



Biomass Taskforce

Issue 3 of 1998

Biomass Taskforce Membership¹ Expanded

Delta Electricity, Macquarie Generation and Pacific Power, NSW's major electricity generators have joined the Biomass Taskforce since the last issue of the Biomass Taskforce Newsletter. Waste Service NSW and Energy Developments (EDL) have also recently joined the Taskforce. The Department of Primary Industries and Energy (DPIE), Energy Division have taken over ERDC's membership on the Taskforce.

IEA Bioenergy – Australian Participation Gets Closer

The Biomass Taskforce has continued its efforts to enable Australia to participate in the International Energy Agency's Bioenergy program. This international collaborative information exchange program operates on a three year cycle, with the current Tasks for 1998-2000 having commenced. There are ten Tasks in all, with member countries able to choose their participation level. The current Tasks are:

- Short Rotation Crops for Bioenergy (including short rotation forestry)
- Conventional Forestry Systems for Bioenergy
- Biomass Combustion (including co-firing)
- Thermal Gasification of Biomass
- Pyrolysis of Biomass
- Techno-Economic Assessments for Bioenergy Applications
- Energy from Thermal Conversion of MSW and RDF
- Energy from Biological Conversion of Organic Waste
- Greenhouse Gas Balances of Bioenergy Systems
- Biotechnology for the Conversion of Lignocellulosics to Ethanol

The Biomass Taskforce has agreed to pay the fixed national contribution to the Executive Committee to facilitate the formation of participating consortia.

The Biomass Taskforce is moving to form a group(s) to participate in at least one Task of IEA Bioenergy. A Preliminary Application to the Joint Venture Agroforestry Program for funding the Short Rotation Crops for Bioenergy Task was submitted by the Biomass Taskforce and has now moved to the Final Application stage. This application is has support from organisations from four states.

Two well attended meetings were convened to gauge support for participation in other Tasks. On 28 July a meeting was hosted by the Association of Liquidpaperboard Carton Manufacturers, to consider participation in Tasks 23 and 24, Energy from Thermal Conversion of MSW and RDF and Energy from Biological Conversion of Organic Waste.

¹ Founding members: ERDC, RIRDC, Environment Australia (now Australian Greenhouse Office), GRDC, BRS. Membership now also includes CSIRO Div of Energy Technology, FPA of NSW, Pacific Power, Delta Electricity, Macquarie Generation, Waste Service NSW and EDL.

This meeting was targeted at the waste management industry. This meeting was followed by one hosted by the CSIRO Division of Energy Technology, with assistance from the Electricity Supply Association of Australia Ltd targeted at the energy industry. A proposal is now being developed to gain support for participating in a number of Tasks of IEA Bioenergy.

Should you wish to obtain information on this program and the Biomass Taskforce's effort to form participating consortia, please contact Steve Schuck on tel/fax: 02-9416-9246, or email Steve.Schuck@bigpond.com. The IEA Bioenergy has its home page at URL:

<http://www.fri.cri.nz/ieabioenergy/home.htm>

Biomass Taskforce Submission to Greenhouse Office

In May the Australian Greenhouse Office conducted a series of public forums regarding the mandatory targets for the uptake of renewable energy in power supplies, as announced by the Prime Minister in his November 1997 Statement "Safeguarding the Future: Australia's Response to Climate Change". As part of this public consultation process, written submissions were invited on meeting the target of an additional two percent of power from renewable energy sources and specified wastes by 2010, and energy efficiency standards in power stations. The Biomass Taskforce manager provided a submission in which the merits and characteristics of biomass, such as the inherent energy storage of biomass were noted. Attention was in particular drawn to a near term, cost effective way of introducing renewable biomass energy; that of co-firing with coal. The merits of utilising existing power plant and operating a high thermal efficiency, with capital cost savings was noted. Besides carbon dioxide reduction, oxides of nitrogen and sulfur dioxide emissions would also improve. Examples of biomass co-fired plants in the USA were given with co-firing rates and greenhouse gas savings. The submission indicated the possible transition to smaller distributed power generating units operating on a variety of energy sources and feedstocks. The multiplicity of benefits from bioenergy were highlighted, particularly in relation to agroforestry and to landcare. The full text of the submission can be found at web address <http://www.environment.gov.au/net/consulten.html> or the Biomass Taskforce Manager, Steve Schuck would be pleased to provide a copy.

Renewable Energy Industry Program Grants for Biomass Energy

Biomass Energy Services and Technology Pty Ltd has been awarded a grant of \$200,000 to utilise noxious weed harvested from land and water as a fuel and energy source using briquetting technology. The success of this project could also lead to cost-effective control of weeds such as mimosa pigra, which is threatening large areas of the Northern Territory with serious effects on the environment and tourism industry. Contact: Dr Stephen Joseph, Tel: 02 4340 4911.

Rocky Point Sugar Mill in southeastern Queensland has received \$350,000 to demonstrate the feasibility of using existing cogeneration plant at the sugar mill for electricity generation outside the cane crushing season using a variety of locally sourced biomass as a fuel source. Contact: David Heck, Tel: 07 5546 2422.

A Consortium of the Sugar Research Institute at Mackay, the Mackay Sugar Cooperative Association Ltd (Farleigh Mill) and Rolls Royce Industrial Power (Pacific) Ltd was granted \$200,000 towards the commercial demonstration of swirl burner combustion technology at Farleigh Mill. This technology has the potential to significantly increase the efficiency of electricity generation from sugar mill steam boilers using feedstock such as bagasse. Contact: Graeme Bullock, Tel: 07 4952 7600 (source Australian Greenhouse Office).

Renewable Energy Equity Fund (REEF) to be Established

The Federal Government has announced that it will provide almost \$20 million for REEF, to provide venture capital for small innovative renewable energy companies commercialising technologies and services. A fund manager will arrange for matching funds to be provided on a 2:1 basis. The funds manager will then allocate these total funds to various renewable energy investments in accordance with guidelines approved by the Industry Research and Development Board. The fund is to be administered by the IR&D Board through its Fund Management Committee, with specialist advice and support from the Australian Greenhouse Office and the Department of Industry, Science and Tourism. The Government will not be directly involved in making the investment decisions. The fund manager, other private investors in the fund and the Government will share in any profits from the fund. For further information contact 02 6213 7444.

Biomass Taskforce Releases its Strategic Plan

The Biomass Taskforce has released its Strategic Plan for 1998 – 2000. The Biomass Taskforce's Vision is "*By 2010 achieve recognition and wide adoption of biomass as a sustainable resource for producing energy, chemicals and other value added products*", while its Mission is "*The Biomass Taskforce will play a key role in attaining this vision by promoting biomass as an energy source, facilitating joint venture projects and acting as the focus and forum in Australia for biomass development*". The Plan considers Key Issues and Drivers, and sets Objectives to:

1. Promote the economic and environmental attributes of sustainable energy and chemicals from biomass.

Activities – Consultation, Publicity and Networking

2. Broaden the market for biomass by enhancing opportunities, and by helping to reduce financial, regulatory, fuel supply, technical and institutional barriers, to enable widespread adoption of biomass energy.

Activities – Structural and Market Development

3. Facilitate the development and deployment of biomass energy business opportunities and projects.

Activity – Foster Project Development

4. Broaden the support base for the Biomass Taskforce to ensure its continued role in promoting biomass energy in Australia.

Activity – Build the Task Force.

A number of Strategies and Performance Indicators have been developed for each of the above Objectives.

If you would like to receive a copy of the Strategic Plan or require further information, please contact Stephen Schuck, the Biomass Taskforce Manager, Tel: 02-9416-9246, Email: Steve.Schuck@bigpond.com. The Strategic Plan will be installed on the Biomass Taskforce's Web page (<http://www.users.bigpond.com/Steve.Schuck/ABT>) in the near future.

GREENTIE

GREENTIE is an international information network dedicated to collecting and distributing details of suppliers whose technologies help reduce greenhouse gas emissions. Australia is one of eleven countries sponsoring GREENTIE. GREENTIE operates through Liaison Offices in 39 countries and puts project proponents in touch with suppliers of clean energy technologies. GREENTIE maintains a database at <http://www.greentie.org> with approximately 4,000 suppliers worldwide. Of these organisations listed, there are 647 for biomass-fired generation, 533 for pelletised biomass combustion, 487 for biogas by anaerobic digestion, 464 for Municipal solid waste mass burn, and 333 for landfill gas/utilisation. Australian organisations that have expertise in the field of greenhouse gas mitigation technologies (e.g. biomass) and offer this expertise internationally can be included in this directory. For information visit the web site or email: greentie@greentie.org.

Biomass on the Internet

The Internet provides a valuable source of information on biomass and allied topics. Below are some Internet addresses to supplement the addresses given in the first four issues of the Biomass Taskforce newsletters. These lists are all being consolidated on the Biomass Taskforce's web page.

Biomass Taskforce

<http://www.users.bigpond.com/Steve.Schuck/ABT>

Australian Greenhouse Office

<http://www.greenhouse.gov.au/>

University of Adelaide (Paul Harris' beginners guide to biogas)

<http://www.roseworthy.adelaide.edu.au/~pharris/biogas/beginners.html>

Anaerobic Digestion sites

<http://www.gtz.de/anaerob/>

<http://www.environment.gov.au/portfolio/epg/environet/rsd/hybractor.html>

<http://www.crest.org/renewables/digestion-list-archive>

<http://www.softplus.net/industrie/biogas/dateien.htm>

<http://www.newbio.com>

Methane Capture and Use Workbook

<http://www.environment.gov.au/portfolio/esd/climate/methane/mwbbintro.html>

University of Florida Digester Design

<http://www.ce.ufl.edu/activities/waste/wddndx.html>

Farm Digesters in Northern Ireland

<http://dSPACE.dial.pipex.com/town/terrace/ae198/digestors.html>

AgSTAR home page (US EPA farm based digesters)

<http://134.67.55.16:7777/dc/methane/home.nsf/pages/agstar>

Stack Emission Plume Dispersion

<http://www.air-dispersion.com>

British BioGen, Trade Association of UK Bioenergy Industry

<http://www.britishbiogen.co.uk>

Bioenergy '98 Conference homepage

<http://www.cglg.org/projects/biomass/bioenergy98>

Danish Centre for Biomass Technology

<http://www.sh.dk/~cbt>

American Bioenergy Association (ABA)

<http://www.biomass.org/>

Carbon Sequestration (US DOE)

http://www.fe.doe.gov/techline/tl_novelseq.htm
Brightstar Synfuels Gasifier
<http://www.forestindustry.com/brightstar>
Alkali Deposit Studies (summary)
<http://www.teleport.com/~tmiles/alkali.htm>
Centre for Forest Tree Technology (business unit of Forest Service of Vic Dept of Natural Resources and Environment)
<http://cfft.vic.gov.au/>
NASA TechTracs (includes biomass gasification)
<http://ntas.techtracs.org/>
Winrock International – activities in sugar cane energy
<http://www.winrock.org/reep/canemain.htm>
Combustion, Gasification & Propulsion Laboratory (CGPL), Indian Inst of Science
<http://144.16.73.100/~mukunda/home.html>
Environmental News Network article on poplars
<http://www.enn.com/news/enn-stories/1998/06/061198/poplars.asp>
Ethanol article from the Washington Post
<http://washingtonpost.com:80/wp-srv/WPlate/1998-06/11/113I-061198-idx.html>
Sourceguides
<http://www.sourceguides.com/energy/index.html>
Oak Ridge National Laboratory site
<http://www.esd.ornl.gov/bfdp/>
Biomass Energy Foundation database of gasifier suppliers
<http://www.webspan.com/BEF/>
Small scale steam engines (500W- 25 kW)
<http://geocities.com/researchtriangle/6362>
Alternative uses for straw
<http://agripulp.com>
Power Energy Fuels
<http://www.powerenergy.com>
American Farm Bureau Federation biodiesel site
<http://www.biodiesel.org/overview.html>
Elsevier Publishers- Biomass and Bioenergy
<http://www.elsevier.nl/locate/biombioe>
Bioenergy Glossary
<http://rredc.nrel.gov/biomass/states/bio-glossary/>
Biofuels Information
<http://www.ariadne-t.gr/phaethon/biomass/bresource.html>
International Business & Technologies Ltd
<http://www.infi.net/~msenski/>
New Uses Council
<http://ag.arizona.edu/OALS/NUC/NUCHome.html>
Global Warming
http://science.msfc.nasa.gov/newhome/essd/essd_strat_temp.htm
Database on biofuels
http://edv1.vt.tuwien.ac.at/AG_HOFBA/BIOBIB/all.htm
Greentia Directory
<http://www.greentia.org>
Patent Search site
<http://www.patents.ibm.com/>
American Bioenergy Association
<http://www.biomass.org/>
Waste wood for fuel
<http://www.techtp.com/projects/waste%20wood.htm>
GE/Plug Power Fuel Cell

<http://www.plugpower.com/>
What's New on EREN
<http://www.eren.doe.gov/new/whats-new.html>
Oil Presses (Skeppsta Maskin AB, Sweden)
<http://www.oilpress.com/skeppsta.html>
Renewables Fuels Association
<http://www.ethanolRFA.org>
European Biomass Association
<http://www.ecop.ucl.ac.be/aebiom/switzerland.html>
European Energy Crops InterNetwork
<http://btg.ct.utwente.nl/eeci/>

Life Cycle Assessment of a Biomass Gasification Combined-Cycle System

A very comprehensive Life Cycle Assessment (LCA) report (S Schuck was invited to review the draft) prepared by Maggie Mann and Pamela Spath of the USA's National Renewable Energy Laboratory (NREL) is now electronically available. The 22.5MB file is downloadable as a PDF file from:

http://www.eren.doe.gov/biopower/life_cycle.html.

The report considers the production of electricity from biomass in a combined cycle system based on the Battelle/FERCO gasifier, now undergoing testing in Vermont USA. The Life Cycle Analysis examines energy and material flows of all processes necessary to construct, operate and eventually decommission the power plant. The overall system consists of the production of biomass as a dedicated feedstock crop, its transportation to the power plant, and electricity generation. Upstream processes required for the operation of the system are analysed in detail. Particular attention is paid to the net system carbon dioxide emissions and energy production. The study adopts a cradle to grave approach required by the LCA methodology and provides a year-by-year assessment of resources required and all emissions from seven years before commissioning and then for the thirty year life of the plant. The study found the net energy production of the system to be highly positive, with 95 percent carbon closure, and one Joule of fossil energy (used mainly in biomass production, harvesting and transportation) results in the production of 16 Joule of electrical energy. NREL is now conducting similar studies for other biomass energy systems, including co-firing biomass with coal in utility boilers.

Utility Co-Firing Experience

A Florida utility is conducting test burns at co-firing rates of 2%, 4% and 6% using a closed-loop energy crop (eucalyptus) in a 365 MW pulverised coal unit. Pictures from this project are on the web at:

<http://www.serve.com/commonpurpose/newimages/tampa1.jpg>

<http://www.serve.com/commonpurpose/newimages/tampa2.jpg>

Inquiries about the project can be directed to Dr Rockwood (forestry) and Dr Alex Green (engineering) through the Common Purpose Who's Who in Renewable Energy Webpage

<http://www.serve.com/commonpurpose/contacts.html>

Olive Fuelled Power Plant

Endesa, Spain's electricity utility is reported to be about to build a \$18 million generating plant in Ciudad Real in southern Spain that will be fuelled by the mashed waste left overs from olive oil manufacture. (Source Sydney Morning Herald 17 July 1998).

Camp Lejeune Energy from Wood Project

A USA project has been undertaken to demonstrate small scale (1MW) biomass gasification for electricity for government installations, industrial sites, rural co-operatives, small municipalities and regions of developing countries. The plant consists of a moving bed bulk wood dryer, a downdraft, fixed bed gasifier using hogged wood residues, a gas cleaning and cooling system, and a spark ignition engine. Operation of the plant has resulted in the characterisation of major technical challenges and provided solutions. The process design, initial operating results, and future direction are provided on the web at:
<http://www.epa.gov/appcdwww/crb/apb/crppage/clew.htm>

ERDC Publications

With the closure of the Energy Research and Development Corporation, ERDC publications e.g. "Biomass in the Energy Cycle" may be purchased in future from:

Publication Sales
Energy Strategies Pty Ltd
PO Box 4170
Manuka ACT 2603

Tel: (02) 6260 6444
Fax: (02) 6260 6555
Email: publications@enerstrat.com.au

Publications will also soon be made available in electronic form from:

EIDN Pty Ltd
PO Box 1
Kensington NSW 2033
Email: crcwmpc@unsw.edu.au

Handbook of Biogas Utilisation

The US Southeastern Regional Biomass Energy Program, managed by the Tennessee Valley Authority of the US Department of Energy has a publication, "The Handbook of Biogas Utilization" which covers biogas sources and characteristics, biogas properties, conversion technologies, handling and storage, instrumentation and controls, health safety and environmental considerations, and system economics. Appendices include system suppliers, glossary of terms, and a listing of relevant organisations. The text without appendices is 180 pages and cost US\$30 for outside the USA (including surface mail). Orders can be placed by phone on 0011-1-205-386-2925, fax 0015-1-205-386 2499, or email pcbader@tva.gov. VISA and Mastercard payment with orders is accepted.

BioFacts

- Bioenergy rules of thumb

- Energy content of typical biomass 18 MJ/kg
 - Gasification of 1kg of biomass makes 3 m³ of gas
 - The energy of 1 kg of biomass can generate 5 kWh thermal or 1 kWh electric power (at 20 percent thermal efficiency).
- Biomass is often characterised by low bulk densities, providing a driver for densification by pelletising, briquetting and charcoaling. An indication of typical dry bulk densities is provided below:

hardwood sawdust and bark	227 kg/m ³	pine whole tree chips	181 kg/m ³
mixed pine-hardwood sawdust	219 kg/m ³	hardwood hogged trims	221 kg/m ³
clean hardwood pulp chips	210 kg/m ³	hardwood shavings	157 kg/m ³
hardwood whole tree chips	211 kg/m ³		

- What is the status of large scale biomass gasification? Foster Wheeler Energia Oy of Finland (formerly Ahlstrom Pyropower) supplied four commercial scale atmospheric circulating fluidised bed (CFB) gasifiers to the pulp and paper industries in Finland, Sweden and Portugal with capacities from 17 to 35 MW based on fuel input in the mid 1980s. These units are still operating today.

Forthcoming Events

Bioenergy '98, October 4-8 1998. Madison, Wisconsin, USA. Great Lakes Regional Biomass Program. Internet: <http://www.cglg.org/bioenergy98/>

World Renewable Energy Congress on "Renewable Energy Technologies and Policies for Sustainable Development", Murdoch University, Perth, 10-13 February 1999. Contact Jessica Ryan, Tel: 08 9360 2896, Fax: 08 9310 4997.

IBC Greenhouse Gas Industry Forum has organised a national summit "Rethinking Greenhouse Gas Reduction Strategies", to be held at Sydney's ANA Hotel 7th and 8th December, 1998. The event will bring corporate Australia up-to-date on the recent developments in Greenhouse gas reduction strategies as well as the latest news stemming from the recent Buenos Aires protocol. Topics covered will include emission trading, waste-to-energy, renewable energy, carbon sequestration, and new technologies in coal fired generators. Contact Helen Callas, IBC Conferences, Tel (02) 9290 1133, Email: helen_callas@ibcoz.com.au. The Biomass Taskforce Manager has been invited to present a paper at this forum.

36th Annual Conference of the Australian and New Zealand Solar Energy Society, 25-27 November, University of Canterbury, Christchurch, New Zealand. Email: solar98@cont.canterbury.ac.nz. Web: <http://eureka.arch.unsw.edu.au/faculty/arch/solarch/anzses/Confnce/Solar98/Solar98/html>

Fourth Biomass Conference of the Americas. Biomass: A Growth Opportunity In Green Energy and Value Added Products. August 29-September 2 1999. Oakland Marriott City Center, Oakland, California. Web <http://www.nrel.gov/bioam>.

2nd Olle Lindstrom Symposium on Renewable Energy, Bioenergy9-11 June 1999, Royal Institute of Technology, Stockholm, Sweden. Internet site: http://www.ket.kth.se/O_L_Symposium.html

Residues

- Powerhouse Magazine published a feature article entitled “Sunrise Industry has Blue Sky Potential” about the Australian biomass industry in its May/July issue. The article was based on an extensive interview with Dr Stephen Schuck, the Biomass Taskforce Manager. The Biomass Taskforce also facilitated another article in the same issue entitled “Enersludge Process- A Bioenergy Success”.
- The Netherlands Energy Research Foundation (ECN) maintains a database containing most (bio)chemical and physical properties of many different biomass and waste streams. The database contains over 1100 records. ECN may be able to help biomass energy planners with information from the database. Contact Bram van der Drift on email vanderdrift@ecn.nl or try biomass@ecn.nl.
- The Institute for Chemical Engineering, Fuel and Environmental Technology, University of Technology Vienna also maintain a database (called BIOBIB) which contains calorific values, and other information. Address of database is: <http://edv1.vt.tuwien.ac.at/biobib/>
- The Proceedings of an IEA Bioenergy workshop “Effects of the Kyoto Protocol on forestry and bioenergy projects for mitigation of net carbon emissions”, held in New Zealand in March 1998 are available at a cost of US \$20 from Joanneum Research., Elisabethstrasse 5, 8010 Graz, Austria. Fax: +43-316-876-1320, email: ief@joanneum.ac.at. The Proceedings contain 14 papers and two appendices.
- Professor Harry Parker of Texas Technical University is teaching a postgraduate course “Advanced Industrial Waste Treatment” entirely over the internet. Bioenergy and waste treatment share several major topics and processes. Course preview at: <http://www.coe.ttu.edu/che/hwp/preview/>. International participants are welcome.
- Two gasification/pyrolysis plants to utilise sewerage sludge are under construction in the UK. One is a 500 kg/h project for a UK water company with the syngas to be used to provide energy for the sludge drying process. To be commissioned late 1998. The other, larger plant for Northumbrian Water will use the Lurgi LR process which has been applied to coal gasification. The syngas will be used to generate electricity. The plant should be operational in 1999.
- ELSAM, the Danish utility has rebuilt a power station with a biomass straw and wood boiler replacing a coal fired boiler. The new boiler started up in January 1998 and is expected to save 80,000 tonnes of coal per year and reduce carbon dioxide emissions by 190,000 tonnes pa. The 40 MW_e plant is expected to consume 120,000 tonnes of straw and 30,000 tonnes of wood. For information see the May 1998 issue of CADDETT at <http://www.caddett-re.org/html/>. Contact Jens Clausen, ELSAMPROJEKT, fax +45-75-56-4477.
- A recent 200 page US report “Study of Market for Rice Husk-to-Energy Systems and Equipment” is available from Brett Craig of Louisiana State University. Cost is US \$19.95 excluding postage and handling. Email: brcraig@AGTR.LSU.edu
- Juniper Consultancy Services Ltd, a UK based company has published a major report “The Market for Pyrolysis and Gasification of Solid Waste: A Technical and Business Review”. The report can be previewed at website <http://www.juniper.co.uk/pyroflyr.htm> The 200 page report covers 22 technologies and has 174 figures and tables. The report contains the commercial status of each technology, capital and operating costs, forecasts of market trends in Europe, energy and mass balances of leading technologies, summary of each technology including process flow diagrams, contact details of companies, an analysis of key market drivers, attitude and opinions of potential customers towards key technologies, and sales forecasts.

