
International Energy Agency
Bioenergy Agreement
Task 32, Triennium 2007 - 2009
Biomass Combustion and Cofiring

Working Group Meeting
Arranged by:

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Content:

Minutes of the 1st Task Meeting, triennium 2007 - 2009
Working Group Meeting-Biomass Combustion and Cofiring

7-11 May, 2007
Berlin, Germany

IEA Working Group Meeting Task 32
Biomass Combustion and Cofiring
7-11 May, 2007, Berlin, Germany

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Annex 5.	Spontaneous combustion of biomass: experimental study into guidelines to avoid and control this phenomena, R. Meijer and C.H. Gast
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Programme

Monday, 7 May 2007: Workshop on Fuel storage, handling and preparation and system analysis for biomass combustion technologies

Location: European Biomass Conference, Conference Centre, Berlin, Germany

From	Topic
15:00	Introduction and welcome, Sjaak van Loo
15:10	System analysis of overall efficiencies of different routes for bioenergy, Thomas Nussbaumer, Verenum, Switzerland
15:40	Torrefaction for biomass upgrading into commodity fuels, Jaap Kiel, ECN, Netherlands
16:10	Modelling logistical aspects of biomass supply, Bert Annevelink, Wageningen University (WUR), Netherlands
16:40	Waste wood processing as a basis for an improved fuel quality for biomass combustion plants, Thomas Brunner, BIOS Bioenergiesysteme GmbH, Austria
17:20	Discussion
17:30	Closing

Thursday, 10 May 2007: Field trip

Location: Neustrehlitz and Malchin, Germany

From	Topic
8:00	Travel to Neustrehlitz.
10:00	Visit to CHP for fresh wood, 7 MW _e grate combustion plant in Neustrehlitz
12:00	Travel to Malchin and lunch on the way.
14:00	Visit to 10 MW _e , steam based CHP for wood waste and citrus pulp in Malchin
16:00	Return to Berlin
18:00	Arrival in Berlin
20:00	Task dinner in Restaurant Kadima

Friday, 11 May 2007: Task meeting

Location: Concorde Hotel am Studio, Berlin, Germany

From	Topic
09:00	Opening, news from IEA Bioenergy ExCo
09:15	Report of last meeting
09:20	Status of Handbook (2 nd edition)
09:30	Short country reports (facultative)
10:30	<i>Refreshment Break</i>
11:00	Cofiring activities (Edward Pfeiffer)
	Pellet handbook (Ingwald Obernberger)
	Aerosols project (Thomas Nussbaumer)
12:30	Work plan and planning of workshops
13:00	Next meetings
13:15	<i>Closing and lunch</i>

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Workshop on Fuel storage, handling and preparation and system analysis for biomass combustion technologies

Introduction, Jaap Koppejan, Procede Biomass BV

Jaap Koppejan welcomed all participants to this workshop, which was organised by IEA Bioenergy Task 32. Task 32 is aimed at further expansion of the production of energy from biomass combustion by generating and disseminating information on technical and non-technical barriers and anticipated solutions for both dedicated biomass combustion systems, and biomass co-firing in existing coal fired power plants

This presentations and the following discussion should help to identify the logistical chains that are available for different types of biomass combustion systems, and to evaluate the interaction between the fuel logistics and the costs and environmental aspects of the combustion system.

System analysis of overall efficiencies of different routes for bioenergy

Thomas Nussbaumer, Verenum, Switzerland

Thomas Nussbaumer showed the results of a study that was done for IEA Bioenergy Task 32 on the net CO₂ impacts of different bioenergy routes. While bioenergy is often assumed to be carbon-neutral, the net reduction of CO₂ is often significantly less than 100%. In several places in the logistical chain, CO₂ from fossil origin may be emitted due to the use of transportation or pre-treatment equipment. The amount of fossil CO₂ that is totally released depends on various factors, such as efficiency of the end use equipment, pre-treatment methods applied, transportation distances etc.

Because of the direct relation between indirect CO₂ emission and indirect energy consumption, the Cumulative Energy Demand and the Energy Yield Coefficient (EYC_{NR} =the ratio of produced final or collectible energy and the fossil energy input put into the supply chain) are very useful parameters to rapidly determine the performance of bioenergy chains in terms of CO₂ savings.

For example, when comparing a log wood boiler with other biomass based heating alternatives and a light oil fired boiler, the comparison shows that a logwood boiler performs even better in terms of CO₂ savings than a district heating system fired with wood chips.

If nowadays energy systems are assumed as reference scenarios, the potential to substitute fossil fuels is likely to exhibit the following ranking:

1. highly efficient power production
2. efficient heating systems
3. biofuels for transport

The same methodology can be used to determine the energy payback time of different bioenergy options. It varies between approx a month for a woodlog boiler to approx 2.5 months for a biomass fired power plant where the electricity is used to energise heat pumps.

Torrefaction for biomass upgrading into commodity fuels ***Jaap Kiel, ECN, Netherlands***

Torrefaction is a way to upgrade various biomass species into commodity fuels that are brittle and have a high energy density. The process is similar to roasting: biomass is slowly heated to approx 200-300 °C in the absence of oxygen. After 20-30 minutes, a homogeneous, hydrophobic and stable fuel results, which can eventually be pressed into pellets.

Approx 70% of the mass is converted into the product, while the energy efficiency amounts to approx 90%. This implies that the energy density increases from 10-17 to approx 19-22 MJ/kg.

Specific advantages are foreseen in storage and (long-distance) transport, co-firing in pf boilers and entrained-flow as well as small-scale pellet boilers and stoves.

The proof of concept was performed in 2004/2005. A pilot scale evaluation is currently performed, and technical demonstration is foreseen in 2007/2008.

Modelling logistical aspects of biomass supply ***Bert Annevelink, Wageningen University (WUR), Netherlands***

In the conceptualisation stage of a bioenergy plant, it is highly relevant to optimise the logistical chain for fuel supply since this may be a major cost component. As fuel logistics are often complex and can be set up in many different ways, the logistical costs and energy consumption may vary widely from one scenario to another. Modelling can then be a useful tool to minimise costs and energy consumption of fuel supply.

Wageningen University earlier produced a logistical model (BIOLOCO) to simulate and optimise the impacts on costs and energy consumption of a given supply chain to a desired goal criterion, given a certain seasonal and spatial distribution of biomass resources, transportation means, pre-treatment technologies, and conversion techniques.

Waste wood processing as a basis for an improved fuel quality for biomass combustion plants, ***Thomas Brunner, BIOS Bioenergiesysteme GmbH, Austria***

Wastewood is an extremely inhomogeneous fuel, and its chemical composition and level of contaminations may vary widely. As this has large consequences for the processing options, it is important in trading waste wood that cost effective pre-treatment and quality control measures for wastewood are developed and utilised to guarantee that the fuel meets quality standards required for a given end user. In Germany and Austria, a classification system consisting of 7 types of wastewood is used, varying from chemically untreated wood to halogen plastic containing, impregnated wood.

An R&D project was performed in Austria to evaluate the impact of various fuel pre-treatment methods on the combustion process (gaseous and particle emissions, boiler slagging, corrosion, ash removal and characterisation) and develop and test a suitable pre-treatment process, consisting of a shredder and ferro/non ferro separation. It appeared that the highest concentration of most critical elements can be found in the smallest size fraction of shredded wood, therefore size separation can be an effective measure to reduce chemical contamination.

It was concluded that a processing plant for waste wood is efficient primary measure. The removal of the fine fuel fraction resulted in a significant reduction of particularly cyclone fly-ash. In addition, the rate of deposit decreased by approx. two third. Chlorine contamination was not found to be sensitive to particle size, therefore this can only be addressed using proper acceptance criteria.

Discussion and conclusions

It was concluded that fuel pre-treatment technologies now available can substantially improve technical and financial performance of a bioenergy option. Using such technologies and improving the logistical aspects of a fuel supply chain can make it possible to use cheaper biomass resources over longer distances in efficient energy conversion equipment, while reducing environmental impacts and operational costs at the same time.

Field trip

Neustrehlitz Stadtwerke

A field trip was organised by Hans Hartmann to two biomass combustion plants north of Berlin.

The first plant visited was a biomass fired district heating plant (7 MW_e/17 MW_{th}) operated by Stadtwerke Neustrehlitz. The plant was opened on January 21, 2006 and built by Bertsch of Austria. It burns approx 85 kton per year of forest residues, produced from forest maintenance in the surroundings of Neustrehlitz. The existing district heating network could be used to distribute the heat from the station.

Wood chips are fed into the on a moving grate furnace hydraulically. The boiler has a capacity of 29.3 MW and generates steam of 480°C/64 Bar. The first stage of the extraction condensing steam turbine generates 5.2 MWe, the second is a condensing stage and generates up to 1.8 MWe from steam which further expands from 2 Bar to 0.12 Bar. Expanded steam is condensed in an air cooler. The flue gas cleaning system consists of a cyclone and electrostatic precipitator.

The investments costs for the power plant alone amounted to 17 million Euro, including costs of engineering. Annual energy production amounts to 45 GWh of electricity and 63 GWh of heat. The peak heat demand that can be covered by the plant is 17 MW_{th}, above that another fossil based power plant can supply additional heat.

Malchin

The second biomass combustion plant visited was a 10 MWe, steam based CHP in Malchin, burning fresh wood, collected wood waste, and citrus pulp residues from a nearby pectin production factory owned by Cargill. The plant was built in 2002-2003 and taken into operation in 2003 by Envia Therm GmbH.

To prevent excessive mould and rotting during storage and improve drying, fresh citrus pulp is mixed with wood waste (class 1+2 according to the German classification system). The fuel mixture is then burned in a travelling grate spreader furnace built by Detroit Stoker to generate 43.5 MW of superheated steam (51 tph of 60 Bar/450°C). The steam is used partly in a steam turbine to produce electricity (net efficiency 26%), another part is delivered as process steam to the nearby pectin factory. Flue gas is cleaned using a cyclone and cloth filter. Expanded steam is further condensed in an air cooler.

The total investment amounted to 30 Million Euro, including land, buildings, backup and a steam connection of a few hundred meters to the pectin factory.

In spite of the relatively difficult fuel with regard to fouling and corrosion tendency (particularly the high Cl contents), the plant has demonstrated a high availability. This is attributed to the robust boiler design, existence of backup components for critical parts, and the use of high quality filter material in the bag filter.

Task 32 meeting, Friday 11 May, 2007

Opening, news from IEA Bioenergy ExCo

Sjaak van Loo welcomed everyone to the first meeting of IEA Bioenergy Task 32 in the new triennium 2007-2009, which took place in the Concorde Hotel am Studio, Berlin. As of this new triennium, Finland has again joined Task 32 while Australia has left Task 32. Except for UK, all member countries were represented at the meeting. For this meeting, Michael Temmerman represented Belgium instead of Didier Marchal. For Canada, Sebnem Madrali was represented by Les Marshall. The overhead sheets used by Sjaak van Loo to present several issues on the agenda of this task meeting are included as Annex 1.

Sjaak van Loo attended ExCo58, which was held in Golden, USA on 25 and 27 April 2007. Several items discussed here have a direct relation with Task 32. Adam Brown (former ExCo Chairman) has been appointed as Technical Coordinator to improve operational interaction between the Tasks and the ExCo and establish more consistency in the deliverables generated by the individual Tasks. His work started as of 2007 and is partially funded by 2.5% of the Tasks budgets. With regard to Task 32, there are several potential linkages with other Tasks that can be further explored, such as 29 (socio-economic aspects), 34 (pyrolysis) and 38 (greenhouse gas balances).

We submitted a proposal to the ExCo in which we suggest that the production of a pellet handbook should be a cross-task activity, where other tasks may provide their input using their held back funds. This resulted in a positive reaction of both the ExCo and some other Task leaders. Additional funds were in principle agreed upon, if we slightly modify the proposal and coordinate inputs from other task members.

Task 32 will provide input to a strategic study performed by IEA headquarters on the potential for renewable heating and cooling.

While Italy has left the IEA Bioenergy ExCo, South Korea and Turkey may enter as new members. Turkey has shown interest in the work of Task 32, it will be known shortly if they will also become a member.

Kees Kwant was suggested as the new vice chair of the ExCo, Peter Hall is retiring.

Report of last meeting

The minutes of last meeting contained a wrong suggestion about the Sweden's future ambitions for renewable energy. It is currently examined if it is possible that Sweden becomes a fossil free country in 2020, this is not yet included in official policy targets.

Status of Handbook (2nd edition)

Chinese translation

The final draft of the Chinese translation of the first edition of the Task 32 produced Handbook of Biomass Combustion and Cofiring has been read by Chinese employees working at NRCAN. The book is currently being printed in China.

Second edition

The manuscript for the Handbook of Biomass Combustion and Cofiring has been submitted, proofreading and typesetting remains to be done with the publisher. Expected timing for release is September 2007. It will be discussed with the publisher if the BIOENERGY2007 conference could act as a launching event.

There was a question whether the first edition of the book could be published on the internet. It is yet unknown if this will be allowed under the current copyright agreement, this will be discussed with the publisher.

Short country reports (facultative)

Netherlands

Jaap Koppejan gave a brief update on recent developments in the Netherlands. A few new biomass combustion plants are underway in the Netherlands:

- A waste processing company in the east of the country (TWENCE) is currently building an combustion installation for wastewood and composting residues (grate fired, approx 25 MW_e, 140 ktons/year input).
- A grate fired incinerator for wastewood by HVC in Alkmaar near Amsterdam (28 MW_e, 150-180 ktons/year of wastewood)
- A BFB combustion installation (delivered by Austrian Energy) for 400 kton of poultry litter (36.5 MWe)

Regretfully, the day before the task meeting (10 May 2007) a major fire accident occurred with a recently built ORC plant in Sittard, which used landscape maintenance waste (prunings and thinnings) and as fuel. The cause of the accident is yet unknown.

Norway

The country presentation on Norway by Øyvind Skreiberg is enclosed as Annex 2. Recent developments in Norway were

- the establishment of a Centre for Renewable Energy (SFFE) at NTNU/SINTEF/IFE in Trondheim, which connects approximately 200 employees. Director is Johan Hustad.
- After having been involved in a summer course, NTNU is now involved the establishment of a Master Programme in sustainable energy systems in East Africa, named NOMA (NORAD Master education program).
- Different Nordic universities have joint forces to collect expertise on biofuels and waste conversion to energy in BiofuelsGS-2 – Nordic Graduate School of Biofuels Science and Technology.
- Currently there are five different PhD theses underway on thermal conversion of biomass at NTNU
- Some projects NTNU is currently involved in are BioSOFC (the aim is to connect a gasifier to a SOFC fuel cell). NextGenBioWaste (the largest EU project on conversion of biomass and waste), and aCom (Advanced Combustion).
- NTNU has successfully developed and tested a wood stove afterburner which is now commercialized by Ecoxy.
- The research council of Norway (NFR) has now a 25 million project call open for anaerobic digestion, gasification and combustion research
- There is increasing interest in biofuels in Norway. Biofuels target for Norway are 2% in 2007 and 4% in 2010.
- Green electricity certificates are not yet introduced, but there will be a premium of 10 øre/kWh (1 Euro cent) for biomass electricity

European Commission

A large number of proposals submitted in the May 2007 call for energy research seems to be related to liquid biofuels. For the 2008 call, input is requested from Task 32 on priorities for biomass combustion related research. It was agreed that we collect ideas and forward these to Erich Nägele.

Canada

The first financial incentives for supporting bioenergy will be in place soon. There is a 1.5 billion Can\$ support scheme renewable energy in general, and a subsidy of 10 can\$ per MWh of renewable electricity generated.

Biomass cofiring can play an important role in generating renewable energy. In the province of Ontario, wheat shorts are available in large quantities. A separate presentation on cofiring wheat shorts in the Nanticoke Generating Station was presented by Les Marshall of Ontario Power Generation, see Annex 3. After an initial test trial in 2006 with cofiring various ready to burn and pelletised biomass types (wheat shorts, soy hulls, oat hulls, barley hulls, straw, corn stover, wood pellets, oat hull pellets), the Nanticoke Generating Station is currently being equipped with a direct injection system for dry, granular feed stocks, including storage and pneumatic transportation up to the mill outlet pipes. The system is expected to be put into operation June 2007 and has a capacity equivalent to some 50 MW of electricity. If this is successful, it will be considered to install one or two units of each 100 MW_e for granular feedstock.

Germany

Hans Hartmann shared some important biomass combustion related developments in Germany.

A chimney sweepers programme will be put in operation to encourage clean combustion on household level. While the current dust limit of wood stoves is 150 mg/m³ at 13% O₂, this will in 2008 be reduced to 80 mg/m³, and 16 mg/m³ in 2015. Chimney sweepers will do the compliance tests. Several industrial companies are already involved in developing cheap flue gas cleaning systems.

The pellet price in Germany is still increasing. For a 3000 kg bulk delivery, prices are now around 275 Euro/ton.

It is observed that there is now a biogas boom. As maize is increasingly used for biogas production through co-digestion, competition for land is already sensed.

Sweden

Projects within the programme (Swedish Energy Agency) “Small-scale biomass based heating” will be initiated before the summer. Projects will concern district heating (issues regarding fuels, process and emission reduction), small-scale pellet technology, biofuel - solar combinations and system aspects. In addition, a new programme under development for fuels from agriculture for district heating and CHP (SLF, Värmeforsk) have been initialised,

Activities within a Programme for development of the countryside (2007-2013, 5 billion SEK/year) is to be initiated. An important area is the production of renewable energy. Most

funding will be available in regional programmes. It is expected that this will lead to introduction of more advanced biomass combustion systems in the countryside.

Burning cereals is attracting significant interest with the increasing prices of wood pellets. It may however lead to ash melting problems in the boiler as well as emissions such as SO₂, HCl and particle matter. R&D is done in Sweden on small scale combustion of energy grains, in particular on cost effective measures to reduce emissions. A copy of this presentation is attached as Annex 4.

Interesting research recently done in Sweden is related to safety issues of pellet storage. Accidental fires have occurred in the past with pellet storage facilities in Sweden. A report is available from SP. It was noted by Edward Pfeiffer that in the Netherlands, KEMA has also performed research on safety of biomass storage, a paper is included as Annex 5.

SP is involved in a waste refinery project (www.wasterefinery.se), in which the aim is to define optimum routes for production of different products, fuels, fertilizers and other energy outputs using a combination of different biological and thermochemical conversion and pre-treatment options. An important tool where SP performs research is the waste-fired BFB boilers in Borås.

Finally, the World Bioenergy Conference is again scheduled in Jönköping, June 2008.

Finland

In Finland, the Bioenergy Conference will take place in Jyväskylä, Sept 2007. The next Task 32 meeting will also be held here.

Aerosols is an important R&D topic for biomass combustion, it is estimated that in Finland alone, some 20 people die because of the effects of inhaling particles from biomass combustion. Other combustion related R&D topics are oxyfuel combustion and carbon capture.

Denmark

In Denmark, new political support can be observed for bioenergy. With the current policies, the government aims to stabilise fossil energy consumption at the current level, while on the long run (2025) renewable energy should increase to 30%, while energy conservation should continue with 1.25% per year.

Funding for R&D on 2nd generation biofuels such as hydrogen has increased from 70-200 MDkr/year.

A study was recently done on the current consumption of firewood in Denmark, this showed that domestic woodburning contributed 16.7 PJ to the renewable energy targets.

Finally, as in Germany, Denmark has recently also seen a drastic increase in the price of wood pellets.

Belgium

In Belgium, two large power plants are now burning wood pellets, each approximately 1000 ton per day.

Austria

Austria is lagging behind its CO₂ reduction targets, so more effort is needed to catch up. From July 2007 onwards, approx 500 million Euros are expected to be made available to support R&D on bioenergy and other renewables. More details will follow later.

A new draft directive for emission limits from herbaceous biofuels is under preparation, it is expected that this will be available by the end of 2007. Currently there is no regulation for combustion of herbaceous biofuels.

Feed-in tariffs for small and medium sized CHP plants will be revised shortly. The level of the tariffs agreed will be very important for the feasibility of new installations.

The central European Biomass Conference is planned for 16-19 January, 2008 in Graz, Austria. The deadline for papers is the end of May 2007. A workshop will be organised on particles from small scale combustion.

The Austrian Bioenergy Centre is now in its second half of the first phase. It was recently decided that in the next phase, the ABC will merge with RENET.

Cofiring activities (Edward Pfeiffer)

On request of Kees Kwant (Operating Agent of Task 32), Edward Pfeiffer of KEMA, the Netherlands will be coordinating the activities related to biomass cofiring in Task 32. During the meeting he elaborated on the different activities that are planned during this triennium, see also Annex 6. In this triennium the following activities are foreseen:

- A **position paper on the status of biomass co-firing**, with focus on today's technology developments at existing power plants, trends in co-firing and its potential. The paper will be based on public available reports / papers and ongoing work within research institutes and power industry (Deliverable D4, Q3 2007)
- An **update of the existing web database on experiences with biomass cofiring**. The focus will be on where large scale co-firing is taking place, the fuels used and the operational experiences (do's, don'ts). The information will be based on public available reports / papers and ongoing work within research institutes and power industry. KEMA will co-ordinate the database update and will propose an expert tool outline. Task members and ECN are asked to contribute.
- A **report on corrosion/slagging and fouling in co-firing**. The focus will be on large scale experiences completed with research insights aiming at how to prevent damage. Information will be based on public available reports and ongoing work within research institutes and power industry. KEMA will draft a 10 page concept with references for further reading and asks task members and ECN to review and contribute.
- A **report on increasing co-firing percentages current plants**. The focus will be on the limitations in % including an explanation, what are the main barriers limiting the biomass share. Based on public available reports and ongoing work within research institutes and power industry. KEMA will draft a 10 page concept with references for further reading and asks task members and ECN to review and contribute.
- A **position paper on next generation co-firing systems**. The focus will be on new power plants specially designed for fuel flexibility, liquid / solid fuels, and combustion. The information will be based on public available information and a brain storm session within

task 32. KEMA will draft a 6 page concept and asks task members and ECN to review and contribute

- A one day **international workshop on the limits of co-firing in existing/new plants**, and how to influence these factors. The workshop will be based on the work done in task 32 and previous deliverables completed with the latest information.

It was noted that there is a wide variety of concepts for biomass cofiring available that could be accommodated in this work, such as cofiring of gasified biomass in a gas turbine. It is expected that the emphasis will be on cofiring biomass in pulverised coal fired power plants, but other concepts will not be excluded. Finally, as the number of power plants is rather limited, there is risk that confidentiality of the data prevents inclusion of data in a database. This needs to be respected.

Pellet handbook (Ingwald Obernberger)

It was previously decided that the preparation of a pellet handbook should be performed as a cooperative project, with involvement of individual task 32 member countries and possibly even other IEA Bioenergy Tasks. Denmark and Sweden already have collected national expertise in their own handbooks, which is beneficial. In other countries such as Canada, pellet production is also done in large quantities.

During the 58th ExCo meeting, our proposal for a pellet handbook that made use of a wider number of sources was discussed by the ExCo. They agreed that we could in principle involve other Tasks to improve the quality of the book, which could for this purpose use part of their own held back funds up to a total budget of approximately 50.000 US\$. A number of task leaders already indicated that they would be willing to cooperate, e.g. Andre Faaij (Task 40) on international trade of pellets.

In the coming months we will approach individual task leaders and adapt the proposal to accommodate their inputs. The aim is to start preparation of the book by autumn 2007.

Aerosols project (Thomas Nussbaumer)

Thomas Nussbaumer will coordinate the implementation of an inventory on emissions of aerosols from small scale biomass combustion devices. In this Task 32 funded project, an attempt will be made to quantify the amounts of aerosols emitted from different small scale biomass combustion devices in various Task 32 member countries, using measured emission factors and (estimations of) the number and uses of different types of devices.

The project starts with the collation of emission factor data through a questionnaire, which will be sent to various experts. This concerns both reported figures as well as expert guesses. There was a discussion on the usefulness of lab data and if this represents the actual emission from stoves used in the field. It is therefore necessary that background information is delivered together with the data. Task 32 members are invited to deliver contact information about such experts to Thomas Nussbaumer, after these experts will receive a copy of the questionnaire. The questionnaire should both be sufficiently detailed but also easy to fill in.

Work plan and planning of workshops

The following deliverables are foreseen for the triennium 2007-2009 (planning subject to change):

Nr.	Deliverable	Planning	Status
D1	Task meeting	Q1, 2007	Finished Q1, 2007
D2	Workshop on fuel storage, handling and preparation and system analysis	Q1, 2007	Finished Q1, 2007
D3	Task meeting	Q3, 2007	Planned for Sept 3, 2007
D4	Position paper on the status of biomass co-firing	Q3, 2007	
D5	Handbook on pellet production and utilisation	Q3, 2007	
D6	Updated database on biomass co-firing with expert tool	Q3, 2007	
D7	Task meeting	Q1, 2008	
D8a	Workshop on next generation woodstoves	Q1, 2008	
D9	Report on corrosion and slagging and fouling experiences with co-firing	Q1, 2008	
D10	Task meeting	Q3, 2008	
D11	Report on increasing co-firing percentages in current plants	Q3, 2008	
D12	Workshop with T33 on gasification as pre-treatment option for co-firing	Q3, 2008	
D13	Task meeting	Q1, 2009	
D14	Workshop on formation mechanisms, reduction measures and health impact of aerosols from biomass combustion	Q1, 2009	Planned for Sept 3, 2007
D15	Inventory report on aerosols from biomass combustion	Q1, 2009	
D16	Position paper on next generation co-firing systems	Q3, 2009	
D17	Workshop on increased co-firing percentages for both existing and new plants	Q3, 2009	
D18	Task meeting	Q3, 2009	
D19	End-of-Task report	Q4, 2009	

Next meetings

The next meeting will take place at the BIOENERGY2007 conference in Jyväskylä, Finland which takes place from Monday 3 sept-Thursday 7 sept. We will there organise a conference workshop on aerosols from biomass combustion (D15 in the above scheme of deliverables), most likely on Monday 3 september 2007 in the afternoon.

Task members suggested that we should try to organised the third meeting of this triennium in China, to support the market introduction of the translated Handbook of Biomass Combustion and Cofiring. It was agreed that we will make an effort to arrange this, possibly together with an action of IEA Clean Coal Centre.

Future actions of Task 32

- Members provide input to Thomas Nussbaumer for the inventory study on aerosols from biomass combustion (Until July 2007)
- Finalization and printing of the revised handbook of biomass combustion and cofiring (Sept/Oct 2007)
- Revision of the proposal for a Pellet Handbook and involvement of other Tasks.
- KEMA will prepare a draft position paper on the current status of biomass cofiring.
- The next meeting of Task 32 will be held in Jyväskylä, Finland in the week of 3-7 September 2007, in combination with a workshop on aerosols from biomass combustion

Annex 1. Overhead sheets presented by Sjaak van Loo

Annex 2. Country presentation for Norway, Øyvind Skreiberg

**Annex 3. Status of Biomass Co-Firing at Ontario Power
Generation Nanticoke Generating Station, Les Marshall**

Annex 4. Methods to Reduce SO₂, HCl and Particle Emissions from Small-Scale Combustion of Energy Grain, Claes Tullin and Marie Rönnbäck

Annex 5. Spontaneous combustion of biomass: experimental study into guidelines to avoid and control this phenomena, R. Meijer and C.H. Gast

Annex 6. Co-firing activities Task 32 : What to do and how to cooperate, Edward Pfeiffer