

IEA Task 36: Integrating energy recovery into solid waste management.

Sixth meeting for 2010-2012, Vienna, November 15-16 2012

Minutes of meeting

Present

Ingmar Schüßler	Sweden	Pat Howes	UK – Task Leader
Pat Wheeler	UK	Elisabeth Poncelet	France
Jürgen Vehlow	Germany	Liang Wang	Norway
Helmut Seifert	Germany		
Giovanni Ciceri	Italy		

Guests

- Simon Gandy, AEA.
- Professor Antonis Kokossis of the National Technical University of Athens, representing Greece.
- Professor Helmut Rechberger, TU Wien
- Dr J Fellner, TU Wien

(Contact details provided at end of minutes).

Apologies

Michael Becidan
Niranjan Patel

Actions

No.	Who?	Action	Done?
1	PH	Ensure that absent Task members are informed of all actions/decisions taken at this meeting.	✓
2	PH	Send outstanding national reports to PH by 31 st December.	
3	PH	Website: if anyone has anything else for the website let PH know, presentations/reports can be for the public or members only areas.	
4	PH	Send new password to all members	
Source separation report/Collaboration with Task 37			
5	ALL	Action all: to send national data for tables and other comments and contributions to PH by 1st February 2013.	
EXCO report and membership of Task in Next Triennium			
6	PH	Continue to contact potential organisations in USA.	
7	JV	Inform the Task about the ICIPEC conference and help organise an official presence at one of the conferences over the Triennium.	

8	PH	Action PH: Keep Task members informed about South African workshop.	
9	IS	Organise the first meeting of next Triennium in Sweden, April 2012.	
End of Triennium Conference			
10	PH	Provide feedback to the Technical Co-ordinator and Secretariat on the views of the Task regarding the Conference.	
11	PH	Provide information to speakers on how to claim back the 350 Euro conference fee if AEA did not pay it.	
Topic reports			
12	PH	Put topic report presentations on the Task web site	
13	ALL	All –final topic reports to PH by 31st December.	
14	SG	Take the results for the gasification option out of report, with an explanation in the text.	
15	SG	Undertake a sensitivity analysis on the gasification results.	
Small Scale energy from waste report			
16	PW	Send the IEA fact sheet to PH for circulation	
Workshop on methodologies for biogenic content of waste			
17	IS	Send the Swedish EPA report on these methods to PH	
Next meeting.			
18	IS/PH	Organise next meeting in Sweden. Provide information to Task.	
19	ALL	Inform IS/PH of any dates that are not feasible in April.	

1. Introduction

Absences from this meeting:

Niranjan Patel who could not make the meeting due to prior engagements.

Michael Becidan who could not make the meeting due to prior engagements. Liang Wang represented him.

Action: PH to ensure that these members are informed of all actions/decisions taken at this meeting.

This meeting was held in association with the IEA Bioenergy End of Triennium Conference and also in association with a workshop on methodologies for measuring the biogenic content of waste.

2. Update on Task 36 – Where are we now?

This was the last meeting of the 2010-12 triennium, held in association with the IEA Bioenergy End of Triennium Conference. This means that work for the 2010-2012 triennium should be completed by the end of the year. Progress on the Topic reports and national reports is provided below. The Task participants have worked well together over the past three years and provided an interesting and informative programme of work. As Task leader I'd like to thank each member for the work they have done and to minute how enjoyable it has been to work with them all.

As discussed at the last meeting we have lost Canada and with them the budget for the small scale energy from waste work. The ExCo has asked that we do this work as part of the next Triennium. Other than this, with the exception of some outstanding final and national reports detailed below the work programme is complete.

The next meeting is the start of the new Triennium and a new programme of work.

National reports

I have received some National reports and am checking them to ensure I have no queries. If you have not sent your national report, please can you send it to PH as soon as possible and by the end December at the latest?

Action All: Send outstanding national reports to PH by 31st December.

Website

The website will be updated after the meeting. This will include the presentations at the End of Triennium conference and at the Biogenic analysis methodologies workshop held in association with the Task meeting.

Action: All – If anyone has anything else for the website let PH know, presentations/reports can be for the public or members only areas.

Action PH: Send new password to all members

Collaboration with other tasks

Task 37 has asked us to continue collaboration on the source separation of waste prior to Anaerobic Digestion (AD). SP and AEA have agreed to co-ordinate this work. Hannah Hellström at SP and Andy Godley at AEA have already submitted some information to Task 37. Task 37 has specifically asked for:

- Comments on the structure of the report (and a revised structure if necessary)
- Up to date data tables
- Case studies, shorter than the information submitted by AEA. These can be at national and regional level.
- Comments on why source separation is necessary.
- Definitions of terminology
- Photos and illustrations

If you can contribute to this or provide any information for the report, please let PH know as soon as possible.

Action all: to send national data for tables and other comments and contributions to PH by 1st February 2013.

3. Report from ExCo

PH attended this in Vienna. This meeting discussed the work for the next Triennium and a workshop on energy recovery from waste in South Africa in association with the next ExCo meeting.

Membership of Task for next Triennium

At this ExCo members indicated which Tasks they will be supporting for the next Triennium. PH has circulated the proposal which was submitted. The Task 36 participants will be:

France, Italy, Germany, Norway and Sweden.

PH thanked the participants for their continued support.

UK membership is still under discussion and PH will inform members as soon as she knows the outcome. In the absence of UK support Germany has said that it will be Operating Agent, with AEA remaining as Task Leader. PH thanked the Germans for their support.

In addition we have received news of potential participation from Russia and perhaps Greece (dependent on budget and whether or not Greece joins IEA Bioenergy). Professor Kokossis attended part of the meeting as an observer and he will continue to correspond with PH regarding decisions made about this in Greece. For contact details please see end of minutes.

The ExCo repeated that they would like to us to less European focused, and have a wider international membership and are happy for us to approach organisations who may have an interest. Opportunities that have been investigated include:

- Kathryn Warren attended the Air and Waste Management Association in San Antonio, Texas on 19-22 June. She talked to them about working with Task 36. Unfortunately AWMA are not the right organisation to join from the USA. If there are other potential contacts that PH or KW can investigate, please e-mail the details.
- There is also interest from Malaysia, Indonesia, and Korea. JV presented at the International Conference on Combustion, Incineration, Pyrolysis, Emission and Climate Change (I-CIPEC). It should be possible for the Task to have an official presence at this event this year or next year.
- Australia has also shown an interest. Steve Schuck continues to follow this up and will let us know the outcome. In addition Simon Gandy has contacts in Western Australia which he will explore.

Action: PH to continue to contact potential organisations in USA.

Action: JV to inform the Task about the i-CIPEC conference and help organise an official presence at one of the conferences over the Triennium.

South Africa: Workshop at ExCo 71 21-24 May 2013.

The ExCo announced that the workshop in association with the next ExCo meeting will be on Energy recovery from Waste. This is intended to provide value for South Africa, to demonstrate what IEA Bioenergy can do for them rather than inform the ExCo about energy from waste. The organising

committee will be: Pat Howes, Dr Thembakazi Mali of SANEDI South Africa, Dr Art Wellinger (technical co-ordinator) and Mr Paul Grabowski (USA).

The workshop will be for half a day between 21st and 24th May 2013.

Action PH: Keep Task members informed about this workshop.

Proposals for next Triennium

An outline of potential themed meetings is provided in Annex 2:

- 2013 Impact of segregation of organic waste – joint meeting with Task 37. This will be held in Sweden. IS requested that Task 37 provide a discussion of economics at macroeconomic rather than individual plant level (and also consider if we do not digest these wastes, what is the alternative?).
- 2013 Waste Derived Fuels – joint meeting with ERFO and Task 32. This will be held in Milan, Italy.
- 2014 Barriers to EfW – it has not been decided who will host this workshop.
- 2014 Impacts on changes in operational management on EfW plant – This will be held in Germany, hopefully in association with Abfallbehandlung und Wertstoffrückgewinnung (German Waste treatment and recycling division of the ProcessNET).

Action IS: To organise the first meeting in Sweden, April 2012.

End of Triennium conference

The End of Triennium conference was a success and the Task would like to pass their thanks to the organisers of the conference. There was a general feeling, however, that a bioenergy conference is not the best venue to present the results of work done by the Task. The Task is in agreement that:

- We send only one or two representatives to the next end of Triennium conference.
- We look for an opportunity to present at a more relevant conference.

Action PH: to provide feedback to the Technical Co-ordinator and Secretariat on the Task request.

PH said that the 350 Euro charge for the conference speakers should have been paid by the Task leader, but it was not in a number of cases. PH is looking into how this may be rectified and will let relevant participants know.

Action: PH to provide information to speakers on how to claim back the 350 Euro conference fee if AEA did not pay it.

4. Topic reports

The 4 topics were presented at the End of Triennium conference and not discussed in detail at this meeting.

Action PH: to put these presentations on the Task web site.

Final topic reports must be uploaded onto the website by the end of **December 2012**, and so PH must receive these by December 31st

Action: All –final topic reports to PH by 31st December.

Topic 1 – this report is complete and will be published on the Task web site as soon as possible.

Topic 2 – IS was asked to include a discussion of issues with feedstocks in his report, particularly how sensitive the systems he has examined are to feedstock and calorific value. He was also asked to discuss what happens to provide an energy balance for the anaerobic digestion plants and to discuss uncertainties (such as heat demand) and what happens to the residues. This discussion should include a comment on the amount of electricity needed for dewatering. PW commented that if the plant optimises heat use there is an impact on upgrading. Action IS – to include the comments on the above and in the recommendation section say that better data is important to decrease uncertainty and the need for assumptions.

Topic 4 - SG presented selected results for option 2 of I-AWARE, which included results for gasification showing that this is a particularly good option. In discussion it was decided that the results for gasification are misleading as they are a function of the assumptions made rather than a true representation of what might happen. SG was asked to do a sensitivity analysis of the gasification system, specifically examining the assumptions about amount of gas produced. He was also asked to make it clear that the gasification system examined was Energos, which does not produce syngas. He was asked to include the recommendations that in order to model future processes we must have more realistic data from representative gasification systems, such as: data on processes suitable for syngas clean up (including data on how the gasification works); energy balances; validation of the potentials that are being claimed for gasification. This is not possible with the work we have done because the data is not currently available. Thus from the energy balance the gasification system looks promising but at present it is not possible to undertake the analysis we need to do on the potential benefits (or otherwise) of gasification for the life cycle assessment.

Action SG: to ensure that the results for the gasification option are taken out, with an explanation in the text.

Action SG: to undertake a sensitivity analysis on the gasification results.

Topic 5 – This report is now complete. It was agreed that anaerobic digestion would be taken out of the report and that it would be published on the web site.

5. Small scale Energy from waste

This will be the subject of a topic report in the next triennium. PH circulated a description of the information required for case studies of small scale energy from waste plant and asked for commitment from participants for a survey of one or two small scale plants. Budget has been put aside (\$2000) for each participant to provide this data.

The description of data required for these small scale EfW case studies is provided in Annex 3 of the meeting notes. PW suggested that we use the IEA EfW technical essentials factsheet (2008), which will result in a report of up to 4 pages.

Action PW: to copy the fact sheet to PH for circulation

6. Workshop on methodologies for biogenic content of waste

As part of this meeting the Task held a workshop on methodologies to detect the biogenic content of waste. This was held in association with Professor Rechberger and Dr Fellner of TU Wien, who have developed a mass balance method for calculating the biogenic content of waste from operational parameters from the energy from waste plant. Professor Rechberger does not have funds to test the methodology on energy from waste plants and is interested in opportunities for doing this. PH said the Task would look out for these opportunities.

GC presented the work of RSE and discussed the results RSE have obtained for the various methods that they have compared. This included comparison of the ¹⁴C technique with a mass balance model based on similar lines to Professor Rechberger's work.

Comments included:

- 14 C method was time consuming and expensive.
- There appeared to be no typical incinerator. This was perhaps due to the fact that commercial waste was taken into the plants in varying degrees. This waste is more variable than municipal waste and resulted in more variability in the results.
- 100% kitchen waste fell outside the range of typical results, because it contains variable amounts of plastic.
- If there is a lot of fat in municipal waste, the results are very different.
- Professor Rechberger said that Ramboll sell software based on his technique in Sweden and Denmark.
- The ISO standards committee is writing a standard on the mass balance method.
- RSE are examining other wastes that may be burnt with municipal waste. In some cases (e.g. tyres) they have found that the mass balance technique does not work, probably because there is a dilution of emissions.

Action IS: to send the Swedish EPA report on these methods to PH

7. Next Task Meeting

As indicated above, the next task meeting will be in April, 2013 in Sweden. It will be held in association with a sub-group of Task 37.

Action IS/PH: organised meeting next April

Action All: inform IS/PH of any dates that are not feasible in April.

Pat Howes

December 2012

Annex 1 Contact details for guest attendees and Russian delegate

Contact details for Professor Kokossis

Prof. Antonis Kokossis, CEng, FICChemE, FRSA, FIET
National Technical University of Athens
School of Chemical Engineering
Zografou Campus, 9, Iroon Polytechniou Str.
GR-15780, Athens, GREECE
Tel +30-2-10-772-4275
Fax +30-2-10-772- 3155
e-mail: akokossis@mail.ntua.gr

Contact details for Russia representative

Professor Raif G Vasilov

Head of Bioenergy Science and Technology Complex
National Research Centre (Kurchatov Institute)
1, Kurchatov Square
Moscow, Russia 123182
T: +7 (495) 648 09 13
Mob: +7 (985) 262 50 10
E: raif.vasilov@biorosinfo.ru

Contact details for Professor Rechberger

Professor Rechberger
Institute for Water Quality
Resource and Waste management
Karlsplatz 13/226
A-1040 Vienna

T: +43 1 588801 22645
E: helmut.rechberger@tuwien.ac.at

Annex 2 Proposals for themed meetings

Theme	Suggested topics
Anaerobic Digestion – joint meeting with Task 37	<ul style="list-style-type: none"> • Effect of compositional changes on energy recovery systems. • Systems that integrate AD with EfW • Impacts of increased segregation of waste for AD on EfW. • Digestate: EU End of Waste proposals; effect of EU end of waste proposals on the use of anaerobic digestion to treat MSW through mechanical and biological treatment.
Waste Derived Fuels: latest trends in SRF: informing policy makers	<ul style="list-style-type: none"> • Trends in the use of commercial and industrial waste as a waste derived fuel • Impacts of zero waste strategies on the production of waste derived fuels – and what is meant by zero waste? • End of waste for solid recovered fuel • Mass /energy balance for refuse derived fuels compared with MSW • Trans national waste trade: how much is traded and where; techno-economic and legislative issues. • Characteristics of waste derived fuels and their impact on combustion and energy efficiency.
Barriers to energy from waste	<ul style="list-style-type: none"> • Legislation/policy and planning – comparative assessment of energy from waste policy in participating countries with an understanding of the impact of these policies on energy recovery. • Economic benefits. • Public perception – how do we communicate the benefits of EfW to local communities? How do we address local concerns? • How can we encourage a change from just electricity generation from waste to heat and transport fuels? • Health concerns: PM2.5 emissions: putting these emissions into perspective.
Impacts of changes in management of energy from waste plant	<ul style="list-style-type: none"> • Impacts of change in use of bicarbonate and APC residues • Options to improve electrical efficiency (e.g.pre-treatment processes, improvements in incineration and steam cycle processes as well as new technologies like gasification) • APC residue recovery • Ash characterisation – classification of bottom ash as non-hazardous. • Methods to combat corrosion e.g. cleaning of heat exchange surfaces • Review of recovery of valuables (e.g. metals) from residues • Review on Landfill mining – fuel-characteristics, handling methods

Annex 3 Small scale energy from waste: data requirements

Proposal for Topic report

This work will build on a previous report the Task produced in 2004.

The first stage of the work will include a review of small scale EfW systems in operation (case studies). These may update the 2004 report or examine alternative plants.

The second stage of the work will involve updating a model at AEA to examine what crucial factors influence the commercial operation of a small scale EfW plant.

The data we need to collect as part of the small scale EfW case studies are:

Waste/feedstock

1. The location of plant, community it serves, size of community, annual arisings of waste and how this waste is managed. The nature of the waste going to energy from waste (i.e. is it untreated mixed waste or residue from recycling and its general composition). Nature of plant's relationship to heat user(s) (e.g. plant connected to pre-existing district heat network (DHN), DHN installed at the same time as plant, heat supplied to single industrial customer etc.)
2. Size of plant in terms of mass flow (tonnes/annum)
3. The CV of the material being handled. Responder will need to advise whether this is on a Net CV (Lower Heating Value) or Gross CV (Higher Heating Value) basis. Ideal would be for responder to provide both.
4. For mixed waste streams, the proportion of the energy content that is deemed to be biogenic in origin (may be relevant for a ROC-style subsidy which apply only to renewable heat/power).

Finance/costs

1. The Capital investment, if possible based on mass capacity. The date of this data is important.
2. Operating costs – again, if possible on a mass basis. The date of this data is important.
3. The gate fee – or a range if not possible to have exact figures.
4. How the plant was financed? Through gate fees, underwritten by local community, bank/venture capitalists etc.. Hurdle rates i.e. discount rate required by financier. Lifetime over which project economic case would be assessed.
5. Subsidies or incentives received. A reference to these would be useful, together with an overview of how the subsidy works (e.g. is it a capital grant, feed in tariff, subsidy per MWh)
6. Why was a small scale plant developed (e.g. because of remote location, public perception favoured small scale plant etc.)
7. Costs associated with development of district heating network and whether or not these are included in the capital cost of development or paid for by local authority/alternative user etc.
8. What value (or range of values) does the EfW receive for electricity generated?

Energy use

1. How is the energy used at present? Configuration of plant if possible. Load factor/utilisation rate
2. Type of waste combustion plant – i.e. grate design or whether or not it is advanced conversion.
3. Conditions at which heat is supplied (e.g. water, steam etc.). If steam, at what temperature and pressure.
4. Total amount of heat supplied by plant per annum (in MWh, tonnes of steam etc.).

5. Plant heat and power efficiency at the heat export level described. Efficiencies should be gross (i.e. not accounting for parasitic loads). Responder will need to advise whether this is on a Net CV (Lower Heating Value) or Gross CV (Higher Heating Value) basis.