts in wood log boilers with this technology normally has to be retrofitted some time during the boiler lifetime.	Agreed. Example added to the report.
SBBA	3	v1	18/07/2008	3.2.2		The advantages of a heat accumulating tank when firing wood logs and how this influences efficiency, emissions as well as firing frequency must be described in a separate paragraph. This is not mentioned anywhere.	This will be described in Task 4 in the context of the system analysis.
Interfocos	3	v1	18/07/2008	3.2.3.1		The publication "Handboek Sfeerverwarming" (translated: Handbook domestic combustion) gives some estimates regarding frequency of use and characteristics of use of direct heating appliances in The Netherlands based on a report of Hulskotte et.al. In most cases people use a direct heating appliance as a secondary heat source. 61.2% of the people use it to create an atmosphere, 21.4% use the appliance as a secondary heat source and 17.4% use it on a daily basis as a primary heat source. On average an appliance is fired 460 hours per year 56.4% fires between 5 – 40 hours per month 10-15 % uses it far more often (not quantified). This group uses about the half of the total wood consumption in The Netherlands.	Thanks for the information. Data added to the report.
SBBA	3	v1	18/07/2008	3,4	35	Third dash: the text should be: "where relevant, central heating system with control system and if present, accumulator tank ".	Agreed. Sentence modified in the report.
INFORSE	3	v1	18/07/2008	3,4	36	According to 3.4 a CO alarm might be appropriate (p.36). Are there any documentation for this, e;g. in the form of statistics of accident with CO emissions from small scale solid fuel combustion ?	Such statistic are not available at the European level. Some information from Finland has been added. data have been found.

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INFORSE	3	v1	18/07/2008	3,5	36	In 3.5, lack of quality of information is mentioned as an infrastructure problem that hinders high quality installations. This could be qualified stating that there is a lack of independent reliable information of products and their energy and environmental performance. It is also mentioned as an infrastructure problem local regulation because of district heating. There are also other local regulations that give problems, including limitations because of air pollution concerns (forbidding all solid fuel installations independent of their performance) and because of aesthetics (limiting the use of chimneys in certain districts).	Paragraph has been complemented with these remarks.
SBBA	3	v1	18/07/2008	3,5	36	Sixth dash: "long heating distance" should be "district heating"	Accepted and report modified accordingly.
Schiedel	3	v1	18/07/2008	3,5	36	Add sentence to "Local regulations…": "On the other hand, a lack of local regulations might also hinder the installation of efficient SCI in existing houses, especially in countries where connecting the chimney to a dwelling is not mandatory and therefore often not foreseen." Include additional bullet point after "local regulations": "Suitable chimney: The usage of high-efficiency condensing solid fuel SCI is only possible if the chimney is suitable and meets the already mentioned criteria of resistance to sootfire, vapour diffusion and corrosion. In countries with high usage of biomass, like Austria and Germany, a special approval has been developed by authorities to classify these products – GW3. This topic has also been taken up by EOTA , developing a European wide technical approval for this characteristic."	Accepted and report modified accordingly.
INFORSE	3	v1	18/07/2008			The health and economic effects of air pollution from small combustion should be discussed in Lot 15, either here or in another task.	Significance of SCI as a source of air pollution, especially PM, has been briefly described in the Introduction (Task 1 report). Assessment of direct health and economic impacts of this pollution is indeed interesting but out of the scope of EuP preparatory studies. No changes to the report.
Scan A/S	3	v1	18/07/2008			Pellets stove and emission: When you are showing how must particle emission that is being made when you use a pellets stove. Then you haven't including all the emission that comes from the power plant that make electricity for the pellets stove. Many of these power plant have a huge emission and that need to be included as a part of the emission made when you are using a pellets stove.	In Task 3, the objective is to illustrate the impact of different parameters direct air emissions. In the next task (Task 4 - technical analysis of existing products) the electricity consumption of pellet stoves and other appliances with automatic control/feeding will be looked at. In Task 5, where the environmental impacts are evaluated, electricity consumption will also be taken into account for the relevant appliances. So, the issues is not being ignored; it comes into picture at the next steps.
Schiedel	3	v1	18/07/2008			High-efficiency SCIs: High efficient SCIs are usually based on condensing technology (i.e. lowering flue gas temperatures and thus increasing efficiency). However, this puts additional requirements towards the chimney system, which has to be resistant against moisture, corrosion and soot-fire. In other words: The usage of high-efficiency condensing solid fuel SCI is only possible if the chimney is suitable and meets the above mentioned criteria. Otherwise this would lead to an increased risk of flue gas leaking into dwellings, risk of fire and risk of mould in the dwelling. In countries with a tradition of biomass-usage, like Austria and Germany, a special approval has been developed by authorities to classify these products – GW3. Furthermore, under the EOTA-regime a European Technical Approval has been developed for this application that defines the requirements for such products – on a European level (www.eota.eu => ETA Nr. 237). Products with this approval are considered suitable to being used with efficient biomass SCIs.	Some paragraph have been amended in Task 3 to take into account the importance of the chimney. Further technical aspects of chimneys will be studied in Task 4.
Schiedel	3	v1	18/07/2008			Parameters affecting real life efficiency and emissions: As you have pointed out correctly, there are several parameters affecting the real-life efficiency of appliances. In addition to the mentioned parameters, we suggest to add the dimension of "Building environment". Parameters of this dimension would be whether a chimney is part of the building structure or not and whether this chimney is suitable to be connected to biomass SCIs. Chimneys without proper characteristics (e.g. proper insulation, etc.) reduce the real-life efficiency of appliances by up to 11% (based on external expertise "Gutachten über wärmetechnische Berechnungen, DI Wolfgang Kahrer, 2007. Available on request.)	Some text has been amended to add the dimension of "building environment" / chimney in Task 3 report. Besides, chimney as technical parameter of SCIs will be studied in Task 4.
Austrian Bioenergy Centre	3	v2	21/11/2008		5	Could you please specify what aspects of consumer behaviour are considered important input for the assessment of environmental impact and life cycle costs of the products? In our opinion this is too general and should be specified for the considered product categories.	Acknowledged, major revisions introduced.
Austrian Bioenergy Centre	3	v2	21/11/2008		6	We think that the conclusions of Mahapatra are only relevant for indirect heating systems as Mahapatra has investigated district heating, heat pumps and pellets boiler systems only as far as we are aware of the studies. To use it for such a prominent and general remark at the beginning of the report is therefore likely to be somewhat misleading. One essential finding of Mahapatra is missing. Mahapatra identified installers to be the key information carriers. Maybe you can use this information in the part about local infrastructure. Austrian studies showed that installers are the most important group for the buying decision when having the choice between different (central) heating systems.	Acknowledged, text modified.
Danish Technological Institute	3	v2	21/11/2008	3.1.1	7	It is important to understand consumer bad habits, such as over-night wood burning, waste burning, petroleum coke firing etc. have a huge impact on emissions. Figure 3-1 seems to overestimate environmental awareness which is inconsistent with Figure 3-3.	Figure 3-1 is the results of a direct survey of consumers in Poland. Figure 3-3 is a survey of the stakeholders in Lot 15. Inconsistancy can be expected, however text has been altered surrounding the figures to clarify.
Austrian Bioenergy Centre	3	v2	21/11/2008		7 to 10	The interpretation of the questionnaire might be somewhat misleading. We think that results would differ significantly in case of differentiation between boilers and stoves, automatically and manually stoked systems. A differentiation for different product categories might be useful in order to avoid wrong conclusions.	Acknowledged, text has been amended.
Austrian Bioenergy Centre	3	v2	21/11/2008		9	The text is rather difficult to understand as to missing structure clearly relating findings to product categories.	Acknowledged, revisions have been introduced.
Austrian Bioenergy Centre	3	v2	21/11/2008		10	first paragraph: "they simply often believe that small combustion installations are a "green option" – does this statement include all types of SCI (for fossil fuels as well as for renewable fuels)?	This refers to solid fuel SCIs, in particular biomass fuelled appliances, but mainly in comparison with other systems of producing heat (e.g. from electricity or gas).
Austrian Bioenergy Centre	3	v2	21/11/2008		10	first paragraph, last sentence: Who pays attention to environmental performance in Austria and in Germany? As the chapter 3.1 is related to Appliance Purchase the text emphasizes that buying decisions would be influenced. We think that this wrong. The legal requirements impose that only environmentally "friendly" technologies may be marketed. The manufacturers therefore have to improve their products before being offered on the market. Buyers basically have to decide amongst already environmentally friendly products. Operating any other product is simply illegal in Austria. In Austrian and in Germany financial incentives are additionally linked to products being very environmentally friendly.	Acknowledged. Text has been modified.
Austrian Bioenergy Centre	3	v2	21/11/2008		10	second paragraph: Could you please specify what type of appliances you refer to, when mentioning "such appliances".	The term was for all solid fuel SCIs. Text has been clarified.
Austrian Bioenergy Centre	3	v2	21/11/2008		10	second paragraph, last sentence: Incomplete sentence	Acknowledged, text has been modified.

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Austrian Bioenergy Centre	3	v2	21/11/2008		10 & 11	Policy intervention: We feel that also this chapter needs specification on the type of products to which you refer to and that there are many more examples about policy interventions throughout Europe. Incentives, but also legal banning, are existing throughout the EU Member States, and even within single Member States (eg. Italy). A deeper analysis might be valuable in particular related to decision support for policy makers.	Acknowledged, text has been modified and information added.
Austrian Bioenergy Centre	3	v2	21/11/2008		11	second paragraph: Please review sentence.	Sentence has been modified.
Austrian Bioenergy Centre	3	v2	21/11/2008		11	first paragraph, chapter 3.2: The existing standards for the testing of the defined (?) products should be mentioned here. These standards determine the conditions under which the products are tested / certified. We feel that a differentiation according to product categories would help a lot to be more precise.	Test standards are fully described in Task 1. Repeating them here would be redundant and dilutes the structure proposed by the MEEuP methodology
Austrian Bioenergy Centre	3	v2	21/11/2008		11	second paragraph, chapter 3.2.: Differentiation between products needed otherwise an in-depth analysis is practically impossible.	Acknowledged, major revisions introduced
Austrian Bioenergy Centre	3	v2	21/11/2008		11	second paragraph, chapter 3.2.1: You indicate that the "3Ts" and real life efficiency would be strongly linked to each other. This is not correct. The 3Ts influences maybe boiler efficiency, but real life efficiency is affected much stronger (almost one order of magnitude) by other parameters (correct design of the overall system, correct installation,...).	3Ts are directly followed by how design contributes to the real life efficiency. This order has been retained because the design contributes to the efficiency by providing time temperature and turbulence. Text has been modified for clarity.
Austrian Bioenergy Centre	3	v2	21/11/2008	3.2.1	11	bullet list: • Fuels do not influence real life efficiency as long as the correct fuel is applied (other operation is illegal in those European countries who have adopted the EN 303-5 for boilers and similar standards for stoves). • "Humidity" is not the correct term when referring to fuels, please substitute by "moisture". • In case of forced draught products (pellets boilers, wood chip boilers, and BAT log wood boilers) and combustion chamber vacuum controlled products the 3Ts do not depend on the chimney properties. Also linking the chimney with efficiency of such (forced draught) systems and with emissions is not correct. □ Differentiation according to considered products needed. • What do you mean by supply of secondary air for appliance, how does secondary combustion (?) air supply comply with the chimney properties? (In case you refer to room-air independent combustion systems, also primary air is supplied through the chimney.)	- Correct fuel is not always applied, hence fuels affect real life efficiency. - Accepted, text modified. - To keep the analysis short the chimney text has been retained despite the need for differentiation by product type - Accepted, text modified.
Danish Technological Institute	3	v2	21/11/2008	3.2.1	12	Table 3-1 good point with regard to size, but high return temperatures are necessary for biomass boilers and not a problem, since they are obtained by a shunt circuit. User tendency to extend fuel residence time should be emphasized further (bad habit)	Accepted, table text modified.
Austrian Bioenergy Centre	3	v2	21/11/2008		12	last paragraph: System related issues are so far only rudimentarily dealt with in Task 4. The aspect mentioned in parenthesis (installed capacity vs. heat demand of dwelling) does not appear in Task 4 working document yet, but is together with inappropriate installation / control integration the key factor influencing real life behaviour of central heating systems.	Acknowledged. This aspect will be dealt with more explicitly in Task 4.
Austrian Bioenergy Centre	3	v2	21/11/2008		12	Figure 3-4: The figure is only relevant for a limited number of products. Without differentiation it is rather confusing.	The figure is intended to be generic and applies to all solid fuel combustion appliances. No action taken at this stage.
Austrian Bioenergy Centre	3	v2	21/11/2008		12	Table 3-1: Without differentiation between products almost any comment in the table may also be considered wrong for a certain product category. Please reconsider differentiation of discussed products and review table related to concerned product.	No action taken as the table is intended to be generic and not product-specific.
Austrian Bioenergy Centre	3	v2	21/11/2008		13	Table 3-1, top: Comment on electrical controls: What is observed efficiency? Some eco-labels do consider auxiliary electricity consumption as eco-criteria, therefore it is determined in the boiler testing procedures as well. Comment on fuel stoking: The configuration and controlling of the feeding system is usually not done by the consumer, but by the installer or by the technicians of the boiler or stove manufacturers. It should therefore not be mentioned here or be better justified. Again our recommendation to discuss and analyze in-depth the role and necessity of trained professionals as part of the local infrastructure.	"Observed" changed to "real life" in table. Other comments acknowledged but no specific modifications have been made in the report.
Austrian Bioenergy Centre	3	v2	21/11/2008		13	Table 3-1, fuel section: Why does the nature of a fuel influence the efficiency of an appliance? The use of inappropriate fuels is simply illegal in many countries. Combustion systems designed to handle high moisture fuels will not suffer the described shortcomings. Fuel moisture does not necessarily lead to decreased efficiency and increased pollutant formation if the combustion system is particularly designed to handle such fuels.	Fuel moisture necessarily leads to decreased efficiency on a dry analysis basis of the fuel. No action taken.
Austrian Bioenergy Centre	3	v2	21/11/2008		13	Table 3-1, last row: Secondary air-intake seems to be misleading. We think you mean air-intake only.	Accepted, in the table text has been modified.
Austrian Bioenergy Centre	3	v2	21/11/2008		14	Table 3-1, User behaviour section: Please specify which products / technologies are meant and dealt with. Please restructure and be clearer. Please refer to existing studies, rather than to common opinions.	Acknowledged, major revisions introduced.
Austrian Bioenergy Centre	3	v2	21/11/2008	3.2.2	14	We feel that a differentiation according to product categories is also required here as your comments may again be considered partly wrong for some product categories. You then differentiate between direct and indirect influences of user behaviour and restrict the following analysis to direct influences only. In our opinion this practically excludes automated systems (at least boilers), as users should not have the opportunity to be able to manipulate any controlling devices except the room heat level (and the heating frequencies and times). Moreover, some of the examples you discuss in 3.2.2., eg. inappropriate system installations, wrong or inappropriate control mechanisms and wrong dimensioned capacities are not related to the user behaviour at all, but rather a consequence of the work of insufficiently trained professionals. Again, please discuss this in-depth.	Acknowledged, major revisions introduced.
Austrian Bioenergy Centre	3	v2	21/11/2008		15	third paragraph from bottom: How can the user manipulate the set point of fuel feed? We found from an own study related to slag formation in wood pellets boilers that slag formation was practically only related to fuel properties. Effects on emissions were only observed when the ash management concept of the boiler was not able to handle formed slags. What is the conclusion from analyzing kindling and sustaining fires? Do you recommend for example fire sustaining mode? Again we think that as to being too general you cannot draw clear solutions. We therefore recommend to refer to discussed products.	Acknowledged, revisions have been introduced. Set point issue: we mean that in real life the set point may not be well fixed, not that the user is playing with it. Slagging is indeed mostly due to fuel properties. The paragraph regarding ignition and kindling has been complemented.
Austrian Bioenergy Centre	3	v2	21/11/2008		15	second paragraph from bottom: You have to differentiate between handling, user control patterns and appliance immanent control mechanisms. We would disagree with your conclusion that a maximum simplicity is required if you considered also combustion and load control.	Acknowledged, major revisions introduced and text removed.
Austrian Bioenergy Centre	3	v2	21/11/2008		16	Figures 3-5 and 3-6: One may conclude from the chosen examples that slagging only occurs as to inappropriately controlled boilers.	The figure is there to illustrate the fact that slagging may occur as a result of not well controlled combustion. It does not imply that this is the only way that slagging can occur. Slagging is also mentionned in Table 3-12, as an effect on inapropriate fuel selection.
Austrian Bioenergy Centre	3	v2	21/11/2008		16	section about temperature control: The section is confusing as it is mixing installation patterns and consumer behaviour. The former is related to the availability of trained (or not trained) professionals, whereas the latter is actually consumer behaviour.	Acknowledged, major revisions introduced

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HKI / CEFACD	**3**	**v2**	21/11/2008	3.2.2	18	Table 3-2. The lambda for cookers, stoves and fireplaces might differ from appliance to appliance in a range from 2.0 to 3.5. The figures given for a stove are not right. It is impossible to achieve a power output of 10 kW and an efficiency of 60% with 2.9 kg/h of wood logs (beech). The right and realistic figures should be: Lambda = 3 CO2= 6.5 vol% T = 230 K above ambient Load = 3.9 kg/h CV = 13 MJ/kg P = 10 kW Efficiency = 71.4 % Stoichiometric air demand = 3.3 Nm3 (dry)/kg Air demand at λ = 3.0: 10.0 Nm3 (dry)/kg = 38.7 Nm3 (dry)/h Some deviations may be possible due to a different elementary composition of the fuel. The main error in the table is the fuel load of 2.9 kg/h. As stated in comments on the first working document, the load should be 2.9 kg per batch (fired in 45 minutes). The same goes for a fireplace. The choice of a power output of 5 kW for a closed fireplace does not represent the bulk of these appliances. This goes more for an open fireplace, but since in the table an efficiency of 75% is stated it should be a closed appliance. Realistic figures for a closed fireplace with an airfactor 3.5 are: Lamda = 3.5 CO2 = 5.5 vol% T = 194 K above ambient Load = 3.9 kg/h (=2.9 kg per batch of 45 minutes) CV = 13 MJ/kg P = 10 kW Efficiency = 71.4% Stoichiometric air demand = 3.3 Nm3 (dry)/kg Air demand at λ = 3.5: 11.7 Nm3 (dry)/kg = 45.2 Nm3 (dry)/h Even if you assume a power output of 5 kW for this particular fireplace the figures stated in the table are not correct. More realistic figures are: Lamda = 3.5 CO2 = 5.5 vol% T = 370 K above ambient Load = 2.9 kg/h CV = 13 MJ/kg P = 5 kW Efficiency = 47.6%	Table has been modified.
HKI / CEFACD	**3**	**v2**	21/11/2008	3.2.2	18	Table 3-3. The lambda for cookers and stoves might differ from appliance to appliance in a range from 2.0 to 3.5. Looking at these findings I would suggest to check the calcula-tions made for the other appliances in this table and in table 3-3. Fireplaces are missing in this table.	Accepted, table modified. Coal fireplace figures not included.
Austrian Bioenergy Centre	**3**	**v2**	21/11/2008		18	Tables 3-2 and 3-3: Please check numbers.	Accepted, table modified.
Austrian Bioenergy Centre	**3**	**v2**	21/11/2008		19	Bullet list on top: The commonly used terms are “natural draught” and “forced draught”	Accepted, text modified.
HKI / CEFACD	**3**	**v2**	21/11/2008	3.2.2	20	Table 3-4 Typical concentration of volatile matter for biomass ranges from 65 – 85 %. See also table 3-5 where a volatile matter concentration for wood pellets of 84.6 % is stated.	Accepted, table modified to be consistant.
Austrian Bioenergy Centre	**3**	**v2**	21/11/2008	3.2.3	20	You should refer to European fuel standards and follow the characterization approach of these standards. We disagree that fuels differ from defined standards. Please justify your statement with references and relate to specific fuel. If there are regional differences (we assume there are, as we have different experiences), these should be discussed somewhere, eg. under local infrastructure issues.	Text modified to say "fuels can differ" rather than "fuels often differ", other major revsions introduced.
Austrian Bioenergy Centre	**3**	**v2**	21/11/2008		20	Table 3-4: We suggest to use data from and reference these European standards. Questions of fuels standards should be dealt with in this section or maybe better in an infrastructure section.	Solid biofuels standards are referenced in annex of Task 1.
Austrian Bioenergy Centre	**3**	**v2**	21/11/2008		22	second paragraph from top: What do you mean by solid alternative fuels? What do you want to conclude in this second paragraph?	Text has been modified to clarify things.
Austrian Bioenergy Centre	**3**	**v2**	21/11/2008		22	third paragraph: What do you mean by “fuel group”?	Text has been modified to clarify things.
Austrian Bioenergy Centre	**3**	**v2**	21/11/2008		22	Table 3-5 and 3-6: Please give references. Please review the data for biomass fuels. The values for the ash contents of pine wood sawdust and wood pellets are likely to be wrong or not representative. The nitrogen content of the wood pellets indicates that non wood components have been utilized as well.	References added and table revised.
Austrian Bioenergy Centre	**3**	**v2**	21/11/2008		23	Table 3-7: Please reference the data otherwise please review it. The ash content of virgin soft wood species is usually around 0.3 weight%. Hard wood species are somewhat higher. What do you mean by energy plants? SRC like willow have an ash content in the range indicated for willow chips in Table 3-5, Miscanthus are about the same. What other “Energy plants” do you consider?	References added, energy plants removed
Austrian Bioenergy Centre	**3**	**v2**	21/11/2008		23	Table 3-8: Please give references.	References added
Austrian Bioenergy Centre	**3**	**v2**	21/11/2008		24	Table 3-10: Commercial fuels usually are commercial for being standardized. We recommend to refer to the standards for these fuels.	Acknowledged.
Danish Technological Institute	**3**	**v2**	21/11/2008	3.2.3	25	Table 3-14 Wrong estimate of loss of efficiency, Please help me establish contact with Polish researcher who calculated the figures.	This table has been replaced.
Austrian Bioenergy Centre	**3**	**v2**	21/11/2008		25	Table 3-14 and paragraph above: If a combustion installation is designed to handle high moisture fuels, it is not correct what you state here and common efficiency definitions are based on the NCV. The following example of Hartmann is related to a chimney stove operated in updraft mode, but should not be generalized to other installations.	This table has been replaced.
Austrian Bioenergy Centre	**3**	**v2**	21/11/2008		27	section contaminants: Please mention that the mentioned fuel assortments are not suited for the considered installations.	Accepted, statement is generalized to not refer to appliance but rather "ferrous components".
Austrian Bioenergy Centre	**3**	**v2**	21/11/2008		27	section Effects of fuel characteristics…: In our opinion the key aspect relevant for many previously mentioned topics is missing: SCIs (boilers for sure) are designed, tested and marketed for one or more particular standardized fuels. Any other use is simply illegal at least in Central Europe. But we assume this is similar in all European countries. Table 3-16 appears therefore to be slightly redundant in case of assuring that only the appropriate fuels are used in the appliances.	The aim of this table it to present the different fuel characteristics on the real-life operation and performance of SCI. It is acknowledged that solid fuel SCIs are designed for and should only be used with their appropriate fuel, this is mentionned elsewhere (eg in best-practices and in the introduction of the appliance use and fuel types and quality section) but is not the purpose of this specific discussion.

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HKI / CEFACD	3	v2	21/11/2008	3.2.3	28	Emission related to fuel type The figures shown in this clause give the impression that the level of the emissions and the suggested relationship between them seems to be adaptable to other types of appliances (unclear if measured in one type of boiler or in one type of boiler per fuel type). This is absolutely untrue. As well for industry the compilation of data seems to be very strange and not representative. Please provide further information on the source of the data.	Acknowledged, text in clause modified. Source: Kubica K. et al. (2004) Small Combustion Installations, Chapter for "Emission Inventory Guidebook"; UNECE TFEIP, 2004 (Updated by Kubica K., and Woodfield M. in 2006), B216-2, Techniques, emissions and measures for emission reduction.
Danish Technological Institute	3	v2	21/11/2008	3.2.3	28	Figure 3-12 Need to explain what is a "comparable boiler" (pellet and log boiler are not comparable) Should be more focused on biomass instead of coal, which is only used by a minority of countries Electrical consumption neglected	Accepted, word in text clarified.
Austrian Bioenergy Centre	3	v2	21/11/2008		28	section Emissions related to fuel type: What is a comparable boiler for log wood, wood pellet and coal? There is no comparable technology for these fuels, they differ significantly.	Accepted, text modified.
Austrian Bioenergy Centre	3	v2	21/11/2008		28	footnote 23: Typing mistake.	GVC has been indeed corrected into GCV.
Austrian Bioenergy Centre	3	v2	21/11/2008		29	Figure 3-12: CO2 is not considered a pollutant, but a greenhouse gas. Please re-format the graph for TSP (start like in all other graphs with 0 on y-axis).	Acknowledged, email sent to get graphs for update
HKI / CEFACD	3	v2	21/11/2008	3.2.3	30	First Para. The statement "The lower the output, the heavier the environmental impact is observed" has to be proved. In industries opinion there is no evidence for this state-ment.	Acknowledged, major revisions introduced
Austrian Bioenergy Centre	3	v2	21/11/2008		30	Table 3-17: For what type of fuel has the boiler been commissioned / certified? Have certified / standardized wood pellets also been used? Have the control patterns of the boiler been changed between the fuels?	The boiler was certified for pea coal. Control patterns were changed when pellets were used (providing optimum combustion characteristics for different fuels in the same type of appliance, although one should take into account that retort boilers are not the best solution for pellets combustion, although such practice was observed and hence tested).
Austrian Bioenergy Centre	3	v2	21/11/2008		31	Table 3-18: Oxygen references for certification test and for real life measurements are missing. Have they been the same for both?	Reference oxygen was 10% in both cases.
HKI / CEFACD	3	v2	21/11/2008	3.2.4	34	Please note that the figures stated for the Netherlands are reflecting the situation as it was in 1996 and the possibility exists that those figures are representative for the present situation. At least it should be stated in this paragraph that these are figures from 1996.	Accepted, text modified to include the date of the report
HKI / CEFACD	3	v2	21/11/2008	3.2.4	36	Table 3-19 and further tables It is recommended to use standardised units (preferably PJ or GJ) throughout the whole study instead of Mtoe. This should increase the readability of the report.	Accepted, tables modified
HKI / CEFACD	3	v2	21/11/2008	3.2.4	38	Tables 3-21; 3-22; 3-23; 3-24 The method used to calculate the average energy consumption in table 3-21 is not clearly explained and the text does not allow to recalculate or verify the method. Care has to be taken, as it will serve as input for Task 5. Hence one should be assured of the robustness of this method. For example: Page 35 states that 50.6 Gtoe equals 1337 PJ. This is incorrect. (1 Mtoe is 41.868 PJ)	Acknowledged, major revisions introduced
HKI / CEFACD	3	v2	21/11/2008	3.4	42	The best practice is depending on the appliance. Some of the advices given in this clause might be relevant for every appliance but several should be looked at in detail depending on the appliance. For example 10th bullet: Normally it is absolutely not advisable to use 3 – 6 small wood logs to build a fire. When firing in this way, the gasification of the volatiles goes too fast resulting in low efficiency and high emissions. See also previous comment paper sent to you.	Acknowledged, bullet 10 removed.
					42	chapter 3.4: Again a differentiation would help. The presented best practices reflect Polish experiences only. At moment of purchase: For products, which would be the major heating source of a dwelling, we would recommend to start with (1) "Determination of heat demand under consideration of consumer specific expectations and use patterns" □ (2) "Choice of heating system" □ (3) "Selection of product" □ … (1) and (2) should be done with an energy consultant, (3) with a regional installer,… At use: In Austria and Germany it is simply illegal to burn other types of fuels in an appliance than those for which the appliance is certified for. The chimney sweeper is in charge of controlling this.	Acknowledged. The structure/content of text has been amended, both in the purchase and use phases.
HKI / CEFACD	3	v2	21/11/2008	3.5	43	Transport impacts are the main reason for regional use of fuels and should be taken into account, not only convenience reasons, as these might have a bad environ-mental effect.	Accepted, text modified.
Austrian Bioenergy Centre	3	v2	21/11/2008		43	first paragraph after bullets: In some countries this inspection is a legal must. We think that this should be discussed and analyzed.	Accepted, text modified.
Austrian Bioenergy Centre	3	v2	21/11/2008		43	chapter 3.5.: We feel that important aspects are missing or dealt with too superficially. The bullet list gives the impression that this chapter is rather a collection of arbitrarily chosen statements or hypothesis than an analysis: eg. Fuel availability: "… major availability of one fuel type may hinder shifts towards more environmentally friendly combustibles or technologies." We are not sure whether this is really the major threat. Fuel supply: Markets for different biomass fuels differ substantially also on national levels. We are not aware of country-wide markets for chips supply to small-scale customers, but there are lots of locally developed markets. … (in principle all the bullets needed to be reviewed, are too general)	Comments are acknowledged, and the text has been revised to incorporate some specific points. However the bullets remain general as a deeper analysis of these aspects is not within the scope of this study.
Austrian Bioenergy Centre	3	v2	21/11/2008		45	Conclusions: You concluded about the energy consumption per heating appliance. In our opinion we do not find any quantified conclusions about the influences of users / consumers or the infrastructural framework on the environmental impacts of SCIs. How shall this be done?	Acknowledged, major revisions introduced.
Austrian Bioenergy Centre	3	v2	21/11/2008			Structure and objectives It would be helpful to clearly state the objectives of Task 3: Consumer behaviour and local infrastructure at the beginning. The objectives are unclear, therefore also conclusions (except energy consumption per type of installation) are missing. Maybe you could try to make it clearer how Task 3 considers the identified product categories. Local infrastructure issues are missing almost completely. We feel that the following would help the reader and make the contribution of Task 3 to the overall aim of the preparatory study clearer: • Restructuration of document considering the identified product categories (from Task 1 and considered economically relevant in Task 2) • Objectives • Consideration of infrastructure with respect to particular product categories • Deeper analysis of findings related to malfunction and operator influence • Conclusions	Acknowledged, major revisions have been introduced. However the suggestion to restructure by product category is not followed since the aim of this task is to present the general trends in use phase.

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Austrian Bioenergy Centre	**3**	**v2**	21/11/2008			Proposed infrastructure issues We feel that the following infrastructure issues should be dealt with in Task 3 • Electricity infrastructure • Fuel availability, quality, supply and storage at end-customer • Characteristics of heat distribution systems in houses and buildings (closed water cycles / open water cycles, low or regular temperature heating systems,…) • Existence and state of chimneys • Availability of trained professionals (chimney sweeps, installers, service staff of suppliers) Some of these issues are directly influencing the performance (mainly emissions, but also efficiency); some are directly influencing the life cycle performance (electricity mix, available fuel and its quality); some are absolutely essential with respect to policy measures. Moreover, we have the feeling that these issues were intended to be considered in the study by the European Commission. At least for automatic combustion systems these infrastructures determine real-life behaviour much stronger than one may expect from the nominal performance of the products. For a better understanding: • BAT pellets boilers achieve under testing conditions efficiencies beyond 90%. • Optimum annual efficiency of such boilers may be somewhere in between 80 and 85%. • Real annual efficiency may be about 60% and lower. • Natural draught log wood boilers from the 80ies might have had about 80-85% efficiency under testing conditions, but may achieve 75-80% annual efficiency when optimally installed (with large heat tank) and operated. Our conclusions: Excluding infrastructure and system questions from the scope of the LoT15 study might give completely misleading results.	Acknowledged. Electricity consumption is dealt with in Task 4. Real-life behaviour section has been improved. Availability and supply of fuel, existence of chimneys, characteristics of distribution system are discussed in a general way in the barriers to ecodesign section, but an analysis of this issue is not within the scope of this study.