MINUTES

CERTIFICATION OF CONFIRMATION OF COMMITTEE MEETING MINUTES

7 APRIL 2011

I, Cr Frank Lindsey, hereby certify that the following minutes [pages 1 to 70] of the Meeting of **RESOURCE RECOVERY COMMITTEE** held on 7 April 2011 were confirmed at a meeting of the Committee held on 9 June 2011.

Frank Lindsey.

Signature

Cr Frank Lindsey

Person presiding at the Committee Meeting held on 9 June 2011

RESOURCE RECOVERY COMMITTEE

MINUTES

7 April 2011

(REF: COMMITTEES-11678)

A meeting of the Resource Recovery Committee was held at the EMRC Administration Office, 1st Floor, 226 Great Eastern Highway, BELMONT WA 6104 on **Thursday, 7 April 2011**. The meeting commenced at **5.01pm**.

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1 DECLARATION OF OPENING AND ANNOUNCEMENT OF VISITORS

The Chairman opened the meeting at 5.01pm.

2 ATTENDANCE, APOLOGIES AND LEAVE OF ABSENCE PREVIOUSLY APPROVED

Committee Members

Cr Tony Cuccaro (**Chairman**)	EMRC Member	Shire of Mundaring
Cr Gerry Pule	EMRC Member	Town of Bassendean
Cr Alan Radford	EMRC Member	City of Bayswater
Cr Glenys Godfrey	EMRC Member	City of Belmont
Cr Frank Lindsey (**Deputy Chairman**)	EMRC Member	Shire of Kalamunda
Cr David Färdig	EMRC Member	City of Swan
Mr Simon Stewert-Dawkins *(from 5.07pm)*	Director Operational Services	Town of Bassendean
Mr Doug Pearson	Director Technical Services	City of Bayswater
Mr Ric Lutey	Director Technical Services	City of Belmont
Mr Shane Purdy	Director Infrastructure Services	Shire of Mundaring
Mr Jim Coten	Executive Manager Operations	City of Swan
Mr Peter Schneider	Chief Executive Officer	EMRC

Apologies

Mr Mahesh Singh	Director Engineering Services	Shire of Kalamunda

Deputy Committee Members - Observers

Cr Graham Pittaway	EMRC Member	City of Bayswater

EMRC Officers

Mr Stephen Fitzpatrick	Manager, Project Development
Mr Brian Jones	Director Waste Services
Ms Mary-Ann Winnett	Personal Assistant to the Director Corporate Services

Visitors

Mr John King	Cardno
Ms Melanie Cave	Freehills

3 DISCLOSURE OF INTERESTS

Nil

4 ANNOUNCEMENT BY THE CHAIRMAN OR PERSON PRESIDING WITHOUT DISCUSSION

Nil

5 CONFIRMATION OF MINUTES OF PREVIOUS MEETINGS

5.1 MINUTES OF THE RESOURCE RECOVERY COMMITTEE MEETING HELD ON 18 NOVEMBER 2010

That the Minutes of the Resource Recovery Committee meeting held on 18 November 2010, which have been distributed, be confirmed.

RRC RESOLUTION(S)

MOVED CR FÄRDIG SECONDED CR GODFREY

THAT THE MINUTES OF THE RESOURCE RECOVERY COMMITTEE MEETING HELD ON 18 NOVEMBER 2010, WHICH HAVE BEEN DISTRIBUTED, BE CONFIRMED.

CARRIED UNANIMOUSLY

6 PRESENTATIONS

6.1 PRESENTATION ON THE RESOURCE RECOVERY PROJECT

Mr John King of Cardno gave a presentation on the Resource Recovery Project contract ownership options, the list of acceptable tenderers and contract option preferences.

Mr Stewert-Dawkins entered the meeting at 5.07pm.

Mr King introduced Ms Cave who gave a presentation on the key features and issues of the models being considered including an alternative ownership model called Design Build Operate Maintain (DBOM).

The Committee considered the following issues:

- Whether the EMRC as the asset owner had the ability to place any of their own staff members on site and whether the EMRC would have any control over the functions and roles of their staff;
- Warranty period for the Resource Recovery Facility (RRF);
- Comparison of advantages and risks associated with a Design Build Operate Maintain, Build Own Operate or Design & Construct model and the financial implications of each of the models in relation to either a larger capacity plant at commencement or a staged approach to increasing the capacity;
- Whole of life costs;
- Hybrid ownership models; and
- Member Councils to be provided with as many facts as possible in order to make a decision on the ownership type and the guarantees.

The Committee requested that the EMRC investigate the DBOM model and provide a further report to Council.

The Chairman thanked Mr King and Ms Cave for their presentations.

Mr King and Ms Cave departed the meeting at 6.15pm.

7 ANNOUNCEMENT OF CONFIDENTIAL MATTERS FOR WHICH THE MEETING MAY BE CLOSED TO THE PUBLIC

Nil

8 BUSINESS NOT DEALT WITH FROM A PREVIOUS MEETING

Nil

9 REPORTS OF OFFICERS

9.1 PROGRESS REPORT ON RESOURCE RECOVERY INITIATIVES

REFERENCE: COMMITTEES-11758

PURPOSE OF REPORT

The purpose of this report is to keep Council informed of continuing progress on resource recovery processing initiatives.

KEY ISSUES AND RECOMMENDATION(S)

- The EMRC and the City of Swan are assisting Ansac Pty Ltd of Bunbury with the supply of a 30 tonne batch of refuse derived fuel for a gasification trial to be undertaken in December 2010.
- The City of Belmont has engaged Murdoch University to undertake a pilot scale trial anaerobic digestion of horse manure waste.
- Strategic Waste Initiative Scheme grant applications by Bruce Bowman & Associates and the City of Belmont for research into waste processing were both unsuccessful.

Recommendation(s)

That the report be received.

SOURCE OF REPORT

Manager Project Development

BACKGROUND

At the Council meeting of 24 August 2000, Council adopted the following resolutions:

"1. THAT THE EMRC UNDERTAKE A STUDY TO DETERMINE THE RANGE OF COMMERCIAL AND FINANCING OPTIONS AVAILABLE TO THE EMRC FOR ITS INVOLVEMENT IN THE SECONDARY WASTE TREATMENT FACILITY.

2. THAT THE EMRC REQUEST THE OPPORTUNITY FOR EACH MEMBER COUNCIL TO RECEIVE A PRESENTATION REGARDING THE TECHNOLOGIES, COSTS, NEED FOR STAGED COMMITMENTS ETC FOR THE INTRODUCTION OF A SECONDARY WASTE TREATMENT FACILITY.

3. THAT AN OVERSEAS STUDY TOUR OF OPERATING SECONDARY WASTE TREATMENT FACILITIES BY OFFICERS AND COUNCILLORS OF THE EMRC, TO BE DETERMINED AT A LATER DATE, FOLLOWING A DESKTOP STUDY OF SUITABLE LOCATIONS AND PREFERABLY IN CONJUNCTION WITH AN INTERNATIONAL WASTE MANAGEMENT CONFERENCE.

4. THAT SUBJECT TO THE PROVISION OF A COPY OF THE REPORT SECONDARY TREATMENT FEASIBILITY STUDY, AS COMMISSIONED BY MINDARIE REGIONAL COUNCIL, A REPORT ON ITS CONTENT AND APPLICATION TO THE EMRC'S PROPOSED ACTIVITIES BE PROVIDED.

5. THAT A CONSULTANT BE ENGAGED TO PROCEED WITH THE RED HILL DEVELOPMENT 'MASTER PLAN' INCLUDING A REVIEW AND RECOMMENDATION FOR AN APPROPRIATE SITE FOR A SECONDARY WASTE PROCESSING FACILITY AND THE PROVISION OF A PROGRAM TO INTRODUCE SECONDARY WASTE TREATMENT.

Item 9.1 continued

6. *THAT A PROGRAMME BE DEVELOPED FOR THE COMMUNITY CONSULTATION NECESSARY FOR THE INTRODUCTION OF A SECONDARY WASTE TREATMENT FACILITY FOR THE EMRC.*
7. *THAT A DETAILED REPORT BE PREPARED ON THE CONTENT AND SIGNIFICANCE TO THE EMRC OF THE "REPORT OF THE ALTERNATIVE WASTE MANAGEMENT TECHNOLOGIES AND PRACTICES INQUIRY" FROM NEW SOUTH WALES.*
8. *THAT A SECONDARY WASTE PROCESSING RESERVE BE ESTABLISHED AND STAFF PROVIDE A RECOMMENDATION OF THE INITIAL AMOUNT TO BE TRANSFERRED TO THAT RESERVE TAKING INTO ACCOUNT THE ADDITIONAL TIPPING FEES IMPOSED EFFECTIVE FROM 1 JULY 1999.*
9. *THAT THE EMRC START PUBLIC EDUCATION AND CONSULTATION FOR ALL MEMBER COUNCIL RESIDENTS ON PLANS FOR SECONDARY WASTE TREATMENT AS SOON AS PRACTICABLE."*

The nine resolutions from the 24 August 2000 Council meeting have been reported on in all subsequent meetings of the SSWTC/RRC and are complete with the exception of resolution 3, which has been incorporated into the project schedule for the resource recovery technology selection.

At the Council meeting of 26 April 2001, Council resolved the following:

"THAT THE REPORT BE RECEIVED AND THE ATTACHMENT BE UPDATED FOR EACH MEETING OF THE STRATEGIC AND SECONDARY WASTE TREATMENT COMMITTEE."

At the Council meeting of 20 May 2004, Council resolved the following:

"THAT A NUMBER OF INTERESTED EMRC COUNCILLORS WITH EMRC OFFICERS ATTEND GLOBAL RENEWABLES LIMITED, EASTERN CREEK, NSW FACILITY WITHIN SIX (6) MONTHS OF THE FACILITY OPENING."

Report item 9.3 of the SSWTC agenda for 8 June 2006 reported on the EMRC visit to GRL Eastern Creek and other resource recovery facilities in the eastern states, satisfying this resolution.

Council resolved at its meeting of 31 July 2008 to attend the second international conference on Energy from Biomass and Waste in Italy and to visit waste treatment plants in preparation for the EOI process. This visit was reported to RRC at its 12 February 2009 meeting.

Progress reports on resource recovery initiatives being undertaken elsewhere in Australia are attached Attachment 1).

Other Resource Recovery Facilities operating in Australia including the EarthPower, Camelia facility, the Rethmann Integrated Waste Management Facility at Port Macquarie and the Cairns Bedminster facility now owned and operated by SITA CEC Environmental Solutions were reported in agenda item 10.1 of the 14 June 2007 RRC meeting.

A pilot scale pyrolysis technology plant has been developed by Best Energies in Gosford, NSW and was reported in the RRC July 2007 agenda (report item 9.3).

A proposed waste to ethanol project by a consortium of Holden, the Victorian Government, Caltex, Veolia, Coskata and Mitsui was reported in the RRC 8 July 2010 agenda (item 9.1).

Item 9.1 continued

REPORT

Gasification trials at Ansac, Bunbury

An application for Strategic Waste Initiative Scheme (SWIS) funding from the Waste Authority from consultants Bowman & Associates to conduct MSW gasification trials at Ansac's Bunbury pilot plant involving mixed MSW, green waste and RRF residual waste was declined on the basis of the amount of funding requested (93% of the total project cost) and on the basis "that there are a number of thermal waste treatment technologies already available which are actively being promoted within the State".

The gasification trial at Ansac's Bunbury plant using 30 tonnes of refuse derived fuel (RDF) prepared by the City of Swan has been proceeding slowly. At Ansac's request the RDF material was regrounded and rebagged by the City of Swan to reduce the sizing of the material. Plant modifications are being undertaken at present before the completion of the trial.

Ascot Horse Manure Project

The City of Belmont in conjunction with the EMRC and Perth Racing have been researching options for horse stable waste for some time, including a study in 2007 by Murdoch University, on the potential for anaerobic digestion of the waste.

The City of Belmont have signed a contract with Murdoch University to investigate pilot scale trial anaerobic digestion of horse manure waste and this commenced in March 2011. The City of Belmont also applied for SWIS funding to participate in a research trial being conducted by UWA Centre for Energy - An Innovative Two-Phase Anaerobic Process for Biogas Production from Green Waste and Animal Droppings (Horse Manure).

The Waste Authority did not approve funding for the UWA research trial on the basis that "The Waste Authority considers that the concept of anaerobic digestion of animal manures to produce and recover methane gas for energy production is well known and the literature is full of many examples around the world over a long period of time. This project is therefore not significantly new or innovative." The Waste Authority also considered the amount of grant funding requested excessive in comparison to the City's own contribution and that the total project cost was one third of the annual disposal cost of the waste concerned which would provide incentive to proceed with the project on the basis of the long-term financial benefits. It is also noted that other partners in the project have access to significant amounts of grant funding from other sources.

AnaeCo DiCom Developments

The second stage of the Shenton Park anaerobic digestion facility has commenced and is expected to be completed by March 2012.

STRATEGIC/POLICY IMPLICATIONS

Key Result Area 1 – Environmental Sustainability

1.3 To provide resource recovery and recycling solutions in partnership with member Councils

Item 9.1 continued

MEMBER COUNCIL IMPLICATIONS

Member Council	Implication Details
Town of Bassendean	Nil direct implication for member Councils
City of Bayswater	
City of Belmont	
Shire of Kalamunda	
Shire of Mundaring	
City of Swan	

FINANCIAL IMPLICATIONS

All Resource Recovery Project activities are accounted for in the annual budget approved by Council.

SUSTAINABILITY IMPLICATIONS

The Resource Recovery Project is aimed at reducing greenhouse gas emissions from the EMRC's waste disposal operations and State programmes for reduction of waste to landfill.

ATTACHMENTS

Progress on Resource Recovery Initiatives in Australia as at 24 March 2011 (Ref: Committees-11758)

VOTING REQUIREMENT

Simple Majority

RECOMMENDATION(S)

That the report be received.

Cr Godfrey asked if more information could be provided in future for each of the organisations listed in the attachment to this report such as the type of technologies, bin systems and ownership models used to facilitate comparisons between like minded projects.

RRC RECOMMENDATION(S)

MOVED CR FÄRDIG SECONDED CR PULE

That the report be received.

CARRIED UNANIMOUSLY

COUNCIL RESOLUTION(S)

MOVED CR CUCCARO SECONDED CR ZANNINO

THAT THE REPORT BE RECEIVED.

CARRIED UNANIMOUSLY

Item 9.1 continued

Attachment 1 to RRC 7 April 2011 Item 9.1

PROGRESS REPORTS ON RESOURCE RECOVERY INITIATIVES IN AUSTRALIA AS AT 24 March 2011

Southern Metropolitan Regional Council (SMRC), Regional Resource Recovery Centre (RRRC) Project, Canning Vale

The SMRC's Canning Vale operation has received certification for its environmental management system to the environmental standard ISO14001.

Rivers Regional Council, Resource Recovery Project

No further progress to report.

Atlas Waste Treatment Facility, Mirrabooka

No further progress to report.

Mindarie Regional Council (MRC), Resource Recovery Project

No further progress to report.

Ti Tree Bioenergy Project, Queensland

No further progress to report.

Veolia Woodlawn Bioreactor Project, NSW

No further progress to report.

Emergent Capital, Eastern Creek, NSW

No further progress to report.

AnaeCo, Shenton Park

AnaeCo are proceeding with stage 2 of the DiCom Bioconversion Waste plant at Shenton Park which will increase capacity to 55,000 tpa.

Coffs Harbour City Council, Alternative Waste Treatment (AWT) Plant

No further progress to report.

WSN Environmental Solutions, South Sydney, AWT Facility

SITA are now the owners of WSN's operations.

9.2 RESOURCE RECOVERY FACILITY - PROGRESS REPORT

REFERENCE: COMMITTEES-11976

PURPOSE OF REPORT

To update Council on the progress of the Resource Recovery Facility (RRF) project.

KEY ISSUES AND RECOMMENDATION(S)

- Cardno has lodged the draft Environmental Scoping Document with the Office of the EPA.
- Baseline monitoring at Red Hill Waste management Facility is proceeding as part of the preparation for the Public Environmental Report.
- The Community Task Force have finalised a draft Community Partnership Agreement which will be made available for public comment and a new member of the CTF was recruited to replace a member who resigned.
- A project briefing was provided to the Hovea Ratepayers Group on 2 March 2011.
- Project team members attended the presentations by Dr Connett at the Midland Town Hall, EMRC Council and the Conservation Council in February 2011.

Recommendation(s)

That the report be received.

SOURCE OF REPORT

Manager Project Development

BACKGROUND

On 30 April 2009, Council resolved to proceed with the Expression of Interest process.

At the 27 August 2009 meeting of Council it was resolved:

"1. THE FOLLOWING RESPONDENTS TO THE EXPRESSION OF INTEREST ARE LISTED AS ACCEPTABLE TENDERERS:

A. ENERGOS AS;

B. EVERGREEN ENERGY CORPORATION PTY LTD;

C. GRD MINPROC LIMITED;

D. MOLTONI ENERGY PTY LTD;

E. SITA ENVIRONMENTAL SOLUTIONS;

F. TRANSPACIFIC CLEANAWAY LIMITED; AND

G. WSN ENVIRONMENTAL SOLUTIONS.

2. THE FOLLOWING RESPONDENTS TO THE EXPRESSION OF INTEREST ARE NOT LISTED AS ACCEPTABLE TENDERERS:

A. ANAECO LIMITED; AND

B. THIESS SERVICES PTY LTD.

3. THE RESPONDENTS TO EXPRESSION OF INTEREST 2009-10 BE ADVISED OF THE OUTCOME OF THE ASSESSMENT.

4. THE ATTACHMENT REMAINS CONFIDENTIAL AND BE CERTIFIED BY THE ACTING CHIEF EXECUTIVE OFFICER AND THE EMRC CHAIRMAN.

5. THE TENDER EVALUATION COMMITTEE BE ACKNOWLEDGED FOR THE SIGNIFICANT EFFORT PUT INTO EVALUATING THE EOI SUBMISSIONS."

Item 9.2 continued

On 24 September 2009, Council resolved that:

"1. THE FOLLOWING PRELIMINARY RECOMMENDATIONS OF THE RESOURCE RECOVERY COMMITTEE FORM THE BASIS OF CONSULTATION BETWEEN THE EMRC AND THE MEMBER COUNCILS AND THE COMMUNITY WITH THE INTENTION OF REPORTING BACK TO COUNCIL IN APPROXIMATELY MARCH 2010 WITH A FINAL RECOMMENDATION.

A) RED HILL WASTE MANAGEMENT FACILITY IS THE PREFERRED SITE FOR THE RRF BASED ON ENVIRONMENTAL, ECONOMIC AND PLANNING CONSIDERATIONS, COMMUNITY RESEARCH AND THE POTENTIAL VALUE OF THE EMRC HAZELMERE SITE AS A RESOURCE RECOVERY PARK.

B) THE DESIGN & CONSTRUCT CONTRACT OWNERSHIP MODEL IS PREFERRED TO A BUILD OWN OPERATE CONTRACT MODEL.

C) THE RRF TECHNOLOGY OPTIONS INCLUDING ANAEROBIC DIGESTION, GASIFICATION AND PYROLYSIS ARE RANKED HIGHER THAN COMBUSTION AND PLASMA AT THIS STAGE BUT MORE INFORMATION IS REQUIRED BEFORE A FINAL PREFERENCE CAN BE DETERMINED.

D) A THIRD BIN FOR HOUSEHOLD ORGANIC WASTE COLLECTION IS CONSIDERED IN CONJUNCTION WITH ANAEROBIC DIGESTION TECHNOLOGY."

Further, on 4 December 2009, Council resolved that:

"1. COUNCIL APPROVE A VISIT TO EASTERN STATES AND OVERSEAS RESOURCE RECOVERY REFERENCE FACILITIES TO BE UNDERTAKEN BY THE CHAIRMAN, RESOURCE RECOVERY COMMITTEE, MR JOHN KING, PROJECT DIRECTOR FOR CARDNO LIMITED AND THE MANAGER PROJECT DVELOPMENT.

2. INFORMATION GAINED FROM THE VISIT BE REPORTED TO THE RRC AND COUNCIL IN EARLY 2010 AS PART OF THE FINAL RECOMMENDATION ON THE PREFERRED RESOURCE RECOVERY FACILITY OPTIONS."

On 22 April 2010, Council resolved in relation to the reference facility visits that:

"1. THE REPORT BE RECEIVED.

2. INFORMATION GAINED FROM THE RESOURCE RECOVERY FACILITY VISITS BE APPLIED TO THE ANALYSIS OF THE PROJECT OPTIONS ON TECHNOLOGY, CONTRACT MODEL AND BIN COLLECTION SYSTEM.

3. THAT THE ATTACHMENT TO THIS REPORT REMAIN CONFIDENTIAL AND BE CERTIFIED BY THE CHIEF EXECUTIVE OFFICER AND CHAIRMAN."

On 20 May 2010, Council resolved that:

"1. THE FOLLOWING OPTIONS ARE CONFIRMED AS THE PREFERRED OPTIONS FOR THE RESOURCE RECOVERY FACILITY:

A) RED HILL WASTE MANAGEMENT FACILITY IS THE PREFERRED SITE FOR THE RRF.

B) THE DESIGN & CONSTRUCT CONTRACT OWNERSHIP MODEL IS PREFERRED TO A BUILD OWN OPERATE CONTRACT MODEL AT THIS STAGE OF THE PROJECT.

C) THE RRF TECHNOLOGY OPTIONS INCLUDE ANAEROBIC DIGESTION, GASIFICATION, PYROLYSIS AND COMBUSTION. PLASMA TECHNOLOGY WILL ONLY BE CONSIDERED IF IT IS AN INTEGRAL PART OF ONE OF THESE TECHNOLOGIES.

D) A THIRD BIN FOR HOUSEHOLD ORGANIC WASTE COLLECTION BE CONSIDERED IN CONJUNCTION WITH ANAEROBIC DIGESTION TECHNOLOGY, OTHERWISE A TWO BIN SYSTEM IS RECOMMENDED FOR THE THERMAL TECHNOLOGY OPTIONS.

2. COUNCIL PROCEEDS WITH THE ENVIRONMENTAL AND PLANNING APPROVALS TASK FOR THE RESOURCE RECOVERY PROJECT BASED ON THE PREFERRED SITE AND TECHNOLOGY OPTIONS."

Item 9.2 continued

On 21 October 2010, Council resolved to amend the Resource Recovery budget to allow for the predicted cost of baseline environmental monitoring and additional consultant costs as follows:

> "*THAT THE BUDGET FOR SEEK ENVIRONMENTAL APPROVALS (TASK 15) IN THE ANNUAL BUDGET UNDER RESOURCE RECOVERY BE INCREASED FROM $220,000 TO $525,000 AND THAT THIS INCREASE BE FUNDED FROM THE SECONDARY WASTE RESERVE*."

By way of explanation, the two contract ownership models being considered for the RRF are as follows:

Build Own Operate

Under a Build Own Operate (BOO) contract delivery model, the Contractor will be required to build, finance, own and operate the facility for a fixed period of time (the economical life of the facility and anticipated to be for 20 years). Under this contract model, some of the project risks, and in particular, the risks associated with the design, construction and performance of the RRF, are transferred to the Contractor.

Design and Construct

Under a Design and Construct (D&C) contract delivery model, the Contractor would design and construct a facility that conforms to agreed standards and performance requirements. If the D&C model were adopted by the EMRC, the Contractor would also be required to operate the facility for a minimum of 12 months and up to two years after the completion of wet commissioning. Under this contract model, the operational and ownership risks would be assumed by the EMRC, particularly following transfer of operational responsibilities to the EMRC and expiry of warranties and defects liability periods. The EMRC may operate the facility using its own staff or enter into a separate contract for the operation of the facility under this D&C contract delivery model.

REPORT

Environmental Scoping Document

Cardno has completed the draft Environmental Scoping Document (ESD) required by the EPA and this was lodged with the EPA on 24 March 2011. The ESD is an outline of what will be addressed in the PER and work will commence on the Public Environmental Report (PER) as soon as the Office of the EPA have approved the ESD content.

Environmental Monitoring for the PER

The EMRC has commenced baseline monitoring at Red Hill for noise, odour and air quality. Lloyd George Acoustics were appointed to do the noise monitoring and modelling, SLR Consulting Australia were appointed to do the odour monitoring and modelling and Synergetics Environmental Engineering were appointed to do the air quality monitoring and modelling.

The noise and odour monitoring have been completed and preparations are underway for the air quality monitoring to commence on 25 March 2011. This involved location of suitable sites at Red Hill and off-site in Hidden Valley Estate and Gidgegannup and preparation of these sites to house monitoring stations. The ambient monitoring at these locations will be run for 2 months and will be augmented by campaign sampling by Synergetics Environmental Engineering.

An information request has been issued to the acceptable tenderers for data on noise, odour and air quality emissions for their respective technology options outlined in their Expressions of Interest. This data will be used when modelling the predicted emissions from the different technology options to establish noise and air quality levels with and without the RRF.

Item 9.2 continued

Community Engagement

The Community Task Force (CTF) met on 1 February 2011 and 15 March 2011 to finalise the draft Community Partnership Agreement (CPA) (refer attachments 1 and 2). The draft CPA is to be issued for community comment for a 7 week period, following which adjustments may be made to the CPA before it is considered for endorsement by Council before inclusion in the tender documentation. Availability of the draft CPA will be advertised in community newspapers, on the EMRC website, via a letterbox drop around Red Hill and the Gidgegannup Post Office and via the electronic database for the project.

Attached are the draft Resource Recovery Update advertisement copy (attachment 3) and the draft CPA and feedback form (attachment 4).

A new member of the CTF, Mr Myles Harmer of Mt Helena was recruited to replace Mr Greg Jones who formally resigned in January 2011 following ill-health. Mr Harmer was the only community member who applied after a call for expressions of interest and was also a previous applicant in July 2010. Mr Harmer lives around ten kilometres from the Red Hill Site. As a member of Mt Helena Ratepayers Association, Save Mundaring Weir Villages Association and the Executive of Mundaring Historical Society, he has strong links with his local community. With a background in science and education, Mr Harmer has joined the Community Task Force to share and use his knowledge to achieve positive community outcomes from the Resource Recovery Project. Mr Harmer attended his first meeting of the CTF on 15 March 2011.

The next meeting of the CTF is planned for May 2011 to consider community feedback on the draft CPA.

Community Briefings

A request for a project briefing by the Hovea Ratepayers Group was provided by the project team on 2 March 2011.

Presentations by Dr Connett

Project team members attended presentations by visiting campaigner Dr Paul Connett on 5 and 10 February 2011 and through the Alliance for a Clean Environment, Dr Connett gave a presentation on his ideas to councillors at the EMRC office on Monday 7 February 2011. A separate report on this is provided (refer agenda item 9.5).

STRATEGIC/POLICY IMPLICATIONS

Key Result Area 1 – Environmental Sustainability

1.3 To provide resource recovery and recycling solutions in partnership with member Councils

FINANCIAL IMPLICATIONS

The cost of using consultants Cardno is budgeted at $681,000 in the 2010/2011 Budget under – Resource Recovery – Implement Resource Recovery Project Plan. This includes budget provisions for the tasks related to the environmental approval process and community engagement.

SUSTAINABILITY IMPLICATIONS

The Resource Recovery Facility and/or Resource Recovery Park will contribute toward minimising the environmental impact of waste by facilitating the sustainable use and development of resources.

Item 9.2 continued

MEMBER COUNCIL IMPLICATIONS

Member Council	Implication Details
Town of Bassendean	Nil
City of Bayswater	
City of Belmont	
Shire of Kalamunda	
Shire of Mundaring	
City of Swan	

ATTACHMENT(S)

1. Minutes of Community Task Force Meeting - 1 February 2011 (Ref: Committees-12009)
2. Unconfirmed minutes of Community Task Force Meeting - 15 March 2011 (Ref: Committees-12019)
3. Resource Recovery Update – March 2011 (Ref: Committees-12010)
4. Draft Community Partnership Agreement and Feedback Form (Ref: Committees-12011)

VOTING REQUIREMENT

Simple Majority

RECOMMENDATION(S)

That the report be received.

RRC RECOMMENDATION(S)

MOVED CR FÄRDIG SECONDED CR PULE

That the report be received.

CARRIED UNANIMOUSLY

COUNCIL RESOLUTION(S)

MOVED CR CUCCARO SECONDED CR ZANNINO

THAT THE REPORT BE RECEIVED.

CARRIED UNANIMOUSLY

Community Task Force - Meeting Notes

Date: 1st Feb 2011 **Venue:** EMRC office

Attendee		Attendee		Attendee	
Martin Chape	✓	Peter Jensen	✓	Stephen Fitzpatrick	✓
Jan Foster-Hawkings	✓	Greg Jones	x	Prapti Mehta	✓
Noel Hales	✓	Peter Pearson	✓	Joel Levin	✓
Max Jamieson	✓	Noelene Wigmore	✓	**Other**:	
Other:		Other:		Other:	
Present ✓ Apology = x Observer/Presenter = O					

Meeting Opened: 6:35pm **Meeting Chair**: Joel Levin

Item	Issue/ Topic	Discussion
1.	**Previous Minutes**	As the last meeting was focused on the development of the draft CPA, no minutes where recorded for presentation to this meeting. (*Since this meeting minutes have been prepared and circulated.)* Past action items were reviewed. During this item, there was also a discussion about the current speaking tour of Dr Paul Connett on the impact of various technologies (esp thermal options). CTF members were informed of the various speaking dates and that the EMRC council and some technical staff have arranged a meeting with Dr Connett to identify any research that the EMRC needs to follow up on.

2.	**Vacant Position on the CTF**	Further to the email communication, Greg Jones has needed to step down from the CTF for health reasons. The group thanked Greg for his contribution and wished him well with his recovery. The discussion on what to do with the vacant seat acknowledged the importance of maintain community engagement, especially from the Stoneville and surrounding area and the difficult any new member would face in 'getting up to speed'. It was felt the coming comment period for the CPA would be a natural point for a new member to commence. However, it was important for any new member to understand the work that has been completed to date and the current timelines and past decision would form the basis of their involvement. Approaches would be made to people who had originally expressed an interest in the committee (baring one oerson who had asked not to be contacted and another who had a conflict of interest due to a role as a councillor in a member shire), the Stoneville Rate payers Association and members of the Red Hill Liaison Group. • Any interested parties would be asked to complete the same EOI form that all current members had completed. • Submissions can be made to Stephen by the end of February. • Interested parties need to be available for the next meeting on March 15th The decision will be done via email circular and phone discussion.

Action/Resolution 1.	Send thank you card on behalf of the CTF to Greg Jones in acknowledgment of his contribution and efforts	**Action by:** SF
Action/Resolution 2.	Approach Stoneville association, Red Hill Liaison group and past applicants with a view to receiving EOI's by end of the month.	**Action by:** SF
Action/Resolution 3.	Selection of new member conducted via email and phone discussions with the CTf prior to the next meeting	**Action by:** ALL

3.	**Community Education and participation in PER**	The group discussed how to best assist the community prepare for the PER process. EMRC has already agreed to extend the comment period to eight weeks. Two other suggestions where floated at the meeting. These suggestions where based on the meeting held with some CTF members and Peter Schneider last year. 1) Giving the CTF members access to the PER before it was made public so the CTF can comment and assist in refining the final draft 2) Approaching DEC for funding to make an independent consultant available to assist the community undertake and independent review of the PER The EMRC is receptive to both these suggestions. Stephen also provided an update on the various monitoring activities that will form part of the baseline data for the PER - Odour monitoring started this week - Noise monitoring is already underway - The quotes for Air quality monitoring are going before council with the view to starting this month. - Source data will also be collected for the different technology types to allow for an independent review of the modelling to be conducted - Cardno will undertake surveys on flora and fauna, traffic and ground water This information will need to be complied with a view to having the draft PER ready by July / Aug.

4.	**CPA Consultation period**	As the CPA will be sent to the community for feedback, prior to working on the CPA, the discussion focused on the best use of the comment period. Members felt the following information would need to be available as context for the community - The draft CPA - A document outlining the content/context for the CPA and how the CPA will be used. The following consultation tools where suggested as part of the community feedback period - Website access to the document. - Press release and advertisements in the local newspaper - Letter box drop to surrounding Red Hill residents
Action/Resolution 4.	Ensure various communication mechanisms are in place for the consultation period commencing next month.	**Action by:** EMRC

5. CPA drafting	The remainder of the session was dedicated to progressing the CPA. The draft was [progress to include objectives and indicators. CTF members to review the draft with comments for the next meeting.	
Action/Resolution 5.	CTF members to review draft for any gaps	**Action by:** ALL

6. Meeting Closed	8:30pm	**7. Next meeting**	Regular Meeting: Match 15th 2011

These minutes have been ratified by ALL members of the CTF as a true and accurate record of the meeting

Signed on behalf of CTF Members: **Joel Levin (Independent Facilitator)** **Date:** 2/02/2011

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ACTION LIST

Action/Resolution 1.	Send thank you card on behalf of the CTF to Greg Jones in acknowledgment of his contribution and efforts	**Action by:** SF
Action/Resolution 2.	Approach Stoneville association, Red Hill Liaison group and past applicants with a view to receiving EOI's by end of the month.	**Action by:** SF
Action/Resolution 3.	Selection of new member conducted via email and phone discussions with the CTf prior to the next meeting	**Action by:** ALL
Action/Resolution 4.	Ensure various communication mechanisms are in place for the consultation period commencing next month.	**Action by:** EMRC
Action/Resolution 5.	CTF members to review draft for any gaps	**Action by:** ALL

Community Task Force - Meeting Notes

Date: 15th Mar 2011 **Venue:** EMRC office

Attendee		Attendee		Attendee	
Martin Chape	✓	Peter Jensen	✓	Stephen Fitzpatrick	✓
Jan Foster-Hawkings	✓	Myles Harmer	✓	Prapti Mehta	✓
Noel Hales	✓	Peter Pearson	✓	Joel Levin	✓
Max Jamieson	✓	Noelene Wigmore	X	**Other**:	
Other:		Other:		Other:	
Present ✓ Apology = x Observer/Presenter = O					

Meeting Opened: 6:35pm **Meeting Chair**: Joel Levin

Item	Issue/ Topic	Discussion
1.	**Previous Minutes**	Minutes were adopted electronically as per CTF arrangement. Past action items were reviewed. During this item, there was also a discussion about the current speaking tour of Dr Paul Connett on the impact of various technologies (esp thermal options). CTF members were informed of the various speaking dates and that the EMRC council and some technical staff have arranged a meeting with Dr Connett to identify any research that the EMRC needs to follow up on.
2.	**New Task Force Member**	Myles Harmer was introduced to the group as the new task force Member. Myles was appointed via the process agreed at the previous meeting to fill a vacant position on the group. Myles lives within 10 km of the Red Hill site and was unanimously endorsed by the other members of the taskforce.

3.	**EMRC Update**	Stephen Fitzpatrick provided the following update for CTF members: a) As part of Dr Connett's recent speaking tour in Perth the EMRC invited Dr Connett to a meeting with elected members of the council (and members councils) to share his concerns about various waste to energy options and ensure the EMRC was aware of any new/emerging research in the field. Twelve councillors plus staff where at the meeting, which included a presentation by Dr Connett followed by discussion. As a result of the meeting the ERMC have undertaken to see if they can source validated research into the potential impact of nano particles b) The EMRC is planning to bring a speaker from the UK on the topic of anerobic digestion. It is envisaged that a public session will be held on this topic and will include a speaker from the University of WA to achieve a balance between practical and academic perspectives. c) Environmental Monitoring has started at the Red Hill site in preparation for the environment approvals process - Noise monitoring has been completed. - Odour monitoring has been completed with samples taken from various sites around Red Hill - Air quality sampling with start this month. There will be three air quality stations (one onsite and two off site at residential locations). Monitoring will occur for a two months period and will be supplemented by 'campaign' monitoring, where samples will be taken from around the site. Once the baseline data as been established from each of these monitoring activities, the consultants will model the predicted impacts from the four technology options to compare with baseline and Perth air quality data. d) The PER is on track to be released for public comment around Sept/Oct this year. The ERMC will seek funding to provide an independent peer review for the community. The EMRC has also agreed to provide an advance copy of the PER documentation to CTF members for feedback prior to submission to the EPA.

4.	**Community engagement and public comment on the draft CPA**	Once the Community Partnership Agreement (CPA) has been signed off (expected to occur tonight), the draft will be made available to the wider community for comment. The following engagement activities are planned for this public comment period. - Advertisements to be placed in local newspapers at two stages of the comment period (7 weeks) - Copies will be available through the EMRC website and hard copies will be posted on request. - Copies will be sent to all member councils with request to distribute through their networks - A letterbox drop will occur around the Red Hill site to ensure local residents are aware of the process - Notifications will be sent to the existing stakeholder data based including various progress and community associations. - Notification will be sent to people that attended the community forum in September 2010 - CTF members will be asked to distribute through their networks. A standard set of question will be coupled with the comment process to allow for greater consistency of responses. A draft of the advertisement was distributed to CTF members for comment. Members were supportive of the content, with some suggestion to make the 'invitation' font larger and more prominent.

Action/Resolution 1.	Distribute engagement questions to CTF members for review and comment	**Action by:** EMRC

5. CPA drafting	The remainder of the session was dedicated to finalising the CPA. The draft was finalised, with the introduction and final proof reading to be completed.

Action/Resolution 2.	Complete final proof reading and editing tomorrow (Wednesday)	**Action by:** EMRC
Action/Resolution 3.	Send to CTF members this week for approval to commence the public comment period.	**Action by:** ALL
Action/Resolution 4.		**Action by:**

6. Meeting Closed	8:30pm	**7. Next meeting**	Regular Meeting: May 3rd 2011

These minutes have been ratified by ALL members of the CTF as a true and accurate record of the meeting

Signed on behalf of CTF Members: **Joel Levin (Independent Facilitator)** **Date:** 17/03/2011

ACTION LIST

Action/Resolution 1.	Send thank you card on behalf of the CTF to Greg Jones in acknowledgment of his contribution and efforts	**Action by:** SF
Action/Resolution 2.	Approach Stoneville association, Red Hill Liaison group and past applicants with a view to receiving CTF EOI's by end of February.	**Action by:** SF
Action/Resolution 3.	Selection of new member conducted via email and phone discussions with the CTf prior to the next meeting	**Action by:** ALL
Action/Resolution 4.	Ensure various communication mechanisms are in place for the consultation period commencing next month.	**Action by:** EMRC
Action/Resolution 5.	CTF members to review draft for any gaps	**Action by:** ALL

Resource Recovery Update - April 2011

Invitation to comment on the draft Community Partnership Agreement

In partnership with its six member Councils - Town of Bassendean, City of Bayswater, City of Belmont, Shire of Kalamunda, Shire of Mundaring and City of Swan - the Eastern Metropolitan Regional Council (EMRC) is working to develop a more sustainable solution to managing waste in Perth's Eastern Region. This is known as the Resource Recovery Project.

Community Task Force

The Community Task Force (CTF) was formed in July 2010 to develop a Community Partnership Agreement in relation to the development and performance of the proposed Resource Recovery Facility. The CTF, which works on behalf of and in consultation with the broader community within Perth's Eastern Region, is made up of eight community representatives, two EMRC members and an independent facilitator, who has been appointed to guide discussion. The CTF has met several times since August 2010 focusing on, among other things, the development of the Community Partnership Agreement.

Community Partnership Agreement (CPA)

A major role for the CTF, is to develop a CPA to ensure that the construction and ongoing operation of the Resource Recovery Facility (RRF) at the Red Hill Waste Management Facility, is undertaken in alignment with community expectations. CTF members have brought community input from their own local community links and used feedback from a community forum held in September 2010, to prepare the CPA.

In developing the CPA, the CTF has set the following objectives:

- To develop a CPA which will be useful in the long-term for both the community and EMRC
- To provide a mechanism for community aspirations and concerns to be captured, heard and responded to in an ongoing manner
- To provide community confidence that their aspirations and concerns are being considered throughout the project
- To ensure that the CPA has enough credibility and status with EMRC and community.

How will the CPA be used?

In the short-term, the CPA will form part of the tender documents which tenderers will have to address. In the long–term, the document is meant to provide indicators through which EMRC and RRF operators, can benchmark the RRF performance on agreed social; environmental; and economic outcomes, and report these back to the community. The CPA will be used at various stages of the project. I.e. in the tender evaluation, facility design, construction, operation and ongoing monitoring.

Draft CPA prepared – have your say

The CTF has prepared a draft CPA for public review and comment, which is available at www.emrc.org.au or by phoning 9424 2222.

The CTF invites residents and organisations in Perth's Eastern Region to comment on the draft CPA. Comments on the draft CPA can be made by email to resourcerecovery@emrc.org.au or in writing to:

Chief Executive Officer
EMRC
PO Box 234
BELMONT WA 6984

Should you wish to comment in person, please contact EMRC on 9424 2222.

EMRC must receive all comments by 16 May 2011 in order for them to be reviewed by the CTF in formulating the final Community Partnership Agreement.

For further project information please click on the Resource Recovery Project tab when you visit

www.emrc.org.au

Protecting Perth's Eastern Region

Community Partnership Agreement

Statement of intent

This *Community Partnership Agreement (CPA)* represents a commitment by the Eastern Metropolitan Regional Council (EMRC) to work with the community to ensure that the construction and ongoing operation of the Resource Recovery Facility (RRF) at the Red Hill Waste Management Facility is undertaken in the best interests of the community.

This agreement has been developed in consultation with the community and the EMRC Community Taskforce (CTF) and is expected to be endorsed by EMRC Council following community feedback.

In considering the contents of this document the CTF have set the following objectives:

- That the CPA be useful into the long-term for both the community and the EMRC;
- To provide a mechanism for community aspirations and concerns to be captured, heard and responded to in an ongoing manner;
- To provide community confidence that their aspirations and concerns are being considered throughout the project;
- The CPA has credibility and status with the EMRC and community to enforce compliance with these objectives.

The CPA will form part of the Tender documentation to which tenderers will have to respond. In the long-term it will also provide indicators through which the EMRC and RRF operator can benchmark their performance and report back to the community. The CPA will be used at various stages of the RRF project (Tender phase, commissioning, ongoing operation and reporting).

Community Partnership Agreement

Background to the development of this document

The Eastern Metropolitan Regional Council (EMRC) has collaborated with its six member Councils: Town of Bassendean, City of Bayswater, City of Belmont, Shire of Kalamunda, Shire of Mundaring and the City of Swan in the development of the Resource Recovery Project.

Given that the proposed Resource Recovery Facility (RRF) is likely to influence all aspects of waste management in Perth's Eastern Region, the EMRC has undertaken extensive research on the various technology options and has also actively engaged with the community since 2004.

Community input has been sought through a Waste Management Community Reference Group, the Red Hill Community Liaison Group, community workshops, surveys and information sessions. Information on the RRF has also been made available through newsletters, newspapers advertisements and on the EMRC website (www.emrc.org.au).

In 2009 EMRC completed an Expression of Interest process, which enabled EMRC Council to make key decisions related to the acceptable technologies for the RRF as well as identifying the Red Hill Waste Management Facility as the preferred site.

Following this the EMRC Council established a Community Task Force (CTF) in mid 2010, tasked with the responsibility of drafting the *Community Partnership Agreement* (CPA). In September 2010 EMRC organised a Community Forum to gather the views, aspirations and concerns of the community in relation to the construction and operations of the RRF. Members of the CTF attended the forum and used the feedback from the forum as input into the development of the draft CPA.

The CTF members have met regularly following the Community Forum and have undertaken the following activities:

- Analysis of community feedback collected during the Community Forum (a report on the forum is available on EMRC's website).
- Met with members of the Mindarie Regional Council's (MRC) Community Advisory Group following a tour of the Neerabup Resource Recovery Facility. This group was responsible for the development of the Mindarie Community Partnership Agreement, prior to the construction of the Neerabup Resource Recovery Facility, run by BioVision 2020 for the MRC.
- Discussions and meetings with their local community to collect information on their aspirations and concerns for the RRF.
- Regular meetings to formulate a *Community Partnership Agreement* giving consideration to the aspirations and concerns of the community.

Community Partnership Agreement

At their meeting held on 15 March 2011 members of the CTF finalised a draft *Community Partnership Agreement* (draft CPA) and now make this available to the community in order to collect feedback on the draft CPA. Once community feedback has been received and analysed, the draft CPA may require to be updated to ensure it reflects community feedback. Subsequent to this it will be presented to EMRC's Council for consideration and acceptance to form part of the tender document.

The draft CPA is available on EMRC's website www.emrc.org.au and on request from the EMRC on 9424 2222. A feedback form is also available on the website to facilitate comments.

Community Partnership Agreement

Goals

The draft CPA has six goals for the construction and operation of the RRF:

Goal 1: Ensure strong community involvement and communication

Goal 2: Enhance community education and waste recycling

Goal 3: Ensure prudent financial performance and long-term viability

Goal 4: Achieve high quality operations and monitoring

Goal 5: Minimise the impact on human health and the environment

Goal 6: Provide an attractive landscape and aesthetics

Notes:

- Some items deemed to be more specifically focused on the tender process (ie: short-term in nature) will be included in the Draft Tender Evaluation Criteria (TEC), which will form part of the EMRC's tender and selection process.
- Examples of performance indicators are provided for each objective. These indicators will be finalised during the tender process based on feedback from tenderers.

Goal 1: Ensure strong community involvement and communication	
Objective	**Examples of possible indicators**
1.1 Accessible and regular communication with the community ▪ Information about plant operations provided in multiple formats (newsletter, social media, RRF website etc) ▪ Regular reports outlining project milestones and site performance against the CPA	1.1.1 Quarterly reports made available to the community outlining project milestones and site performance against the CPA 1.1.2 Number of visits to RRF website 1.1.3 Bi-annual survey of nearby residents/landowners
1.2 Timely and accessible complaints management system in place	1.2.1 Hotline and web site access for complaints acknowledged within 48hrs 1.2.2 Number of complaints and resolution times
1.3 Community Engagement Advisory Group be formed to oversee the implementation and monitoring of the CPA	1.3.1 Meeting attendance and committee composition 1.3.2 Bi-monthly committee meetings

Goal 2: Enhance community education and waste recycling	
Objective	**Examples of possible indicators**
2.1 Design to enable as much of the RRF operations to be viewed as practically possible from a viewing platform or CCTV	2.1.1 Percentage of operations able to be viewed onsite 2.1.2 Percentage of operations able to be viewed online 2.1.3 Number of visits to RRF website 2.1.4 Provision of an interactive video
2.2 Conduct on-site tours and Open Days available for interested parties	2.2.1 Number of tours per year 2.2.2 Number of participants at Open Day
2.3 Incorporate RRF information into EMRC's existing Education Centre	2.3.1 Visits to education centre 2.3.2 Level of knowledge and improvement from education centre visits
2.4 Encourage waste reduction and source separation throughout the member councils (Reuse, Reduce, Recycle, Recover) through EMRC's waste education programme	2.4.1 Percentage recovered through recycling 2.4.2 Percentage diverted from landfill

Goal 3: Ensure prudent financial performance and long-term viability	
Objective	**Examples of possible indicators**
3.1 Value for money operations and services provided to the member Councils and their communities	3.1.1 Business plan fully costed over the life of the facility (e.g. 20yr plan) 3.1.2 Costs per household per year
3.2 Run a financially sustainable operation based on prudent financial management	3.2.1 Quarterly financial reporting 3.2.2 Usefulness/marketability of products produced

Goal 4: Achieve high quality operations and monitoring	
Objective	**Examples of possible indicators**
4.1 Ensure reliable, well managed, ongoing operations	4.1.1 Number of unscheduled shutdowns 4.1.2 Comprehensive Business Continuity & Disaster Recovery Plan in place
4.2 Establish monitoring and reporting systems, including real time analysis of key emissions, as part of the operations.	4.2.1 On-stream analysis of key emissions as part of operations 4.2.2 Comprehensive monitoring of all emissions that require sampling as required by DEC license 4.2.3 Analyses to be made publicly available online and published regularly 4.2.4 Onsite display of key emissions
4.3 Implement defined and documented quality control, assurance and improvement systems and reporting.	4.3.1 Performance against quality control systems reported to Community Engagement Advisory Group 4.3.2 Performance against continuous targets beyond minimal requirements (noise, dust, odour etc)

Goal 5: Minimise the impact on human health and the environment	
Objective	**Examples of possible indicators**
5.1 Facility meets licence conditions for: noise, air emissions, dust, odour, light, water	5.1.1 No breach of environmental licence and/or ministerial conditions 5.1.2 Set operational targets below licence limits
5.2 Ensure safe handling, storage and disposal of all materials	5.2.1 Handling, storage and disposal of materials to meet appropriate regulations
5.3 All environmental standards met to ensure no damage to surrounding flora, fauna and human health	5.3.1 Compliance against environmental standards 5.3.2 Compliance against health standards
5.4 Is a net producer of energy and reduces greenhouse gas emissions relative to landfill	5.4.1 Energy efficiency of operations
5.5 Minimise the use of scarce natural resources	5.5.1 Water recycling 5.5.2 Capture of water run off

Goal 6: Provide an attractive landscape and aesthetics	
Objective	**Examples of possible indicators**
6.1 Provide a functional and visually acceptable landscaped facility	6.1.1 Community and customer feedback

Acknowledgement

The effort and commitment of the Community Task Force for working towards development of a Community Partnership Agreement is acknowledged.

1. Jan Foster-Hawking, Gidgegannup;
2. Martin Chape, Bellevue;
3. Max Jamieson, Helena Valley;
4. Myles Harmer, Mt Helena;
5. Noel Hales, Hazelmere;
6. Noelene Wigmore, Parkerville;
7. Peter Jensen, Gidgegannup;
8. Peter Pearson, Bassendean;
9. Stephen Fitzpatrick (Manager Project Development, EMRC)
10. Prapti Mehta (Manager Organisational Development, EMRC)

The assistance of the following is also appreciated

1. Greg Jones, Stoneville (CTF member from August to December 2010)
2. Joel Levin, Independent facilitator assisting the Community Taskforce

COMMUNITY FEEDBACK ON THE DRAFT COMMUNITY PARTNERSHIP AGREEMENT

The draft *Community Partnership Agreement (draft CPA)* represents a commitment by the Eastern Metropolitan Regional Council (EMRC) to work with the community to ensure that the construction and ongoing operation of the Resource Recovery Facility (RRF) at the Red Hill Waste Management Facility is undertaken in the best interests of the community.

Once finalised the CPA will form part of the Tender documentation to which tenderers will have to respond. In the long-term it will also provide indicators through which the EMRC and RRF operator can benchmark their performance and report back to community. The CPA will be used at various stages of the project (Tender phase, Commissioning and ongoing operation and reporting).

This is your opportunity to review the Draft Community Partnership Agreement and provide your feedback and comments.

The draft CPA has six goals and associated objectives and examples of indicators for the design, operation and performance of the RRF.

1. **On a scale of 1 to 5, do the six goals and objectives reflect your aspirations for the design, operation and performance of the Resource Recovery Facility?**

1	2	3	4	5
No		Somewhat		Yes

2. **Are there any other goals and objectives that should be included in the CPA?**
   Yes ❑ No ❑ If yes, what are these?

   _____

   _____

3. **Are there any goals and objectives that could be deleted?**
   Yes ❑ No ❑ If yes, which ones and why?

   _____

   _____

4. **Are there any other indicators that could be included as examples?**
   Yes ❑ No ❑ If yes, what are they and which objectives should they be placed against?

   _____

   _____

   _____

5. **Any other comments?**

   Please quote the goal and objective number when providing feedback on a specific goal or objective.

   _____

   _____

   _____

   _____

   _____

   _____

   _____

Demographic information *This information is for internal purposes only.*

Name _____

Address _____

Email _____

Phone _____ Mobile _____

Can EMRC contact you about your feedback if we would like further information about your comments? Yes ❑ No ❑

Would you like to be included on EMRC's contacts database for future news about the Resource Recovery Project? Yes ❑ No ❑

9.3 WASTE EDUCATION PROGRESS REPORT

REFERENCE: COMMITTEES-11977

PURPOSE OF REPORT

To provide an update on the progress of the EMRC regional waste education initiatives.

KEY ISSUES AND RECOMMENDATION(S)

Updates in the following items are included within this report:

- The Waste & Recycling Guide for 2011 / 2012 is in the final design and review stages.
- The dry cell battery (household) recycling program continues to expand in schools and public places.
- Progress report on the fluorescent light recycling station in public places.
- Household Hazardous Waste in the Eastern Region.
- Waste Education at the 2010 Waste and Recycling Conference.
- EMRC Earth Carers training course held in November 2010.
- Tours of Red Hill Landfill Facility, community events and presentations.
- Red Hill Education Centre's new sustainable Re-Use garden and rain water tanks.
- EMRC awarded a Keep Australia Beautiful grant.
- New signs for Mundaring Transfer Station, funded by the Shire of Mundaring, as part of an education strategy.

Recommendation(s)

That the report be received.

SOURCE OF REPORT

Manager Project Development
Waste Education Coordinator

BACKGROUND

The Regional Waste Education Steering Group (RWESG) was formally endorsed by member Councils and the EMRC in 2004 to guide the development and delivery of a waste education program on a regional basis.

During April and May 2005, each member Council adopted in principle support for:

"1. A REGIONAL STRUCTURE FOR WASTE EDUCATION IN THE EMRC REGION WITH THE EMRC AS COORDINATOR AND THE MEMBER COUNCILS, THROUGH THE MEMBER COUNCIL STEERING GROUP, PROVIDING DIRECTION AND INPUT;

AND

2. THE DEVELOPMENT OF A 3-YEAR, COSTED, REGIONAL WASTE EDUCATION STRATEGY TO BE REVIEWED BY THE MEMBER COUNCILS STEERING GROUP, TECHNICAL ADVISORY COMMITTEE (TAC), EMRC AND MEMBER COUNCILS."

Item 9.3 continued

REPORT

Waste and Recycling Guide 2011/2012

The new Waste & Recycling Guides are in the final stages of the design process. Local council operational and customer service staff have been consulted for changes and concept designs of the draft guides have been distributed for review by the Regional Waste Education Strategy Group. WMCRG members have also been asked for input.

The Waste & Recycling Guide is the major waste communications tool provided to residents and when issued in June/July 2011 an awareness campaign will commence including a series of advertisements in community newspapers reminding residents to look for and use the Guide and its features.

Dry-Cell (Household) Battery Recycling Program

The dry-cell battery collection program continues to expand. The Waste Education Officer has developed tools to help schools keep track of the amount of batteries they are recycling. This year, five new schools have joined the program. This brings the number of primary schools participating in the program to 58, plus Swan Midland TAFE, 25 public libraries and council offices, and five major shopping centres now have battery bins in Perth's Eastern Region.

In January this year the EMRC sent 10 tonnes of dry cell batteries to the Eastern States to be recycled. This is being funded by the Waste Authority through the Household Hazardous Waste (HHW) program.

Fluorescent Light Collection and Recycling

Fluorescent light recycling stations have been manufactured and installed in 12 locations across Perth's Eastern Region, including Bunnings, Belmont Forum, The Shops at Ellenbrook and Midland Gate Shopping Centre. The City of Swan are trialling the "Tube Terminator" a mobile trailer designed to safely crush and separate the components of a Compact Fluorescent Light (CFL) tube ready for the material to be recycled. The "Tube Terminator" will be used as an educational tool and will be demonstrated to the public at libraries and schools in the City of Swan.

In 2010 a total of 570 kilograms of CFL tubes and globes were collected by the EMRC for recycling.

Household Hazardous Waste (HHW)

The Bassendean Household Hazardous Waste collection day took place on Saturday 4 December 2010. The Waste Education team recorded in excess of 300 people attending over the four hour period. The majority of residents reported learning about the day from the leaflet drop and Waste & Recycling Guide. One of the main items collected on the day (five tonnes) was paint, including both water based and oil based. The cost of the collection and disposal was $122,194.60 of which the EMRC will have to fund $21,672.50.

The last HHW collection for 2010/2011 will be at the Shire of Kalamunda's Lawnbrook Road Transfer Station on 14 May 2011.

Waste Education at the 2010 Waste and Recycling Conference

EMRC occupied a stand at the 2010 Waste and Recycling conference which showcased the CFL recycling station, public place battery recycling bins and Hazelmere's timber operations.

The Waste Education Coordinator gave a presentation at the conference about creating a generation of battery recyclers. The presentation was a case study on the EMRC's battery collection and recycling program and its expansion over the past 5 years.

Earth Carers Training Program

In November 2010, the Waste Education team conducted its third Earth Carers training course, with 15 attendees from across the region participating in 5 workshops over 3 weeks. Various local guest speakers and presenters were involved and course participants partook in a number of tours.

Earth Carers will be invited to volunteer at this year's Garden Week and Royal Show events (as well as other local events) to man displays which have information on EMRC's waste education activities, programs and recycled products.

The next Earth Carers training program will commence in July 2011.

Item 9.3 continued

Tours of Red Hill, Community Events and Presentations

In 2010 the Waste Education Officer took over 750 community members and students from local schools on tours of Red Hill Waste Management Facility.

The Waste Education Officer has also given presentations at Waste Wise Schools and Australian Sustainable Schools (AUSSI) events, the Whiteman Park groundwater festival and at several primary schools across the region advocating waste reduction and responsible waste management. Furthermore, the Waste Education Coordinator has been working with the Perth Solar City program to deliver the waste component of the Living Smart courses to each of our member Councils.

The Waste Education team attended the 2010 Perth Royal Show and with the assistance from Earth Carer volunteers promoted ways to reduce waste. The event was a collaborative effort between Perth's five Regional Councils and the space was donated by the Department of Agriculture.

EMRC hosted a Sustainable Officers Networking Group meeting in November 2010 where over 30 attendees from Local Governments across Perth attended the meeting to hear about EMRC's sustainable initiatives.

The Waste Education team coordinated the EMRC's first Corporate Clean Up Australia Day in March 2011. Over 20 staff participated with 3½ sacks of recycling and 5 sacks of general rubbish collected on the day.

Red Hill Education Centre's new sustainable Re-Use garden and rain water tanks

A new organic garden has been installed outside the Red Hill Environmental Education Centre. All of the materials used to create the garden have been salvaged from different sites or recycled in some way such as using Red Hill soil conditioner and mulch and using construction and demolition (C&D) materials from the landfill. The Re-Use garden is harvesting a variety of vegetables and herbs for visitors and staff. The garden will be used as an educational tool for touring schools and community groups.

EMRC awarded a Keep Australia Beautiful grant

The Waste Education Officer applied for and successfully received $5,000 to redevelop the litter activity in the Red Hill Environmental Education Centre. The activity is currently in the design phase and will be called 'From the Hills to the Gyre', and will connect litter in the hills to the surrounding waterways and global ocean systems, thereby highlighting the requirement for a great sense of responsibility for sustainable rubbish disposal habits and better understanding of 'systems thinking'

New signs for Mundaring Transfer Station as part of an education strategy

The Waste Education Coordinator has been assisting the Shire of Mundaring to develop its new signs for Coppin Road and Mathieson Road Transfer Stations. The purpose of the signs is to encourage residents to recycle more using the services available at the sites. A local media campaign will follow the installation of the signs and it is proposed to trial a part time Shire of Mundaring recycling education officer onsite at the transfer stations.

STRATEGIC/POLICY IMPLICATIONS

Key Result Area 1 – Environmental Sustainability

1.1 To provide sustainable waste disposal operations

1.2 To improve regional waste management

1.3 To provide resource recovery and recycling solutions in partnership with member Councils

Item 9.3 continued

FINANCIAL IMPLICATIONS

Nil

SUSTAINABILITY IMPLICATIONS

A well coordinated waste education program with the EMRC, the member Councils and the WMCRG working together to achieve similar outcomes will be more sustainable over the long term.

MEMBER COUNCIL IMPLICATIONS

Member Council	Implication Details
Town of Bassendean	Nil
City of Bayswater	
City of Belmont	
Shire of Kalamunda	
Shire of Mundaring	
City of Swan	

ATTACHMENT(S)

Nil

VOTING REQUIREMENT

Simple Majority

RECOMMENDATION(S)

That the report be received.

RRC RECOMMENDATION(S)

MOVED CR FÄRDIG SECONDED CR PULE

That the report be received.

CARRIED UNANIMOUSLY

COUNCIL RESOLUTION(S)

MOVED CR CUCCARO SECONDED CR ZANNINO

THAT THE REPORT BE RECEIVED.

CARRIED UNANIMOUSLY

9.4 REPORT ON ATTENDANCE AT THE 2010 BIOENERGY CONFERENCE

REFERENCE: COMMITTEES-11978

PURPOSE OF REPORT

To advise Council of the outcome of attendance at the 2010 Bioenergy Conference in Sydney.

KEY ISSUES AND RECOMMENDATION(S)

- The Manager Project Development attended the Bioenergy Australia 2010 Conference in Sydney from 8 to 10 December 2010.
- Pre-conference visits included a trip to the Sydney Water Corp North Head sewage treatment works, the EarthPower anaerobic digestion plant at Camellia, Microgen research laboratory and Pacific Pyrolysis biochar developments and Licella's hydrothermal pilot plant at Gosford.
- Significant research is underway into the commercialisation of liquid biofuels from biomass.
- Interesting developments are underway in eastern Australia and elsewhere with gasification and pyrolysis of MSW and other feedstocks to make syngas and power and liquid fuels.

Recommendation(s)

The report be received.

SOURCE OF REPORT

Manager Project Development

BACKGROUND

The Bioenergy Australia Conference is an annual event which covers developments in the bioenergy industry which includes the production of energy from municipal waste, biomass and agricultural residues using technologies such as anaerobic digestion, gasification and pyrolysis. The programme includes international researchers and developers in the field of the conversion of biomass and waste to fuel. The Manager Project Development has attended previous Bioenergy Australia conferences in 2007 and 2008 and found them very informative in relation to developments in gasification and pyrolysis technologies.

REPORT

The 2010 Bioenergy Australia conference was held in Sydney from 8 to 10 December and included pre-conference visits to the Sydney Water Corp North Head sewage treatment works, the EarthPower anaerobic digestion plant at Camellia, the Microgen research laboratory and a visit to Pacific Pyrolysis bio-char developments and Licella's hydrothermal pilot plant at Gosford.

- North Head sewage treatment works - biosolids were being anaerobically digested to make biogas for renewable power generation.
- EarthPower plant - now owned by Transpacific and Veolia after purchase from Babcock & Brown and is seen as their combined entry into anaerobic digestion in Australia.
- The Microgen laboratory - produces enzymes for the production of liquid fuels from lignocellulose.
- The Pacific Pyrolysis plant at Gosford – viewed the progress of the pyrolysis plant and biochar developments together with the Licella demonstration plant to produce crude bio-diesel from wood using a hydrothermal process involving water at high temperature and pressure.

Item 9.4 continued

The conference was opened by the Hon.Tony Kelly, Minister for Planning, Minister for Infrastructure & Minister for Lands who spoke about the NSW mandate for renewable fuels:

- 4 billion litres of E10 fuel blend has been sold in NSW replacing $220M petrol, reducing emissions of particulates and greenhouse gases (240,000 tonnes CO_2 saved).
- Replace imported fuel with renewable fuel.
- The aim is to provide jobs (1,000 in NSW) and help Australia's balance of payments.
- The aim is to increase the ethanol mandate from 2% of the total volume of petrol sold in NSW to 5%.
- Only 1% of diesel sold is biodiesel.
- The aim is to eventually abolish regular fuel and only sell the E10 blend.

Two of the plenary session speakers were Professor Jack Saddler, University of British Columbia, Canada and Dr Jim McMillan, National Renewable Energy Laboratory (NREL), Golden Colorado, USA. Also presenting was Professor Michael Borowitzka of the Algae Research Centre, Murdoch University.

Prof. Jack Saddler, University of British Columbia

- Prof Saddler is co-leader of the International Energy Agency's (IEA) Bioenergy program Task 39 on Commercialising Liquid Biofuels from Biomass, a collaboration between 15 countries.
- In 2008 most biofuel produced was bioethanol, a smaller amount of biodiesel and a very small amount of 2nd generation biofuels (made from "Bioenergy crops" including miscanthus, switchgrass, poplar).
- Brazil convert sugar cane to ethanol and in the US 36% of corn goes into ethanol.
- In the pulp and paper industry there is potential to make energy from black liquor recovery and sulphite liquor recovery at the same time as making pulp and paper, this is the so-called biorefinery.
- Bioconversion of biomass to ethanol cost $2.53 per gallon in 2005, the target is $1.33 per gallon by 2012.
- There are biological and thermochemical avenues being used to make biofuels.
- Big progress has been made in biological pathways for conversion of lignocellulose to ethanol.
- The company Choren in Freiberg, Germany have under commissioning a plant to produce 18 M litres biodiesel using a 3 stage gasification process. It will also generate 45 MWth (heat output) from 68,000 tpa feedstock (50% residues, 50% chips). Total investment is €100 m investment and this is known as a BTL plant (biomass to liquid fuel).

Dr Jim McMillan, NREL, USA

- Several $ billions of research underway.
- Cellulosic ethanol production is technically sound, economics being proven.
- Commercialisation is starting with 6 commercial plants operating in USA.
- With thermochemical processes, the focus is on clean-up of the gasification process (syngas clean up including reforming methane and tar).

Deborah O'Connell (CSIRO)

- Doing a national assessment of biomass and greenhouse gas emissions for Australia.
- Researching new production systems using algae, pongamia (a legume) and short rotation crop (SRC) eucalypt.
- 49% of petrol could be substituted by liquid biofuels.

Item 9.4 continued

Richard Niven, Manager Transport Fuels, Department of Resources, Energy and Tourism

- The Department runs the Australian Centre for Renewable Energy (ACRE) programs.
- ACRE programs total $167 M including the $100 M Renewable Energy Capital Fund available for commercialisation and venture capital.
- Biofuels currently pay excise but this is fully refunded for ethanol and imported biodiesel.
- Alternative Fuels Strategy aimed at all alternative fuels, not just biofuels.
- Aiming to complete strategy by mid-2011.

Greg McDowell, NSW Office of Biofuels – Outcomes of Biofuels Mandate

- 2007 election mandate was 2% ethanol in fuel from September 2007 increasing to 10% (E10) by July 2011 plus 2% biodiesel.
- Due to an industry wide shortage of ethanol, the volumetric mandate is to remain at 4% until July 2011 and the E10 requirement was suspended until July 2012.
- 2 major projects underway in Australia at Port Kembla and Nowra, $460 m investment, plus a cellulosic ethanol pilot plant.
- Cheaper fuel (ULP $0.02/l cheaper, E10 $0.02 to $0.03/l cheaper than ULP).
- Particulate emissions from petrol down by 10%.
- Greenhouse gas emissions from petrol down by 1%.
- Biodiesel development slower, only 1% of diesel is biodiesel.
- Product quality issues with 5% biodiesel (B5).

Chani Lokuge, URS NSW Waste Practice Leader

- Developed new draft ACT Sustainable Waste Strategy 2010-2025
- Key objectives are:
    - Less waste generated;
    - Full resource recovery;
    - A clean environment ; and
    - Carbon neutral waste sector.
- Central pillar is Energy from Waste
- Thermal conversion technology favoured (pyrolysis, gasification or plasma).
- Waste to be sourced from a combination of C&D (40,000 t/annum), C&I (30,000 t/annum) and MSW (30,000 t/annum ex a dirty MRF) – a total of 100,000 t/annum.
- Other sources of waste are bio-solids from a waste waster treatment plant and forestry waste.
- Preference for pyrolysis over gasification over combustion over anaerobic digestion.
- Reference facilities cited included Thermoselect Mitsui and Chiba, Japan (150 tpd and 330 tpd pyrolysis/gasification), Utashinai City, Japan (100,000t/annum, plasma gasification), Burgau Germany (pyrolysis) and Kawaguchi, Japan (400 tpd gasification). Projects announced include Bristol, UK 7.5 MW (pyrolysis/gasification and, Hasselt Belgium (landfill mining/advanced plasma gasification).

Henning Jorgenson, University of Copenhagen

- Dong Energy and a subsidiary company Inbicon – operate bioethanol from biomass facilities (pilot and demonstration) and energy from MSW (pilot).
- Haldor Topsoe –have syngas to liquids technology.
- Kalundborg, Denmark – demonstration plant - 4 tph biomass, 5,400 m3 /annum ethanol, cost €64 m.

Item 9.4 continued

Juergen Pieterseim, Eck Rohr-Kessel

- Supply boiler and combustion systems and complete engineering.
- 30 licences worldwide, 580 reference plants, 160 MW to 1 MW.
- Gasco in Australia, licensee John Sanderson.
- 100 reference plants for gasification.
- 5 MWe plant possible with Integrated Gasification and Combined Cycle (IGCC) technology, clean biomass feedstock preferred – 35% efficiency predicted.
- Advantages – high temperature and pressure avoids chloride and potassium problems. Gasification at 300^0 to 500^oC.
- 10% less fuel to achieve same power output.

Graham Lowry, AE&E Australia P/L

- Referred to EfW plants in the centre of Paris and London and others in urban environments such as Osaka.
- Architectural enhancement and low profile buildings and emission stacks.
- Referred to installed capacity and new planned capacity increases.
- Mentioned advantages of building an EfW plant in an urban environment include reduced transport costs, delivers product where needed (heat and power), jobs for community.
- Predicted EfW from Refuse Derived Fuel (RDF) will take over from landfill in Australia.
- Road blocks to EfW in Australia can be overcome using European experience.

Prof, Robert Cattolica, University of California

- California Renewable Fuels Policy and the Greenhouse Gas Reduction Bill are both drivers for renewable fuels research and investment.
- They are researching the thermochemical conversion of biomass to liquid fuels with West Biofuels LLC.
- Developing a 5 tpd dual fluidized bed gasification plant based on the Pyrox process which operated for 7 years as a demonstration plant at Funabashi City, Japan, 3 lines, 150 tpd waste.
- Objective is to make syngas and then convert this to mixed alcohols which can be separated or used in conventional or flex-fuel motor car engines.
- Investment cost of a commercial plant estimated at $3.5 m per MW.

Paul Prasad, Plasma Waste Recycling (PWR)

- Uses graphite arc plasma, no dilutive gas.
- Produces between 450 KWh to 1 MWh from 1 tonne MSW.
- Accepts a variety of waste.
- Produces a syngas (for steam, electricity, chemical feedstock or liquid fuels), metals (recovery) and slag (used in building products, building aggregate, rockwool).
- Building a plant in the US, costs are $2.5 m/MW.
- Parasitic power load 30%.

Item 9.4 continued

Martin Gravett, AnaeCo, Perth

- Stage 1 cost $15 m including a $2 m grant from AusIndustry REDI.
- Stage 2 will cost $37 m (secured from Palisade Investment Partners).
- JV with Monadelphous to construct Stage 2 and future facilities.
- Stage 1 technical review involved independent certification by consultants SKM with a review by GHD.
- Environmental approval issued without formal assessment.
- Stage 2 construction will take 14 months followed by 6 months commissioning and ramp up and the 3 months performance testing.
- Challenge is to convert an investment of more than $40m into a sustainable business.

Evelyn Krull, CSIRO

- Conducting research on the effect of bio-char on soil fertility in broad acre farming on low fertility soils.
- Also researching carbon sequestration, greenhouse gas mitigation, lifecycle assessment and biomass availability.

Ian Guss, Flex Ethanol Project, Australia

- June 2009 consortium formed to investigate the viability of a feedstock flexible ethanol plant in Victoria
- Consortium includes:
    - Coskata (technology provider);
    - GM Holden (ethanol demand);
    - Caltex (off-take partner);
    - Moltoni Energy (waste gasification experts);
    - Mitsui Co (major traders and timber industry); and
    - Victorian Government (facilitation).
- Completed business case, visited demonstration facility in Pennsylvania (100 tpd).
- Process involves gasification (AlterNRG plasma gasification) of waste followed by bioconversion of syngas to ethanol.
- Hitachi Metals use the Westinghouse technology (AlterNRG plasma gasification) at Utashinai plant in Japan (making syngas and power).
- 400 litres ethanol/dry tonne biomass.
- Can take a variety of wastes.
- Commercial scale plant planned for 2012 in southeast USA.

Adriana Downie, Pacific Pyrolysis

- Scoping a project for Ballina Shire Council to produce power and biochar from Council wastes using the Pacific Pyrolysis technology.
- Based on feedstock of greenwaste, food waste, dewatered bio-solids, carbon price of $10/tonne.
- Community target of 25% per capita reduction in waste to landfill.
- Mayoral Agreement – 30% reduction in emissions by 2020 (based on 1990 levels) which can be achieved by this project.
- Council looking for grant funding.

Item 9.4 continued

Bevan Dooley, BTOLA Pty Ltd

- Private Australian company.
- Produce indirectly fired gas turbine technology (IFGT).
- Utilises heat exchange to transfer energy into a modified gas turbine engine.
- Can use all grades of fuel and tested on MSW, woodchips, biomass energy crop, feedlot cow manure, coal, dirty waste oils, macadamia nut shell and waste greases.
- High temperature combustion ensures destruction of toxins.
- Claimed to be cheaper than gasification and pyrolysis.
- Gas turbine only sees clean hot air so there is no fouling.
- Capital cost $500,000 for 250 kW ($2 to $3 per watt).
- 2 year payback on a 5 MW system fed by MSW.
- Looking to market technology in US and south-east Asia.

Peter Davies, Real Power Systems

- Gasification process using a rectangular downdraft square hearth.
- Produces a clean, moderate calorific value syngas suitable for boilers or engines.
- Costs claimed at $1.50 to $2 per Watt.
- Could add a catalytic cracker to make syngas crude or liquids for alcohol production.

A full copy of the conference proceedings is available from the Manager Project Development.

STRATEGIC/POLICY IMPLICATIONS

Key Result Area 1 – Environmental Sustainability

1.3 To provide resource recovery and recycling solutions in partnership with member Councils

FINANCIAL IMPLICATIONS

The cost of attending conferences which are relevant to the Resource Recovery Project is budgeted in the under – Resource Recovery – Train and Develop Staff - Resource Recovery.

SUSTAINABILITY IMPLICATIONS

The Resource Recovery Facility and/or Resource Recovery Park will contribute toward minimising the environmental impact of waste by facilitating the sustainable use and development of resources.

Item 9.4 continued

MEMBER COUNCIL IMPLICATIONS

Member Council	Implication Details
Town of Bassendean	Nil
City of Bayswater	
City of Belmont	
Shire of Kalamunda	
Shire of Mundaring	
City of Swan	

ATTACHMENT(S)

Nil

VOTING REQUIREMENT

Simple Majority

RECOMMENDATION(S)

That the report be received.

RRC RECOMMENDATION(S)

MOVED CR FÄRDIG SECONDED CR PULE

That the report be received.

CARRIED UNANIMOUSLY

Cr Godfrey stated that it was a detailed report and requested a brief summary on the technologies relevant to the EMRC. The Manager Project Development advised that the report was intended to document developments in research and development in the conversion of biomass and waste to biofuel. The Manager Project Development advised that the policy driver for this technology development in the eastern states was the NSW Government's Biofuels Mandate which aims to replace imported unleaded fuel and diesel with ethanol blends and biodiesel over a period of several years. The interest for the EMRC and the Resource Recovery project is that the technologies being developed for this application are gasification and pyrolysis both of which are being considered for the Resource Recovery Facility and there is also a potential application at the Hazelmere Resource Recovery Park using timber waste. An advantage of making biofuels is that they are easily stored, blended and transported to markets.

COUNCIL RESOLUTION(S)

MOVED CR GODFREY SECONDED CUCCARO

THAT THE REPORT BE RECEIVED.

CARRIED UNANIMOUSLY

9.5 REPORT ON DR CONNETT'S PERTH VISIT

REFERENCE: COMMITTEES-11979

PURPOSE OF REPORT

To advise Council of the outcomes of the Perth visit and presentations by Dr Paul Connett.

KEY ISSUES AND RECOMMENDATION(S)

- The Alliance for a Clean Environment invited Dr Paul Connett to Perth in February 2011 for a series of presentations opposing waste to energy technology.
- EMRC officers and Cardno representatives attended the presentations at Midland Town Hall and the Conservation Council on 5 and 10 February 2011 respectively.
- EMRC hosted a presentation for councillors at Ascot Place on 7 February 2011.
- Issues raised by Dr Connett about the potential health effects of ultrafine or nano-particles are being investigated and a paper has been prepared on this by Dr Brian Stanmore, an Australian expert on combustion.

Recommendation(s)

That the report be received.

SOURCE OF REPORT

Manager Project Development

BACKGROUND

The EMRC was advised of the visit to Perth by “international waste expert” Dr Paul Connett on 19 January 2011. The Alliance for a Clean Environment (ACE) invited EMRC community taskforce members and EMRC staff to a briefing with Dr Connett which resulted in EMRC hosting a presentation to councillors on Monday 7 February 2011 at the EMRC

REPORT

The Manager Project Development, together with a representative of Cardno, attended the presentations by Dr Connett at the Midland Town Hall on Saturday 5 February 2011 and at the Conservation Council on 10 February 2011. The Waste Management Community Reference Group (WMCRG) and the Community Task Force (CTF) were emailed with details of these presentations and many attended both presentations.

The Midland Town Hall presentation was attended by about 50 to 60 members of the community including two member Council councillors, 3 CTF members, 5 WMCRG members and two EMRC/member Council officers. Ms Jane Bremmer from ACE gave an overview of ACE and what they were involved in which included a section on their Resource Recovery Project involvement before introducing Dr Connett. Some of the statements made included:

- Comments about nanoparticles and the effects on human health being unknown. Reference to children and the lack of government protection and that there was no health impact assessment in WA. Ms Bremmer cited examples of regulatory failure including the Bellevue fire and clean up, Alcoa Wagerup/Yarloop and the Esperance lead contamination (PowerPoint slide claimed 9,600 babies affected which one of the ACE members corrected her on – should have referred to 9,600 birds).

Item 9.5 continued

- Claimed there was no enforceable limits for industry – goals not limits (this is incorrect, all licence limits are legally enforceable and there have been many prosecutions).
- Ms Bremmer mentioned sulphur dioxide air pollution in the Swan Valley from the 5 brickworks and Perth Airport, the asphalt plant and the rendering plant.

Dr Connett then gave his presentation. The following points were made:

- Claims that incineration plants cost £500M to £1bn over their lifetime and that the money was made not from the power generated but from tipping fees. He said half the capital cost was for air pollution control and he referred to there being three boxes, one for the waste incineration, one for the air pollution control and another box for the toxic ash containment.
- He had visited Brescia in Italy (the plant that has won awards and which EMRC representatives visited in 2008). He stated that it cost €300m, provided 80 jobs and received a subsidy of €500m for alternative energy. Officer comment – this is a big plant (800,000 tpa of waste and biomass) and produces renewable heat and power (695MWh heat and 223MWe power) for the town's 130,000 residents and avoids the use of 150,000 tonnes fossil fuel per year and 400,000 tonnes carbon dioxide emissions. Bottom ash is used as a filler material after metals recovery and fly ash is disposed of to landfill. There is a financial incentive for power generation which reduces after 8 years, the aim is to make a profit and keep the gate fee low.
- Cited the example of Nova Scotia where there was resource recovery based on reuse and recycling.
- Referred to the CO_2 emissions from incineration – 2 tonne of CO_2 for each tonne of waste burned and that recycling and composting is 46 times better in reducing CO_2. Officer comment - Cardno estimates made of CO_2 emissions for the technology options indicate that 1 tonne of MSW waste will produce approximately 1 tonne of CO_2 with combustion technology and all RRF technology options show a reduction in greenhouse gas emissions compared to landfill.
- Referred to Kent County Council contract in the UK, 25 year contract and take or pay on 320,000 tpa which the Council could not get out of. Officer comment – whatever contract option or technology is selected, there will be a loan to be repaid over about a 20 year period.
- 4 tonnes of waste makes 1 tonne ash (90% bottom ash and 10% fly ash) and showed a slide of fly ash disposal at a site in the UK showing dust everywhere.
- In the US bottom ash and fly ash are mixed together before testing.
- Bottom ash not being used for buildings.
- Nano particles – cited EC Directive 2008/50/EC. This Directive refers to fine particulate matter ($PM_{2.5}$) and contrary to comments made, it sets a national exposure reduction target for $PM_{2.5}$ and a limit value.
- Stated that Kwinana had a dust load and health impact already and did not need incineration to add to this. Nano particles problems – they are not easily captured.
- Mentioned Prof. Vyvyan Howard in Northern Ireland and his work (pathologist who specialises in toxicology, and in particular the effect of toxic things on the foetus and infant. Now an international expert on the link between environmental hazards and cancer).
- Mentioned that no new incinerators had been permitted in the US since 1995. Officer comment – Ms Robin Davidov of Maryland Waste Disposal Authority advises that this is not so and at least 8 new facilities over the last 5 years have been constructed or received permitting or are in the permitting stage including 2 in her counties.
- On zero waste he said source separation and door to door collection was the way to go and cited how this occurs in Italy (which he has visited 40 or more times), composting (again door to door collections for clean waste), reuse, repair, and deconstruction.

Item 9.5 continued

- He gave an example of how the UK landfill surcharge of £48 / tonne could be turned around if a positive value was attached to reduction, reuse, composting, and recycling and a negative value to incineration and landfill. This was apparently presented to Scottish MP's in 2010.
- He said a Zero Waste research facility was needed to look at the residual waste after doing the 3 R's and composting. He advocated that the residual waste be sent to temporary landfilling until a solution could be found for it.

Overall impressions

- Dr Connett did not really have an answer for closing the zero waste gap (i.e. from 70% to 100% - his suggestion was to place it into landfills and then mine it when we have solutions for alternative uses).
- Strong presence from the Save Perth Hills group and ACE members and a lot of the questions were about waste materials that could not be recycled and composting.
- There were very few, if any, comments or questions from the floor about combustion. Most of the discussion related to activities further up the waste hierarchy.

EMRC Presentation 7 February 2011

The EMRC hosted Dr Connett and Ms Jane Bremmer on Monday 7 February 2011 to allow councillors and officers to hear Dr Connett's views and ask questions. This was attended by seventeen councillors/EMRC and member Council officers. Ms Bremmer gave a brief overview of the ACE agenda and Dr Connett gave an abbreviated version of his presentation at the Midland Town Hall.

Conservation Council 10 February 2011

The debate between Professor Ray Wills and Dr Connett at the Conservation Council was preceded by some commentary by Mr Piers Verstegen of the Conservation Council who appeared to be uninformed regarding the nature of the EMRC proposal by referring to a proposal to build five facilities at Red Hill.

Professor Ray Wills gave a pro case for waste to energy in the context of sustainable energy generation and this was followed by Dr Connett's negative case this being a repeat of the presentation on 5 February 2011. This was followed by a short presentation from the DEC's Dr Jill Lethlean (refer attachment 1) who gave some observations on the role of DEC in considering waste to energy and where it might fit in. Unfortunately Dr Lethlean made no mention of the draft State Waste Strategy and its recognition of the role of resource recovery in reducing waste to landfill, including the recognition of waste to energy options.

Research on emissions of nanoparticles from municipal waste combustion

Clearly the issue of nanoparticles and potential health effects will need to be addressed in the community engagement related to the RRF technology options. Dr Brian Stanmore from Victoria and an Australian expert on combustion processes has provided a paper he has written in relation to the emission of nanoparticles from municipal waste combustion and this is attached for reference (attachment 2).

Dr Stanmore concludes in part that "The emissions of particulate matter from a modern WtE plant are inherently low and are insignificant against the background of particulates in an urban airshed. Using the figures of Morawska et al, the average emissions from the motor vehicle fleet with 7% heavy duty units is 7.5×10^{13} particles per km. At an average yearly distance travelled of 15,000 km, this gives 1.1×10^{18} particles emitted per annum per vehicle. A 100,000 tpa WtE plant would emit about 7×10^{19} particles per year if the figures of Buananno et al are used. The plant would therefore contribute the same nanoparticle emissions as about 65 vehicles".

STRATEGIC/POLICY IMPLICATIONS

Key Result Area 1 – Environmental Sustainability

1.3 To provide resource recovery and recycling solutions in partnership with member Councils

Item 9.5 continued

FINANCIAL IMPLICATIONS

Nil

SUSTAINABILITY IMPLICATIONS

The Resource Recovery Facility and/or Resource Recovery Park will contribute toward minimising the environmental impact of waste by facilitating the sustainable use and development of resources.

MEMBER COUNCIL IMPLICATIONS

Member Council	Implication Details
Town of Bassendean	Nil
City of Bayswater	
City of Belmont	
Shire of Kalamunda	
Shire of Mundaring	
City of Swan	

ATTACHMENT(S)

1. Presentation – Dr Jill Lethlean to Conservation Council Forum 10 February 2011 (Ref: Committees-12028)
2. The emission of nanoparticles from MSW combustion-Dr Brian Stanmore (Ref: Committees-12029)

VOTING REQUIREMENT

Simple Majority

RECOMMENDATION(S)

That the report be received.

RRC RECOMMENDATION(S)

MOVED CR FÄRDIG SECONDED CR PULE

That the report be received.

CARRIED UNANIMOUSLY

COUNCIL RESOLUTION(S)

MOVED CR CUCCARO SECONDED CR ZANNINO

THAT THE REPORT BE RECEIVED.

CARRIED UNANIMOUSLY

Department of Environment and Conservation

CCWA Environment Matters Seminar Series:

Should we burn our rubbish to power our homes?

Dr Jill Lethlean

Manager, Programs
Waste Management Branch
Department of Environment and Conservation

Attachment 1 to RRC 7 April 2011 Item 9.5

Department of Environment and Conservation

Outline

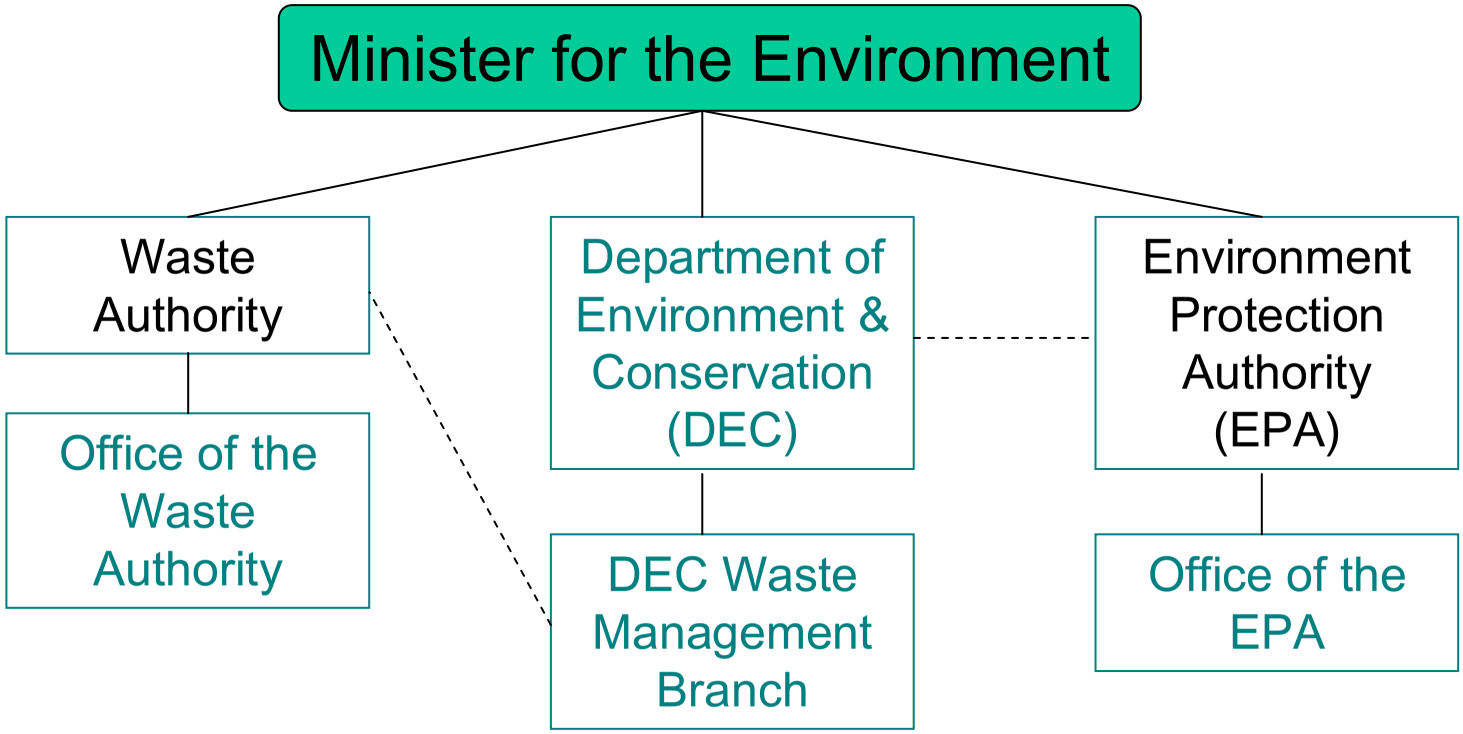
1. State Government Environment / Waste Agencies

2. Role of Department of Environment and Conservation

3. Where Waste to Energy might fit

Department of Environment and Conservation

Relevant State Govt Environment Agencies – Who's who



Department of Environment and Conservation

Environmental Approvals

EPA

- Overall development approval process would be managed by Department of Planning
- Applications referred to EPA for Environmental Impact Assessment
- Applications subject to Public Environmental Review
- EPA makes a recommendation to the Minister
- Minister makes decision to approve or not approve
- Minister may set Ministerial conditions

DEC

- Parallel assessment for Works Approval and Licence
- Approval conditional on Ministerial approval
- Set Licence conditions
- Enforcement of Regulations & Licence conditions

Department of Environment and Conservation

Current DEC Policy on Waste to Energy

DEC has no formal position on Waste to Energy.

However ….

Department of Environment and Conservation

Role of DEC in Waste-to-Energy

Approvals

- provide advice as requested to EPA
- issuing works approval and licence

Regulation

- enforcement of compliance with legislation and licence conditions

Policy

- provide advice to Waste Authority and Minister for the Environment
- provide information and data to industry and the community
- facilitate discussion
- strategic planning for waste and recycling infrastructure

Department of Environment and Conservation

Where Waste-to-Energy might fit

- The amount of material that will need to be handled and managed by Perth's waste and recycling services and infrastructure will be at least double current amounts by 2031
- New landfills on the Swan Coastal Plain unlikely
- Material Recovery Facility (MRF) residuals currently run at 15 - 40%
- Resource Recovery Facility (RRF) residuals currently run at 30 - 50%
- Markets for some recyclables are highly variable and marginal

Department of Environment and Conservation

Where Waste-to-Energy might fit – US EPA

"*Is a WTE facility appropriate for your community?*

To determine whether an energy recovery project is a feasible waste management alternative for the community, the following questions should be addressed:

- When source reduction, reuse, recycling composting and waste-stream growth patterns are taken into account, is the remaining waste stream sufficient to support an energy recovery facility operating at or near capacity over the life of the project?
- Is there a buyer for the energy produced by the energy recovery facility?
- Is there strong political support for a WTE facility?

If the answer to any of these questions is "no", WTE incineration probably will not work, and other options should be considered."

Source: Decision Maker's Guide to Solid Waste Management, Vol II, (EPA 530-R-95-023), US EPA, 1995.

The emission of nanoparticles from MSW combustion

B.R. Stanmore B.Sc. PhD.
Formerly of the Universities of Melbourne and Queensland, and l'école des mines d'Albi-Carmaux

Summary

The small (nano-size) airborne particles released into the atmosphere grow during their lifetime by a dynamic process of accretion, mostly by inorganic salts such as nitrates. The origin of the original nuclei is overwhelmingly from combustion processes. Nanoparticles stay in suspension for long periods, and are transported over intercontinental distances. Organic compounds and metals are found to some extent in all samples of ambient air. The species which are responsible for health impacts are present in material from all sources. Motor vehicles produce most fine particles and dominate the generation of urban pollution. Uncontrolled emissions from bushfires, backyard burning and other internal combustion engines are also a significant contributor to poor air quality. Because the particulate emissions from a well-designed waste-to-energy (WtE) plant, before release into the atmosphere, are of the same order as in the ambient air above a modern city site, they will have a negligible addition to the overall sum of particulates in an urban environment.

Introduction

A nanometre, which is one billionth of a metre (1 nm = 10^{-9} m = 0.001 micrometres (μm)), is the dimension used to measure extremely fine particles. Recent developments in aerosol technology have indicated that particles smaller than 0.1 μm (100 nm) or “ultrafines” are responsible for the adverse effects on human health associated with particulate air pollution. Recent toxicological studies have shown that concentrated airborne particles ($PM_{2.5}$, i.e. Particulate Matter with a size less than or equal to 2.5 μm) can induce pulmonary inflammation, chronic bronchitis, pulmonary hypertension and electrocardial changes (Sondreal et al 2000). It is hypothesised that PM pulmonary irritants trigger a nerve response that increases the heart rate and decreases heart rate variability. There is an inflammatory response to ultrafine particles (defined here as < 20 nm) and the chemical effects of acids, peroxides, nitrates, sulphates, organic carbon and acid aldehydes must be considered.

The tiny mass involved in airborne solids and the small size of the particles requires that measurement is often reported as the number of particles per unit volume of gas. A typical sample of urban air contains 10 – 100 x 10^3 particles per cm^3, which on a mass basis may be 20 to 100 $\mu g.m^{-3}$. The number concentration is dominated by fine particles, and the mass loading by large particles. Special equipment is required for sampling fine particles to avoid artefacts. The

number analysis of ultrafines is carried out by recently developed instruments, namely the scanning mobility particle sizer (SMPS) and the electronic low pressure impactor (ELPI), which also gives a size distribution.

The fine particles in the atmosphere are called aerosols because they form by condensation on a smaller nucleus while in suspension. In general, aerosols begin life in the nucleation mode (1 – 2 nm), formed predominantly in combustion systems. This process is depicted in Figure 1 for diesel particulates. Both gasoline and diesel motors are responsible for a large part of the nucleation mode particles in the urban environment. The particles then grow by coagulation when moisture, organic molecules, and ammonium, sulphate and nitrate radicals are adsorbed onto their surface (accumulation mode). The large sizes ("coarse fraction" > 1 µm) settle quickly and are not present in high concentrations.

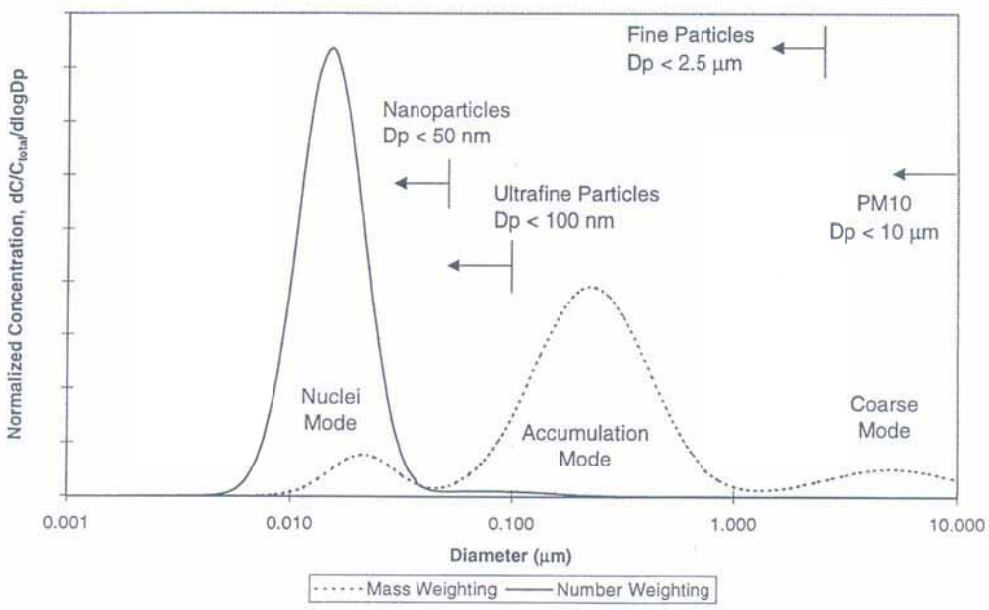


Figure 1 Diesel exhaust emissions showing the effect of accumulation

The adverse health effects noted can be related to the species listed above, and to polyaromatic hydrocarbons (PAH), which with their oxy and nitro derivatives, are present on the surface. To understand the likely effects of WtE operations on air quality, a comparison will be made between ambient city air and WtE and other emission sources.

Ambient air

Airborne primary particles are often carbonaceous and can be separated into two categories: 1) elemental carbon (EC) and 2) organic carbon (OC) of low volatility. The ratio OC/EC is normally much higher than unity in both urban and rural atmospheres. The material comprising the

remainder is mainly inorganic ions such as ammonium, nitrate and sulphate. The atmosphere contains numerous fine particles, of the order of 200 per cm^3 in "clean" air over the ocean, and more than 100,000 (10×10^4) per cm^3 at a polluted city site. The bulk of these are very fine particles smaller than 100 nm. The concentrations averaged over 24 hour periods in January and February 1966 at Pasadena California ranged from 7,100 to 14,000 cm^{-3} (Hughes et al 1998).

On a mass basis the values may lie between 2 and 500 $\mu g.m^{-3}$, and are dominated by micron size particles. The annual means for 1999 at 5 sites in the city of Lyon ranged from 23 to 44 $\mu g.m^{-3}$ (Coparly 2000). Pollution levels increase with population density; mean PM_{10} concentrations were 35 $\mu g.m^{-3}$ near Zurich, 80 $\mu g.m^{-3}$ near Paris and 110.$\mu g\ m^{-3}$ near Tokyo (Zhiquiang et al 2000). In Mexico City which is badly polluted, the mean spatial averages across three sites in the period 2000-2002 were 35.$\mu g\ m^{-3}$ for $PM_{2.5}$ and 76 $\mu g.m^{-3}$ for PM_{10} (Chow et al 2004). However, some 24 hr mean values of PM_{10} rose to as high as 184 and 267 $\mu g.m^{-3}$ in the winter of 1997.

The history of a packet of air passing over the Los Angeles basin was traced by Hughes et al (1999, 2000). The size distributions and compositions of particles sampled at two sites, Long Beach and Riverside, as measured by OPC are shown in Figures 2a and 2b. Very few particles with a diameter greater than the cut-off size of 2.6 μm appear to be present. The clean air at Long Beach had come off the ocean and after travelling inland across the city was sampled again at Riverside. The number count was converted to a mass basis using a mean particle density of 1300 $kg.m^{-3}$. The size distributions show an increase in the larger sizes at Riverside, and also a higher mass concentration. The concentrations of some species increase significantly, namely organic compounds, nitrate and ammonia, due mainly to the accumulation of additional material from industry and motor traffic. Although the mass of the sample had increased, the number of particles did not show a similar increase, as much of the additional mass was adsorbed onto existing particles.

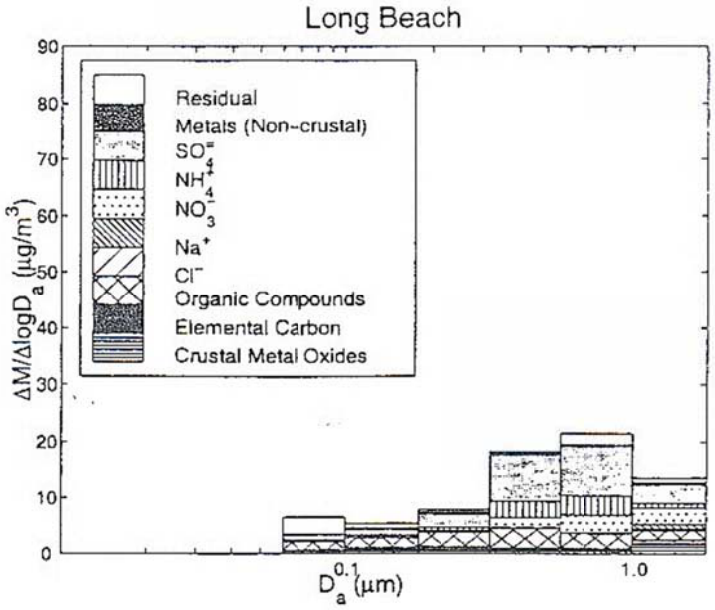


Figure 2a Particle size distribution and composition at Long Beach

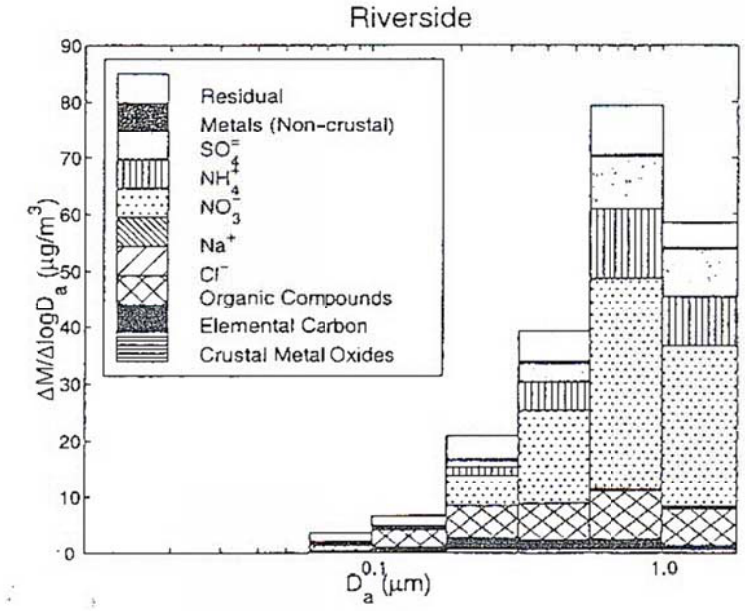


Figure 2b Particle size distribution and composition at Riverside

The metal content of these samples is divided into crustal elements (Si, Al, Fe) from dust, and non-crustal. In both cases the concentration is small. However metals are present in all samples, and have been identified in airborne particulates sampled in the arctic circle, well removed from human activity. A plot of the distribution of six common metals of environmentall interest is shown as Figure 3 (Lűdke et al), which illustrates the extraordinary extent of dispersion through the atmosphere of these small particles.

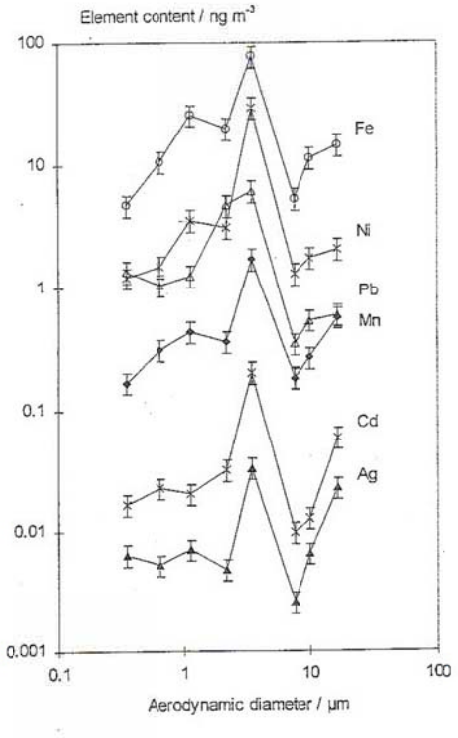


Figure 3 Concentration distribution of metals with particle size in arctic air aerosol (Lüdke et al 1999)

In the USA, the original standard for the concentration of particulate matter in ambient air was for Total Suspended Particulates (TSP). This was replaced in 1987 by a PM_{10} standard for particles with an aerodynamic diameter less than 10 µm. Later concerns focussed around the effects of even smaller particles, so that a $PM_{2.5}$ standard was added in 1997 (USEPA 1998). The current PM_{10} standard is 50 $\mu g.m^{-3}$ for an annual arithmetic mean and 150 $\mu g.m^{-3}$ for a 24 hour mean. The value for $PM_{2.5}$ is 15 $\mu g.m^{-3}$ (as an arithmetic mean), with a 24 hour average of 65 $\mu g.m^{-3}$ (Gertlerl 2005). There tends to be a good correlation between particle number and mass in the atmosphere, and $PM_{2.5}$ tends to be a relatively fixed proportion of PM_{10} mass (Harrison et al 2000b, 1999).

Sources

Analytical techniques have been developed to identify the original source of airborne particulates by sophisticated spectrometric techniques e.g. Cass et al 1998, Kleeman et al 1999.

Transport Vehicles

The origin of 'ultra-fine' i.e. <100 nm airborne particulates in the UK is depicted in Figure 4, where it can be seen that the majority are generated by road transport vehicles (Harrison et al 2000). Both petrol and diesel engines emit fine particles in high concentrations; untreated diesel exhaust from a modern engine contains ~ 10^7 particles cm^{-3} and a spark ignition engine ~ 5 x 10^5 particles cm^{-3}

(Kittelson). The emission rates for light duty i.e. petrol vehicles is in the range 5 to 10 mg of $PM_{2.5}$ per km, while the figure for heavy duty vehicles (trucks) is in the range of 70 to 135 $mg.km^{-1}$ (Gertler). In terms of particulate numbers in the range from 10 to 700 nm, a survey by Morawska et al (2005) shows good agreement between a number of researchers and techniques. Petrol-fuelled cars emit 1.5-2 x 10^{13} particles per km and large diesel vehicles 2-4 x 10^{14} per km. The percentage contribution of vehicular traffic to air quality therefore depends on the nature and use of the motor fleet. The distribution of particle sizes at the exhaust pipe of a diesel engine and later after experiencing accumulation is shown in Figure 1 (Kittelson).

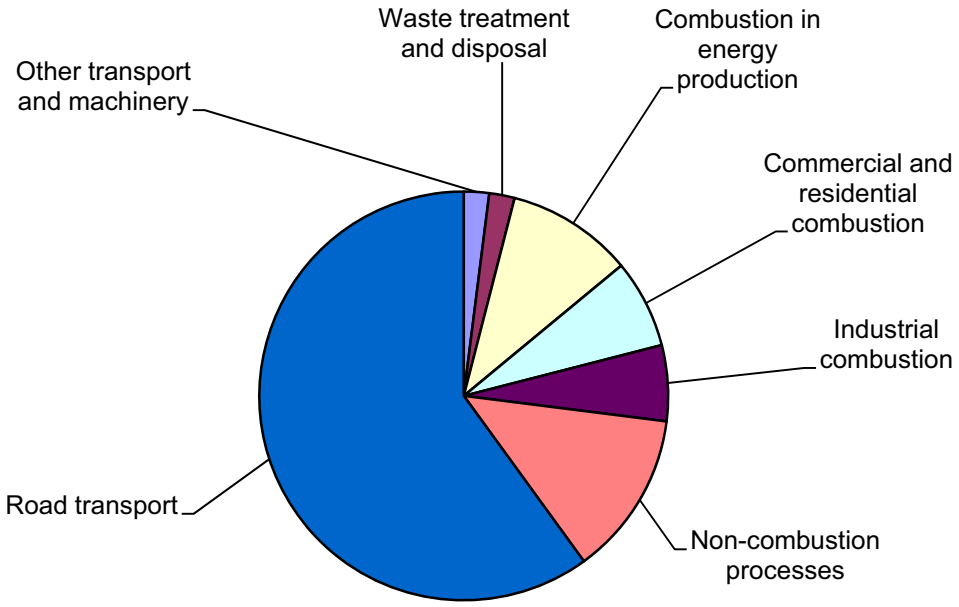


Figure 4 Ultrafine particle sources, UK 1996 (after Harrison et al 2000b)

Harrison et al (1999) and Shi et al (1999) report the size distributions of particulates sampled from a site near a busy road in Birmingham, UK. The average number concentration at the roadside over a four day period was between 1.6 and 1.9 $\times$ 10^5 cm^{-3}. The background values were more consistent than the roadside ones, which could change very quickly. The background samples on a number basis showed an apparently log-normal distribution with a single mode around 30 nm. The roadside distribution also showed the 30 nm peak, together with a second one below 10 nm, the smallest size measured.

Diesel emissions contain a high fraction of elemental carbon (soot), which is a good adsorbent of organic compounds. These particles contain a range of toxic materials including metals and

organic compounds or SOF (soluble organic fraction). SOF consists of polyaromatic hydrocarbons (PAH) adsorbed onto the surface of the particulate, and comprises about 5% of the total mass at full engine load, but as much as 60% at idle. These compounds are known carcinogens, and some are present in the concentrations listed in Table 1 below. Their presence in both the gas phase and on the solid particulates is recorded. The smaller molecules tend to remain in the gas phase, while the larger ones, which are more carcinogenic, are preferentially adsorbed onto the particulates. It has been shown that there is more toxic organic free-radical activity in the smaller particles (Kittelson). The concentrations of PAH and NPAH compounds in ambient air range from 20 $ng.m^{-3}$ in a residential area to about 100 $ng.m^{-3}$ in the vicinity of heavy traffic. The high concentrations in the tunnel at Birmingham compared to the general urban level demonstrates the effects of local dispersion.

Table 1. Mean concentrations of PAH in urban air ($ng.m^{-3}$)

Compound	Phase	Zurich			Birmingham		Damascus	Milan*	Rome*
		road	road	resd'l	tunnel	urban			
1-nitronaphthalene	V				1.59	0.09	0.21		
2-nitronaphthalene	V				1.25	0.07	0.16		
9-nitroanthracene	V				0.16	0.06	0.17		
	P				0.36	0.13	0.25		
1-nitropyrene	P				0.56	0.09	0.20		
benz(*a*)anthracene	P							2.5	0.35
benz(*j*)fluoranthene	P							5.5	2.0
indeno(*1,2,3-cd*)-pyrene	P							4.0	1.7
Total PAH	P	92	46	19				60	37

* Cecinato et al V = vapour, P = particulate; resd'l = residential

Calcium and zinc were the most common metals present in diesel particulates, at around 0.05 % concentration (Lowenthal et al).

Stationary Combustion Sources

Coal-fired power stations

Large coal-fired power stations utilise pulverised fuel firing, in which the feed is ground into a fine powder below 100 μm in size. As the carbonaceous matter burns away, the included mineral matter forms small, spherical particles generally below 10 μm in size. The conversion processes are depicted in a simplified fashion in Figure 5 (Haynes et al). In Australia the emission limits are

commonly set at around 20 - 50 mg.Nm^{-3} so that a significant amount of ash material is released into the atmosphere. However most of it is of a larger particle size which means that it readily settles to the ground.

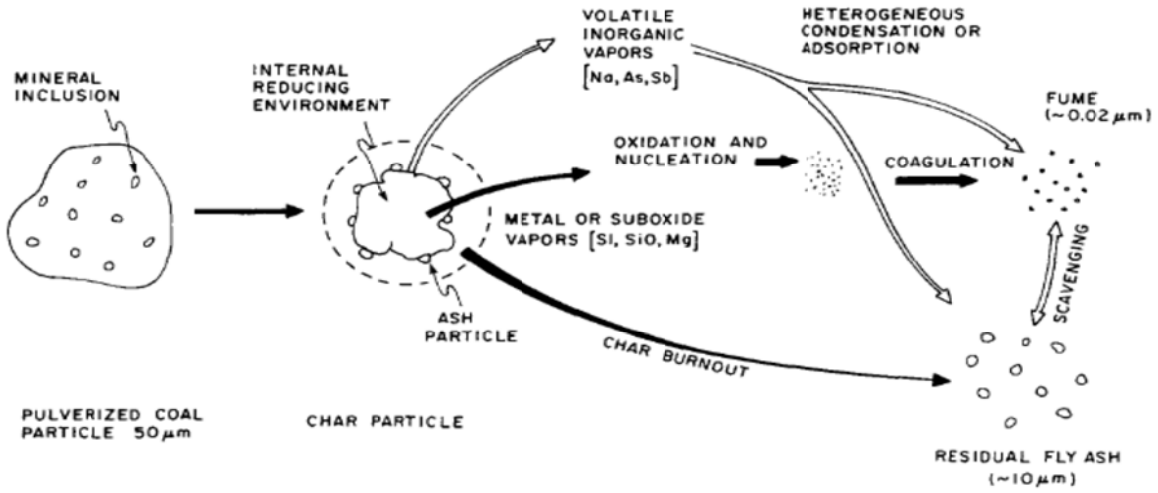


Figure 5 Ash release from a burning coal particle

Coal contains trace metals which during firing migrate into the flyash particles. Some more volatile metals are vapourised in the flame and condense as fume as the gases cool. The distributions of four metals, copper, zinc, cadmium and lead, across the size range of flyash particles from a full-scale coal-fired power station are depicted in Figure 6 (Senior et al).

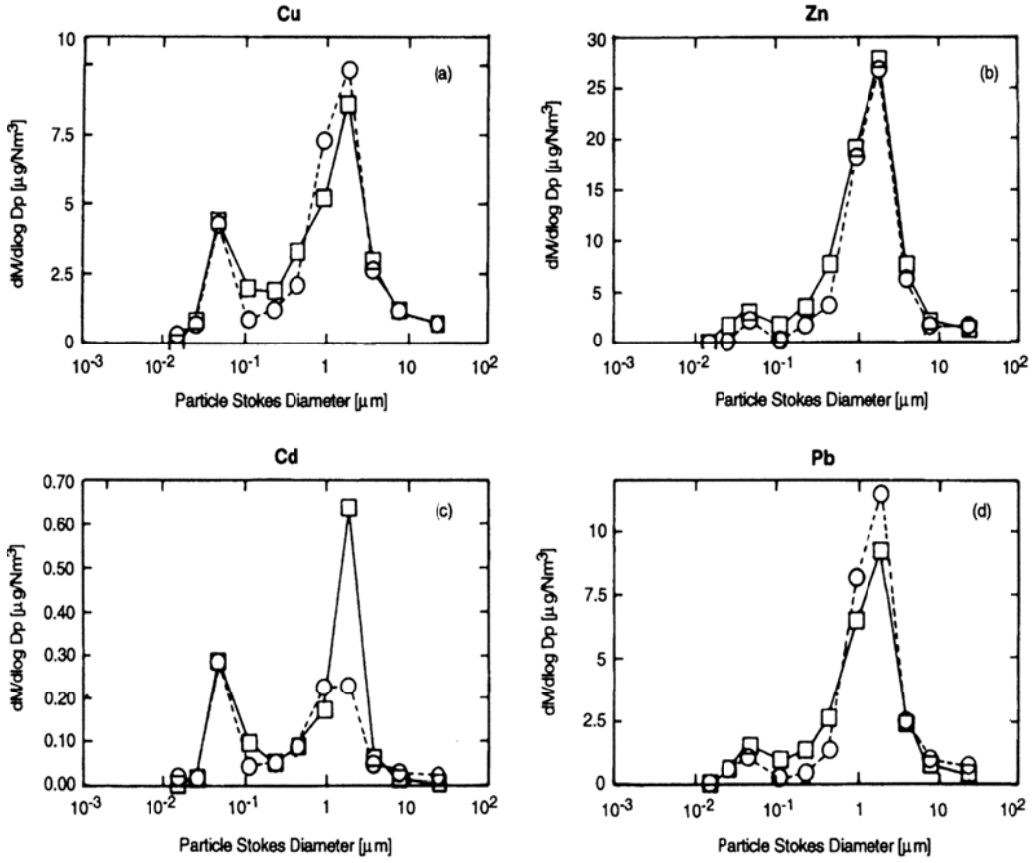


Figure 6 Metal distribution in the flyash generated by pulverised coal firing

It can be seen that there are peaks around 2 μm and 50 nm. The former would be removed almost completely in the gas cleaning system, while some of the latter would escape into the atmosphere and persist for some time. A summary by Pavagau et al of metal emissions in both the vapour/fume and solid phases from one coal-fired station is given in Table 2, with mean values reported here.

Table 2 Metal concentrations in the vapour and solid phases from coal firing (μg Nm^{-3})

Metal	Cd	Hg	Tl	As	Se	Te	Sb	Cr	Co	Cu	Sn	Mn	Ni	Pb	V	Zn
Vapour	14	18	<1	3	7	21	62	265	10	58	37	20	37	340	4	1500
Solid	<1	<0.06	<1	62	<0.5	<1	5	27	10	44	3	120	29	45	96	530

Waste-to-Energy Plants

The amount of emissions depends on the fuel and the combustion aerodynamics, but primarily on the gas cleaning technology. Fabric filters capture 99.99% of particles released, but they are least efficient (~95%) in the 400 to 1000 nm range. Most fine particles consist of salts (Zeuthen et al). MSW stack emissions have been measured at 6.9 x 10^4 cm^{-3} (Zeuthen) and 10 – 20 x 10^4 cm^{-3} (Buananno et al). The mass loadings for tests on two MSW stack emissions were 100 $\mu g.m^{-3}$ (Buananno) and 300 $\mu g.m^{-3}$ (Lind et al). Thus the particulate concentrations emerging from these stacks would be indistinguishable from ambient air sampled at a central city site, and only 5 to 20 times higher than in the relatively clean air of a coastal suburb (see above). In a very short time after discharge they would have been diluted to ambient levels.

Jay and Stieglitz (1995) sampled the stack of a WtE plant in 1994 and found hundreds of organic compounds in very low concentrations, with sums of 189 $\mu g.Nm^{-3}$ for aliphatics and 291 $\mu g.Nm^{-3}$ for aromatics. The plant studied was of a previous design generation, and the emissions from a modern plant would be much lower than this. The concentration of heavy metals in MSW particulates has been extensively measured. The mean emissions from four Italian plants are given by Consonni et al as PM_{10} = 10 g per tonne of MSW, and the metals cadmium 55 $ng.t^{-1}$ and lead 520 $ng.t^{-1}$.

Buananno gives an interesting comparison between emissions from a modern WtE plant and a 3 kilometre stretch of highway. It requires only 20 vehicles (7% trucks) to traverse the section in order to produce the same particulate emissions as the plant operation for one hour.

Other Sources

In a study of aerosols in the USA, Sarofim (2001) totalled the relative emissions from a range of sources and concluded that "wood stoves therefore emit twice as much particulate matter as coal-fired power plants. There is a trend of the small, less regulated sources, becoming the dominant contributors to the particulate emissions. Wood stoves, leaf burning, off-road vehicles, snowmobiles, burning trash in barrels contribute to total particulate emissions a far greater fraction than is represented by the fraction of energy release because their emissions are uncontrolled". In Australia the equivalent to snowmobiles would be outboard motors and jet skis. It is of interest that the Australian EPA attributes measured peaks in dioxin concentrations in city atmospheres during winter to uncontrolled burning i.e. domestic fires burning poor quality fuels (EPA 2004).

The fine particles ($PM_{2.5}$) emitted during the fireplace combustion of woods grown in the USA were studied by Fine et al (2001, 2002). The mass emissions averaged 4 g per kg of wood burned, and over 80% of this mass consisted of organic carbon. Particulate emissions at these levels are about 1000 times higher than from MSW combustion on an equivalent energy release basis. The particle size distributions showed little variation in timber from tree to tree, with the peak in number distribution occurring between 100 and 200 nm. Detailed analyses of the compounds present in the smoke from woods sampled from both the north-eastern and southern parts of the USA are presented.

Evaluation of the likely impact of a WtE plant on air quality

Two considerations are relevant:

1. Most of the mass of aerosols is not due to the primary source, but has accumulated during transport in the atmosphere. As a result their toxicity will primarily be the result of accreted material.
2. The emissions of particulate matter from a modern WtE plant are inherently low and are insignificant against the background of particulates in an urban airshed. Using the figures of Morawska et al, the average emissions from the motor vehicle fleet with 7% heavy duty units is 7.5×10^{13} particles per km. At an average yearly distance travelled of 15,000 km, this gives 1.1×10^{18} particles emitted per annum per vehicle. A 100,000 tpa WtE plant would emit about 7×10^{19} particles per year if the figures of Buananno et al are used. The plant would therefore contribute the same nanoparticle emissions as about 65 vehicles. If the figure of Zeuthen et al is used, the number falls to 30. In absolute terms, the Perth airshed is estimated to absorb about 1.3×10^{24} particles per annum from > 1,000,000 motor vehicles, so that a plant would contribute on a percentage basis either $7 \times 10^{19} \times 100/1.3 \times 10^{24}$, i.e. 0.0054%, or half that amount, if the figure of Zeuthen et al is used.

References

Buonanno G., Ficco G., Stabile L. 2009 Size distribution and number concentrations of particles at the stack of a municipal waste incinerator Waste Management 29 749-755

Cass G.R. 1998. Organic molecular tracers for particulate air pollution sources. *Trends in Analytical Chemistry* **17**, 356-366

Cass G.R., Hughes L.A., Bhave P., Kleeman M.J., Allen J.O. and Salmon L.G. 2000. The chemical composition of atmospheric ultrafine particles. *Philosophical Transactions of the Royal Society, London A* **358**, 2581-2592

Cecinato A., Ciccioli P., Brancaleoni E. and Zagari M. 1998. PAH and NPAH in the urban atmosphere of Rome and Milan. *Annali di Chimica* **88**, 369-380

Chow J.C., Watson J.G., Edgerton S.A. and Vega E. 2002. Chemical composition of $PM_{2.5}$ and PM_{10} in Mexico City during winter 1997. *Science of the Total Environment* **287**, 177-201

Consonni S., Giugliano M., Grosso M. Alternative strategies for energy recovery from municipal solid waste Part B: Emission and cost estimates *Waste management* **25** 137-148

Coparly 2000. *Bilan de la Qualité de l'air 1999* Comité pour la Contrôle de Pollution Atmosphérique dan la Rhône et la Région Lyonnaise

EPA 2004 Dioxins in Australia: a summary of the findings of studies conducted from 2001 to 2004 *Nationa Dioxins program, Department of Environment and Heritage* ISBN 0 642 55014 X

Fauser P., Tjell J.C., Mosbaek H. and Pilegaard K. 2002. Tire-tread and bitumen particle concentrations in aerosol and soil samples. *Petroleum Science and Technology* **20**, 127-141

Fine P.M., Cass G.R. and Simoneit B.R.T. 2001. Chemical characterisation of fine particle emissions from the fireplace combustion of woods grown in the northeastern United States. *Environmental Science and Technology* **35**, 2665-2675

Fine P.M., Cass G.R. and Simoneit B.R.T. 2002. Chemical characterisation of fine particle emissions from the fireplace combustion of woods grown in the southern United States. *Environmental Science and Technology* **36**, 1442-1451

Gertler A.W. 2005 Diesel vs. Gasoline emissions: Does PM from diesel or gasoline vehicles dominate in the US? *Atmos. Environment* **39** 2349-2355

Harrison R.M., Grenfell J.L., Savage N., Allen A., Clemitshaw K.C., Penkett S., Hewitt C.N. and Davison B. 2000a. Observations of new particle production in the atmosphere of a moderately polluted site in eastern England. *Journal of Geophysical Research* **105**, 17,819-17,832

Harrison R.M., Shi J.P., Xi S., Khan A., Mark D., Kinnersley R. and Yin J. 2000b. Measurement of number, mass and size distribution of particles in the atmosphere. *Philosophical Transactions Royal Society London* **358**, 2567-2580

Harrison R.M. and Yin J. 2000c. Particulate matter in the atmosphere: which particle properties are important for its effect on health? *The Science of the Total Environment* **249**, 85-101

Harrison R.M., Jones M. and Collins G. 1999. Measurements of the physical properties of particles in the urban atmosphere. *Atmospheric Environment* **33**, 309-321

Haynes B.S., Neville M., Quann R.J., Sarofim A.F. 1982 Factors governing thr surface enrichment

of flyash in volatile trace species *J. Colloid Interfacial Science* **87** 266-278

Hughes L.S., Allen J.O., Bhave P., Kleeman M.J., Cass G.R., Liu D-Y., Fergenson D.P. Morrical B.D. and Prather K.A. 2000. Evolution of atmospheric particles along trajectories crossing the Los Angeles basin. *Environmental Science and Technology* **34**, 3058-3068

Hughes L.S., Allen J.O., Kleeman M.J., Johnson R.J., Cass G.R., Gross D.S., Gard E.E., Gälli M.E., Morrical B.D., Fergenson D.P., Dienes T., Noble C.A., Liu D-Y., Silva P.J. and Prather K.A. 1999. Size and composition distribution of atmospheric particles in southern California. *Environmental Science and Technology* **33**, 3506-3515

Hughes L.S., Cass G.R., Gone J., Ames M.. and Olmez I. 1998. Physical and chemical chracterisation of atmospheric ultrafine particles in the Los Angeles area. *Environmental Science and Technology* **32**, 1153-1161

Jay K., Stieglitz L. 1995 Identification and quantification of volatile organic components in emissions of waste incineration plants *Chemosphere* **30** 1249-1260

Kittelson D.B. 1998 Engines and nanoparticles: a review *J. Aerosol Sci.* **29** 575-588

Kleeman M.J., Schauer J.J. and Cass G.R. 1999. Size and composition distribution of fine particulate matter emitted from wood burning, meat charbroiling and cigarettes. *Environmental Science and Technology* **33**, 3516-3523

Kleeman M.J., Schauer J.J. and Cass G.R. 2000. Size and composition distribution of fine particulate matter emitted from motor vehicles. *Environmental Science and Technology* **34**, 1132-1142

Lind T., Hokkinen J., Jokiniemi J.K. 2007 Fine particle and trace element emissions from waste combustion – Comparison of fluidized bed and grate firing *Fuel Proc. Tech.* **88** 737-746

Lowenthal D.H., Zielinska B., Chow J.C., Watson J.G., Gautam M., Ferguson D.H., Neuroth G.R. and Stevens K.D. 1994. Characterisation of heavy-duty diesel vehicle emissions. *Atmospheric Environment* **28**, 731-743

Lüdke C., Hoffman E., Skole J. and Kriews M. 1999. Determination of trace metals in size fractionated particles from arctic air by electrothermal vaporization inductively coupled plasma mass spectrometry. *Journal of Analytical Atmospheric Spectrometry* **14**, 1685-1690

Morawska L., Jamriska M., Thomas S., Ferreira L., Mengerson K., Wraith D., McGregor F. 2005 Quantification of particle number emission factors for motor vehicles from on-road measuremenrts Env. Sci. Technol. 23 9130-9139

Pavagau M-P., Pécheyran C., Krupp E.M., Morin A., Donard O.F.X. 2002 Volatile metal species in coal combustion flue gas *Env. Sci. Technol.* **36** 1561-1573

Sarofim A.F. 2001 Combustion generated aerosols: Mechanisms of formation, characterisation and health effects *Conf Combustion Technol for a Clean Environment Porto July* 2001

Senior C.L., Helble J.J., Sarofim A.F. 2000 Emissions of mercury, trace elements, and fine particles from stationary combustion sources *Fuel Proc. Technol.* **65-66** 263-268

Shi J.P., Khan A.A. and Harrison R.M. 1999. Measurements of ultrafine particle concentration and size distribution in the urban atmosphere. *The Science of the Total Environment* **235**, 51-64

Sondreal E.A., Benson S.A. and Pavlish J.H. 2000. Status of research on air quality: mercury, trace elements and particulate matter. *Fuel Processing Technology* **65-66**, 5-19

Wilson N.K., McCurdy T.R. and Chuang J.C. 1995. Concentrations and phase distributions of nitrated and oxygenated polycyclic aromatic hydrocarbons in ambient air. *Atmospheric Environment* **19**, 2575-2584

Zeuthen J.H. Pedersen A.J., Hansen J., Frandsen F.J., Livbjerg H., Riber C., Astrup T. 2007 Combustion aerosols from municipal waste incineration – Effect of fuel feedstock and plant operation *Combust. Sci. Tech* **179** 2171-2198

Zhiqiang Q., Siegmann K., Keller A., Matter U., Scherrer L. and Siegmann H.C. 2000. Nanoparticle air pollution in major cities and its origin. *Atmospheric Environment* **34**, 443-451

10 CONFIDENTIAL MATTERS FOR WHICH THE MEETING MAY BE CLOSED TO THE PUBLIC

Nil

11 GENERAL BUSINESS

Nil

12 FUTURE MEETINGS OF THE RESOURCE RECOVERY COMMITTEE

The next meeting of the Resource Recovery Committee will be held on ***Thursday, 5 May 2011 (if required)*** at the EMRC Administration Office, 1st Floor, Ascot Place, 226 Great Eastern Highway, Belmont WA 6104 commencing at 5.00pm.

Future Meetings 2011

Thursday	5	May (if required)	at	EMRC Administration Office
Thursday	9	June	at	EMRC Administration Office
Thursday	7	July (if required)	at	EMRC Administration Office
Thursday	4	August	at	EMRC Administration Office
Thursday	8	September (if required)	at	EMRC Administration Office
Thursday	6	October	at	EMRC Administration Office
Thursday	17	November (if required)	at	EMRC Administration Office

13 DECLARATION OF CLOSURE OF MEETING

There being no further business, the Chairman closed the meeting at 6.17pm.