

# Commercializing Conventional and Advanced Liquid Biofuels from Biomass

**Task 39**  
IEA Bioenergy

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## From the Task

*By Jack Saddler, Jim McMillan and Sergios Karatzos*

The entire advanced biofuel sector, including Task 39, has seen some exciting developments over the last several months. We hope that you will enjoy reading about our collective progress in the biofuels area in this “end-of-year” issue of the newsletter.

The “end-of-triennium” [IEA Bioenergy Conference 2012](http://www.task39.org/EventsConferences/VIENNA12.aspx) was held in Vienna, 12-15 November. Prior to the conference, the IEA Bioenergy Executive Committee asked all of the IEA Bioenergy Tasks to report on what they had achieved over the past three years and to describe what the Tasks hope to accomplish over the next three years. The main conference included technical sessions highlighting the latest developments in Bioenergy. Task 39 was an active participant with seven of our industry members from leading companies in the advanced biofuels sector (Abengoa, Andritz, Borregaard, Chemtex, CRI, UPM Kymene and VBBC) giving excellent presentations describing their recent progress towards commercializing advanced biofuels. These presentations are available on Task 39’s website (<http://www.task39.org/EventsConferences/VIENNA12.aspx>).

A Task 39 business meeting, including a technical tour of the Vienna University of Technology’s (VTU) thermochemical conversion research pilot plant, was held on 15 November, right after the IEA Bioenergy Conference 2012. Twenty country representatives attended the business meeting with discussions focused on the status of the Task 39 deliverables and activities planned for the next triennium.

## Task 39 Members - ExCo\* and Country Task Reps

### Australia

[Stephen Schuck\\*](#)  
[Les Edye](#)

### Austria

[Josef Spitzer\\*](#)  
[Manfred Wörgetter](#)  
[Dina Bacovsky](#)

### Brazil

[Ricardo Dornelles\\*](#)  
[Paulo Barbosa](#)  
[Viviana Coelho](#)

### Canada

[Ed Hogan\\*](#)  
[Jack Saddler](#)  
[Warren Mabee](#)  
[Stan Blade/Steve Price](#)

### Denmark

[Jan Bungler\\*](#)  
[Michael Persson,](#)  
[Henning](#)  
[Jørgensen](#)  
[Anders](#)  
[Kristoffersen](#)

### Finland

[Kai Sipilä\\*](#)  
[Tuula Makinen](#)

### Germany

[Birger Kerckow\\*](#)  
[Axel Munack](#)  
[Jürgen Krahl](#)

### Italy

[Gerardo Montanino\\*](#)  
[David Chiaramonti](#)  
[Alessandra Frattini](#)  
[Stefania Pescarolo](#)

### Japan

[Shinji Furukawa\\*](#)  
[Shiro Saka](#)  
[Fumihiko Honda](#)

### Netherlands

[Kees Kwant\\*](#)  
[John Neeft](#)  
[Oliver May](#)

### New Zealand

[Elspeth MacRae\\*](#)  
[Ian Suckling](#)

### Norway

[Trond Vaernes\\*](#)  
[Karin Øyaas](#)  
[Judit Sandquist](#)  
[Gisle Johansen](#)  
[Berta Guell](#)

### South Africa

[Thembakazi Mali\\*](#)  
[Bernard Prior](#)  
[Emile van Zyl](#)

### South Korea

[Soosung Hwang\\*](#)  
[Jin Suk Lee](#)  
[Kyu Young Kang](#)  
[Seonghun Park](#)

### Sweden

[Asa Karlsson\\*](#)  
[Maria Nyquist](#)  
[Jonas Lindmark](#)  
[Alice Kempe](#)

### United States

[Paul Grabowski\\*](#)  
[Jim McMillan](#)



Image Source: esf.edu.com

One of the main objectives of Task 39 in the new Triennium is to build on our already good collaboration within the Task and translate this into greater collaboration with other IEA Bioenergy Tasks. A questionnaire has been distributed to our Task 39 country representatives to gauge their interest in contributing to specific activities planned for the next triennium (reports, workshops, etc.). Various activities between Task 39 and the other Tasks are already in the planning stages. Examples include a joint meeting with Task 42 (Biorefinery) planned in conjunction with the Berlin International Congress on Biofuels in January 2014 and a joint meeting with Task 43 (Feedstocks) at the World Bioenergy Symposium at Jönköping, Sweden in May 2014.

Preparations for the 20<sup>th</sup> International Symposium on Alcohol Fuels (ISAF) in Stellenbosch, South Africa are also well under way. This meeting and the associated Task 39 business meeting will be hosted by our South African colleagues. The Task 39 business meeting is planned for 24 March, immediately preceding the 20<sup>th</sup> ISAF. The symposium itself will take place on the 25-27 March and it will include two dedicated Task 39 “IEA” sessions. Overall, Task 39 members are scheduled to deliver 10 presentations, including 2 in conference plenary sessions.

We have made good progress in several of the Task 39 reports. The first draft of the report which compared the energy and GHG balances of biochemical, thermochemical and hybrid routes to advanced biofuels production, authored by our colleague Don O’Connor of S&T<sup>2</sup> Consultants, was sent out for review. This draft was discussed at our Vienna business meeting and is being further revised to incorporate the excellent feedback from our country representatives. We expect a final report to be circulated to our country representatives in early 2013, with open circulation later in the year.

The updated report on advanced biofuels demonstration facilities authored by our Austrian colleagues at Bioenergy 2020+ has been delivered to our Task 39 country representatives for internal review and the report will be finalized and made available for open circulation early in 2013.



We welcome your feedback. Please direct your comments to Sergios Karatzos, editor of the Newsletter  
**Contact Us!**

## Task 39 Management:

Operating Agent (Agency): Ed Hogan (Natural Resources Canada)  
 Co-Task Leader (Agency): Jack Saddler (Univ. of British Columbia)  
 Co-Task Leader (Agency): Jim McMillan (Nat. Renewable Energy Lab)

### Subtask Leaders:

(Biochemical conversion, N. America) Jim McMillan  
 (Biochemical conversion, EU): Maria Nyquist (Swedish Energy Agency)  
 (Thermochemical conversion): Tuula Makinen (VTT, Finland)  
 (Link to Advanced Motor Fuels IA): Axel Munack (Germany)  
 (Policy issues, EU): Michael Persson (Inbicon, Denmark)  
 (Policy issues, North America): Warren Mabee (Queen’s U, Canada)  
 (Implementation Issues): Manfred Wörgetter (BTL Wieselburg, AUT)

Task Coordination: Sergios Karatzos (Univ. of British Columbia)

Another report that has proved to be useful over the last few years has been the “Biofuel Implementation Agenda” Report. The various policies used by our Task 39 member countries to help catalyze biofuel use and development are compared and contrasted in this regularly updated study. The most recent update of the report will include an expanded section detailing the varied approaches of the various biofuels policies. A draft of this report will be circulated to Task 39 country representatives for internal review/input during the first quarter of 2013.

We are also continuing to make progress in the “drop-in” biofuels report. The current draft is being updated to reflect the latest developments in this rapidly evolving (“hot”) area of advanced liquid biofuels. As described in the previous newsletter, drop-in biofuels or fuel intermediates are energy dense hydrocarbons with low oxygen content. They can directly replace petroleum fuels or be incorporated into current petroleum refining operations at several stages of the refining process (e.g., within refinery distillation, upgrading or blending operations). These biofuels (or biofuels intermediates) are different from the more highly oxygenated bioethanol and biodiesel in that they can better leverage the existing, vast, global petroleum refining infrastructure. The report will address the market and policy drivers involved in producing drop-in biofuels and it will describe the potential technical hurdles and risks involved in commercializing this more “infrastructure-compatible” class of renewable liquid fuels. Initial assessments suggest the greatest opportunities for drop-in biofuels are in infrastructure leveraging and co-location and in supplying biofuels for long distance transportation sectors. This will likely involve the aviation, trucking and shipping sectors that cannot be electrified or use existing oxygen-containing biofuels.



As you will see in the news section of this issue, a variety of exciting developments have taken place since our last newsletter (September 2012 issue #31). Among the highlights is the construction of two full-scale cellulosic ethanol facilities. This includes the Chemtex plant of 13 million gallons per year (MGPY) in Italy and the DuPont plant of a 30 MGPY scale in Iowa, USA. Both plants are rapidly progressing in their construction, while the first biosyngas fermentation to ethanol facility with a nameplate capacity of 8 MGPY is being built by INEOS Bio in Florida, USA. In parallel some positive policy developments have taken place in the USA, with the EPA resisting appeals by some

groups to waive RFS2. The US Navy has also indicated that it will continue its strong support of the development of sustainable advanced biofuels technologies. Also notable are the recent announcements of several strategic partnerships for thermochemical conversion of biomass to transportation fuels, including Ensyn/Fibria, UOP/Eni and NREL/Johnson Matthey. Some key reports published have also been released in the last few weeks including the IEA’s World Energy Outlook and the EIA’s Annual Energy Outlook. You will find links to these stories and reports later in the newsletter in the *news section*.

In this issue of the newsletter you will also find an article on jatropha development for biofuels in Africa. Our Austrian colleagues have provided this update on the “Bioenergy in Africa and Central America” (BIA) project which describes some of the challenges in using jatropha as a feedstock for biofuels.

Finally, we thank our Australian colleagues for providing the newsletter’s lead article on biofuel developments in Australia. Although Australia constitutes only a small percentage of total global biofuel production and use, it has demonstrated significant government and industry commitment and entrepreneurial spirit to achieve rapid biofuels growth. Australia is notable in its heavy dependence on coal for electricity generation (>75%) while also being blessed with suitable geographical and climatic conditions for large scale algae farming.



We wish all of you a restful “happy holidays” with your family and friends, and thank you again for your active participation in the Task 39 “Biofuels network”. May potable liquid biofuels (beverage ethanol) enrich your year-end celebrations!

*Jim, Jack and Sergios*

## Transportation Biofuels in Australia

**Author** Les A. Edey, Director - BioIndustry Partners Pty Ltd, Associate Professor, Queensland University of Technology, Australia.

### Introduction

Australia is richly endowed with energy resources. It holds 38% of the planet's uranium resources, 9% of coal resources and 2% of natural gas resources<sup>1</sup>. It produces approximately 2.4% of the world's energy and exports more than three-quarters of this to other countries. Australia is currently the world's largest exporter of coal.

In 2007-2008 Australia's energy production was 17,360 PJ, with coal accounting for 54% of this production. In that year, total primary energy consumption within Australia was 5,772 PJ, with renewable energy accounting for 5% of primary energy consumption. Bioenergy currently provides ca. 78 % of this renewable energy. The largest contribution to this bioenergy provision is firewood for heating (ca. 6 million tonnes per annum). Sugarcane bagasse and forestry waste for process heat and electricity generation also make considerable contributions to this provision. Recently capture and use of methane gas from landfill and sewage facilities and the use of ethanol and biodiesel in transportation have also provided significant inputs.

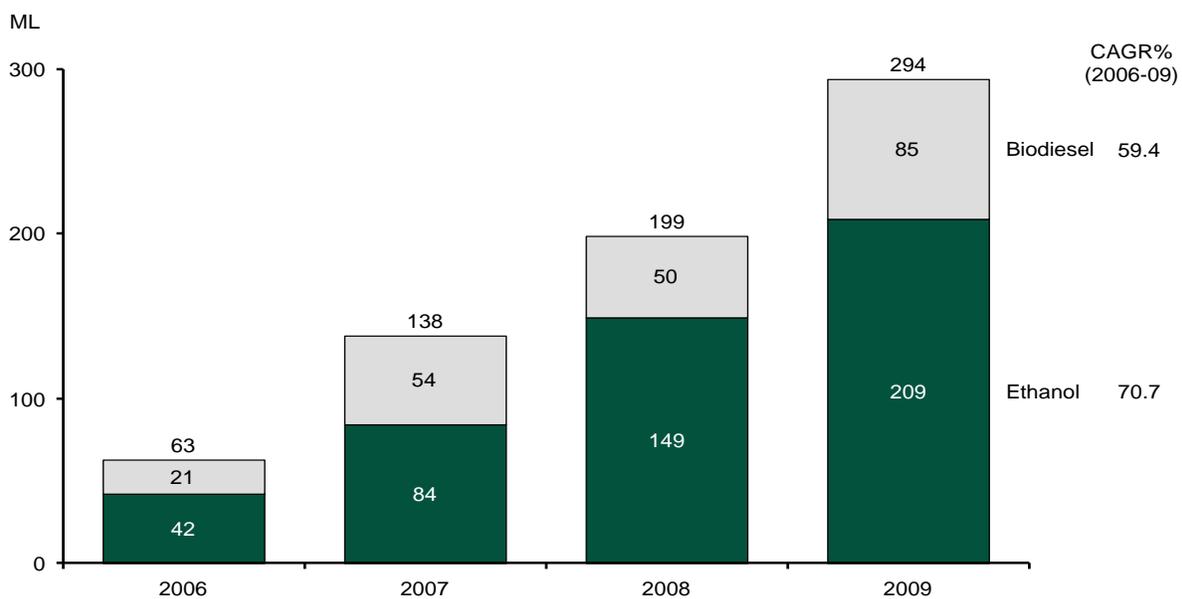
Liquid transportation fuel consumption in Australia reached 44.4 GL in 2010. The annual consumption of liquid transport fuels sourced from 'Energy in Australia 2010'[1] is shown in Table 1. While Australia has vast coal resources, the liquid fuel resource is somewhat limited and increasingly domestic consumption is reliant on imported petroleum.

**Table 1. Transportation fuel consumption in Australia**

Fuel type	2009-2010 (ML)	2005-2006 (ML)	Change
Petrol	18,644	19,048	- 2 %
Diesel	19,044	15,804	+ 21 %
Jet fuel	6,675	5,359	+ 25 %
Total	44,363	40,211	+ 10 %

Biofuels account for ca. 1% of consumption in the transportation sector and comprise conventional 10% ethanol in petrol and 5% and 20% biodiesel (FAME) in diesel blends (see Fig. 1). About 210 ML of ethanol is produced per annum by Sucrogen (60 ML capacity from sugarcane molasses) and United Petroleum (80 ML capacity from sorghum grain) in the state of Queensland, and Manildra (300 ML capacity from low grade wheat) in the state of New South Wales (NSW). About 85 ML of conventional biodiesel is produced predominantly from tallow by five production facilities with a combined capacity of ca. 250 ML per annum. While conventional biofuels use accounts for ca. 1% of liquid fuel consumption, installed capacity represents slightly less than 2%.

In 2011 the Australian governments Department of Resources, Energy and Tourism commissioned LEK Consulting to report on transportation biofuels in Australia [2]. LEK noted that regulatory uncertainty at both a State and Federal level limited investment in new ethanol and biodiesel production plants and constrained supply. For example in 2010, the NSW Government held back planned increases in its ethanol mandate and the Queensland Government deferred introducing an ethanol mandate. Notwithstanding this LEK identified new projects (in addition to the existing three ethanol and five biodiesel production facilities) that would increase ethanol production capacity to 890 ML per annum and biodiesel production capacity to 600 ML per annum by 2015 (see Figs 2 & 3).



**Figure 1. Ethanol and biodiesel production in Australia**

(Source: Australian Bureau of Agricultural and Resource Economics and Sciences)

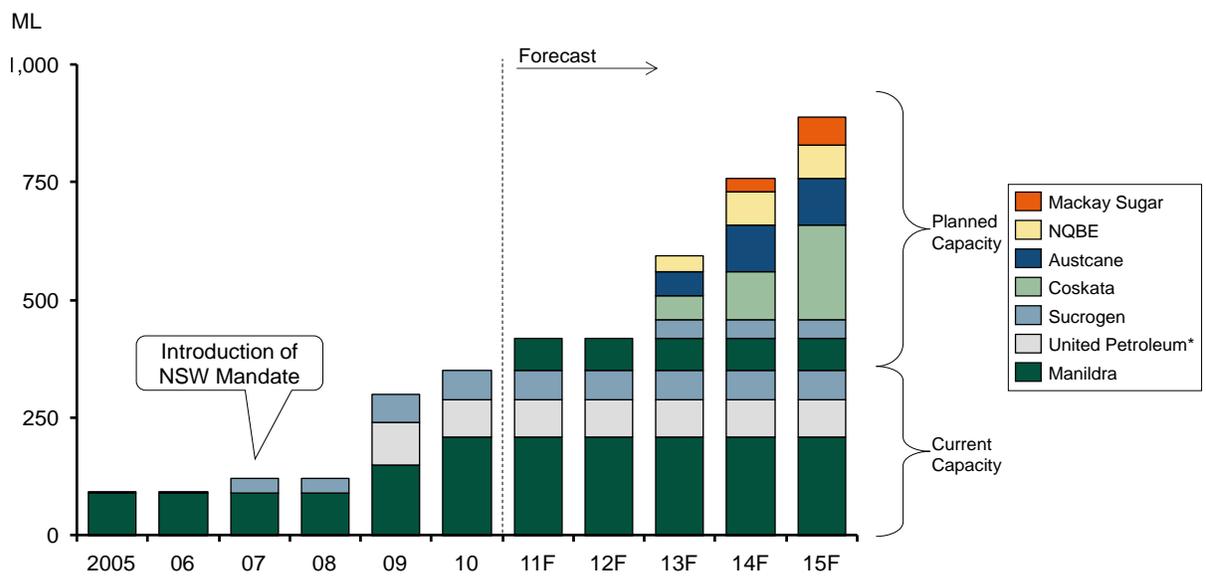
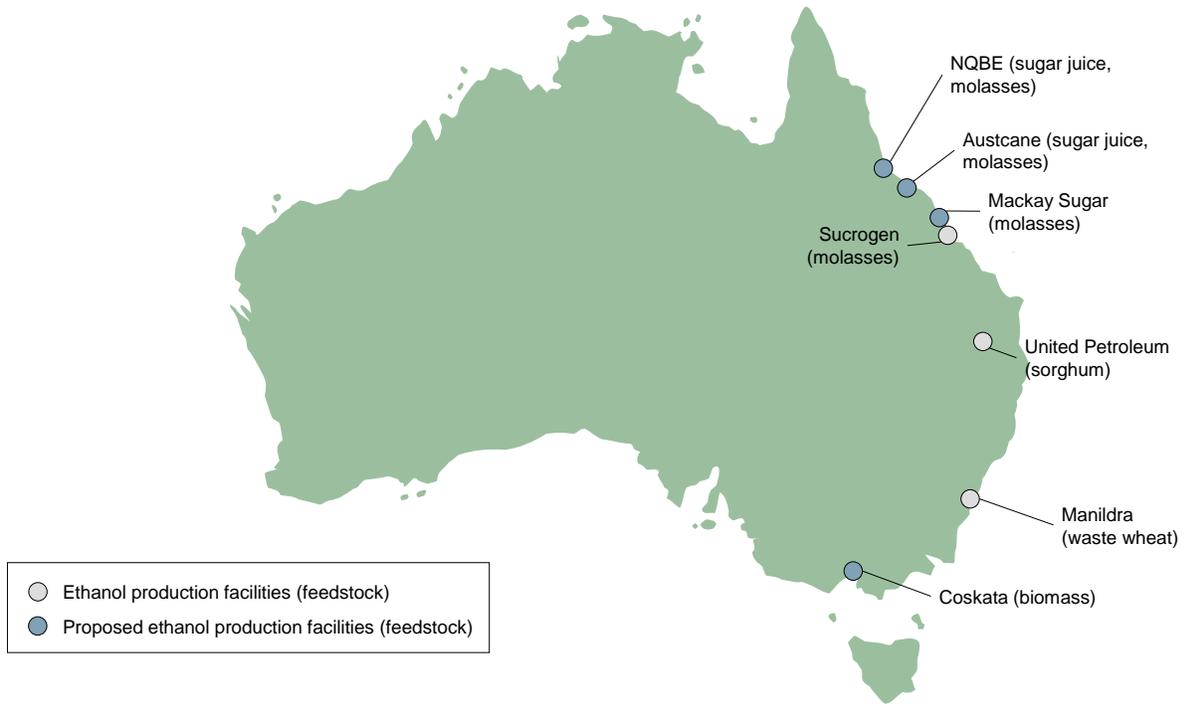


Figure 2. Ethanol production and forecasted expansion

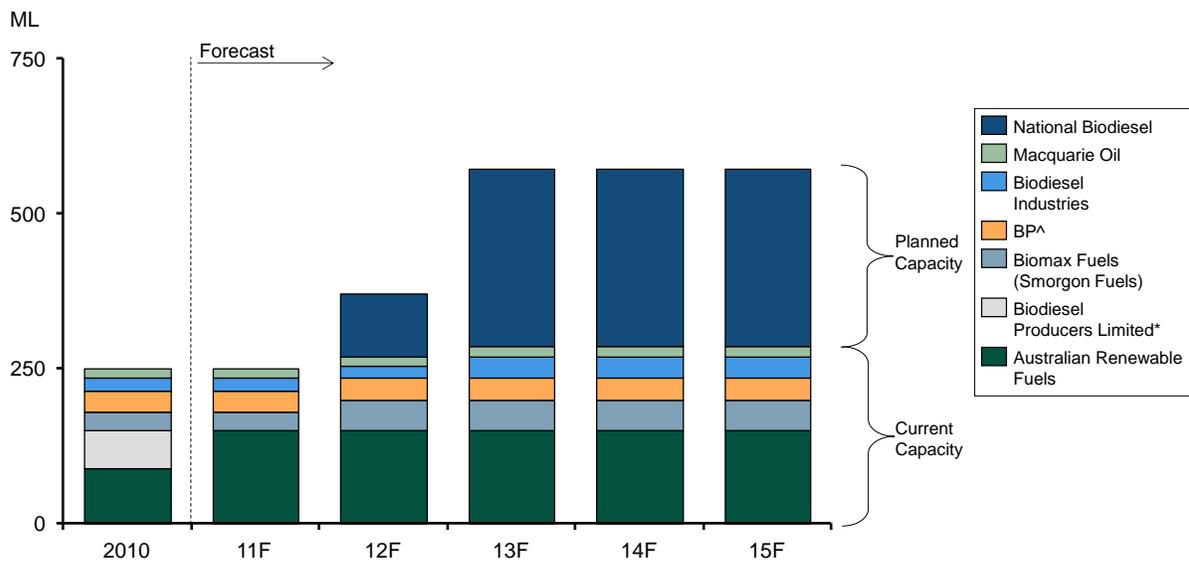
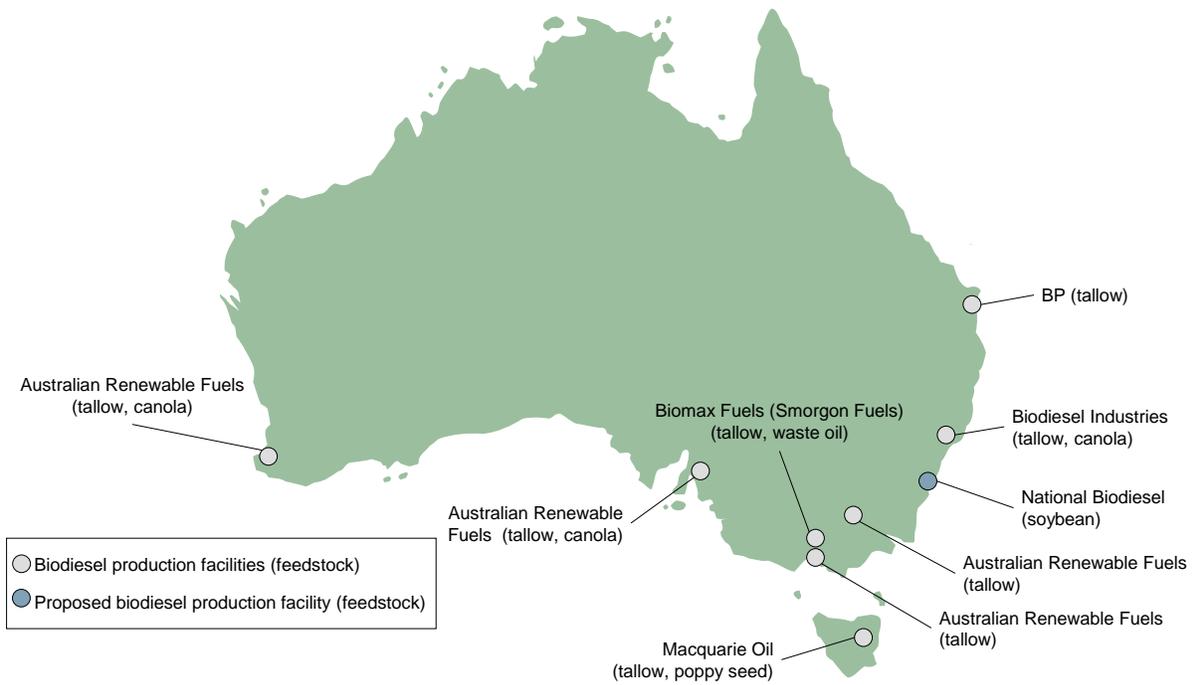


Figure 3. Biodiesel production and forecasted expansion

## Bioenergy policy and R&D support

The use of bioenergy for electricity generation in Australia has expanded considerably over the past decade. This expansion has been supported by Australian Government renewable energy schemes, initially the Mandatory Renewable Energy Target (MRET) and now the Large-scale Renewable Energy Target (LRET) and Small-scale Renewable Energy Scheme (SRES - focussed on domestic solar photovoltaic systems, solar water heaters and heat pump systems). Bioenergy currently provides ca. 1% of Australia's electricity, wind provides ca. 1.5%, hydro ca. 4.5%, while coal contributes ca. 76%. The Australian Government has set a national binding target for 20% of electricity to be sourced from renewable energy sources by 2020 (an additional 45,000 GWh (162 PJ) per annum from all renewable energy sources)[3].

Australia does not have similar binding transportation biofuels targets, but biodiesel, and domestic ethanol are subject to a concessionary excise regime that fully offsets fuel tax excise taxes until 2021. Only NSW has blending mandates (escalating 4% ethanol and 2% biodiesel blending).

The Australian Renewable Energy Agency (ARENA), formed after the last federal election, is an independent Commonwealth Government authority that supports technological innovation in all renewable energy sectors. ARENA invests in R&D, demonstration and commercialisation to meet its statutory objectives of improving the energy market competitiveness and increasing supply of renewable energy. In the transportation biofuels sector ARENA's portfolio includes AUD18 million in funding for nine bioenergy R&D projects that include conversion of algae, forestry residues and sugarcane bagasse to advanced biofuels.

Other Commonwealth Government support programs include the Emerging Renewables Program and the Renewable Energy Venture Capital Fund. The Emerging Renewables Program consists of AUD126 million grant funding for technology and infrastructure development projects and feasibility and preparatory studies. The venture capital fund consists of AUD100 million funding for the commercialisation of early-stage renewable energy technologies. Both programs cover all renewable energy sectors.

Recent notable events that impact on the Australian transportation biofuels industry include the introduction of a carbon tax and the launching of the Australian Initiative for Sustainable Aviation Fuels at the last Bioenergy Australia Annual Conference in Melbourne (November, 2012).

## **Advanced biofuels R&D in Australia**

Research on advanced transportation biofuels extends across several universities and government (both state and federal) research institutions. Of note are pilot facilities for the production of lignocellulosic ethanol, hydrolysis oil and algal biomass, and the development of yeast strains for advanced biofuels production.

Lignocellulosic ethanol production is being demonstrated at pilot scale by Ethtec in northern NSW and Queensland University of Technology (QUT) in central Queensland. Ethtec is a private company developing and demonstrating concentrated acid hydrolysis and recovery technology. QUT was the recipient of National Collaborative Infrastructure Strategy funding and have constructed a multi-purpose, publically accessible pilot plant in Mackay. QUT conducts its own research there and recently filed a patent on a glycerol solvent pretreatment process.

Licella have successfully demonstrated the production of hydrolysis oils at its pilot plant in on the central NSW coast. Microbiogen has developed proprietary yeast strains that are capable of metabolising pentose sugars. Both of these Australian companies have attracted the attention of international partners and are now planning larger scale production.

Australia is one of the few countries in the world with commercial scale algae production. BASF recently acquired Cognis, a company that produces 80% of the world's  $\beta$ -carotene supply in ca. 1200 ha of extensive ponds at Whyalla in the state of South Australia and Hutt Lagoon in the state of Western Australia. While neither of these facilities produces biofuels they serve to demonstrate that Australia is well suited to algae production in terms of climate and landscape. There has been significant progress from laboratory and small-scale outdoor production to larger pilot scale production of algal biomass of the type suited to biofuels. Muradel Pty Ltd, a joint venture of Murdoch University in Western Australia, and South Australia based Adelaide Research and Innovation Pty Ltd and SQC Pty Ltd, has constructed a pilot raceway pond system adjacent to the Yurralyi Maya 7 Mile power station near Karratha. Less than 10 km north east of this site Aurora Algae Pty Ltd have purchased the Aquacarotene site and constructed raceway ponds.

## **Conclusions**

By international standards the Australian transportation biofuels sector is small. Rather than provide a detailed account of this sector, this report provides highlights that show the industry is growing from this small base with strong support from government and industry.



**Figure 4. Muradel site - three raceway ponds to the west of Yurralyi Maya power station**



**Figure 5. Aurora Algae - 6 raceway ponds just south of the former Aquacarotene extensive pond system**

## Acknowledgements

This account of transportation biofuels development in Australia draws heavily on the three cited reports and in particular the report of Stuckley et al. The author has benefited from discussions with Mr Stephen Schuck the Manager of Bioenergy Australia and Ex Co representative to IEA Bioenergy.

## Information sources

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

<http://www.biofuelsassociation.com.au>

## References

1. Energy in Australia 2011 <http://www.ret.gov.au/energy/Documents/facts-stats-pubs/Energy-in-Australia-2011.pdf>.
2. Advanced Biofuels Study - Strategic Directions for Australia, LEK Consulting [http://www.arena.gov.au/\\_documents/abir/advanced-biofuels-study-appendix.doc](http://www.arena.gov.au/_documents/abir/advanced-biofuels-study-appendix.doc)
3. Stuckley, C., et al. (2012) Bioenergy in Australia; Status and Opportunities, available at <http://www.bioenergyaustralia.org/>

## Bioenergy in Africa – North-South Project finalized

**Authors** Manfred Wörgetter, Andrea Sonnleitner, Dina Bacovsky, Bioenergy2020+

The project “Bioenergy in Africa and Central America” (BIA) investigates the opportunities and risks related to the production and utilization of biofuels in East Africa and in Central America. Five European institutions (EMPA (project leader), Wageningen University, Bioenergy 2020+, Overseas Development Institute London, Round Table on Sustainable Biofuels) cooperated with seven partners from Ethiopia, Kenya, Tanzania, Mexico and Belize. The focus was on “*Jatropha curcas*” because of its promise of high yields on degraded land.

The project was funded within the program “Agricultural Research for Development” of the European Research Area. This program funds research that addresses the agricultural challenges and issues faced by developing countries, emerging countries and countries in transition. It thus plays a critical role in fighting poverty and hunger and in supporting more rapid and sustainable development in the poorest countries of the world.

Within the project, the potential of jatropha cultivation and the local production of biofuels and its social and environmental impacts were assessed. Bioenergy 2020+ analysed value chains for the local production of jatropha oil and - in cooperation with FJ BLT - assessed the suitability of the oil for biodiesel production.

A workshop held in Nairobi in November concluded the three years BIA project. Findings of the project on the feasibility of jatropha cultivation and its impact on energy security, climate change, land use and food security were presented. It was concluded that the road to implementation of bioenergy from jatropha in local, regional and global markets is still long:

- Food security in developing countries is a complex issue. Energy from biomass can have positive or negative impacts.
- Jatropha could provide energy to rural communities, but the required cheap, adapted systems for electricity supply, lighting and cooking are not available yet.
- Although life cycle analysis indicates potential for GHG emission mitigation, the related land use change may lead to loss of carbon in soils.
- The promised yields of jatropha cultivation were not met. Knowledge about the factors of influence is limited.
- In contrast to the common understanding, jatropha plants are susceptible to diseases, and there is a risk that this species displaces other indigenous plants

The project results in a number of *Jatropha*-related publications; Bioenergy 2020+ is contributing to the following scientific papers:

- *J. Rathbauer, A. Sonnleitner, R. Pirot, R. Zeller, D. Bacovsky* “Characterisation of *Jatropha curcas* seeds and oil from Mali”; Biomass and Bioenergy - In Press Oct 2012
- *A. Sonnleitner, J. Rathbauer, J.R. Randriamalala, L.I.B. Raoliarivelo, J.H. Andriomanarisoa, R. Rabeniala, A. Ehrensperge*: “*Jatropha mahafalensis* oil - properties and suitability for rural energy supply in Madagascar”. Energy for Sustainable Development (submitted Nov. 2012)
- *B. Muys et al.*: “Integrating mitigation and adaptation into development: the case of biofuels in Africa”. Nature Climate Change (submitted).
- “Influence of harvest time and ripeness of *Jatropha* seeds on oil properties” (planned).

Further information is available at [www.bioenergyinafrica.net](http://www.bioenergyinafrica.net).



## Reports and Research

### World Energy Outlook 2012 (Released on 12 November 2012)

The [2012 edition of the World Energy Outlook](#) was released on 12 November and presents authoritative projections of energy trends through to 2035 and insights into what they mean for energy security, environmental sustainability and economic development. Oil, coal, natural gas, renewables and nuclear power are all covered, together with an update on climate change issues. Global energy demand, production, trade, investment and carbon dioxide emissions are broken down by region or country, by fuel and by sector.



### EIA Annual Energy Outlook 2013

The U.S. Energy Information Administration has published Annual Energy Outlook 2013 Early Release Overview. The document, which provides an update of the AEO reference case, predicts a lower rate of growth for biofuels than the AEO2012. EIA forecasts paint gloomy fuel price projections: \$8.68 gasoline, \$268 crude oil by 2040. Despite more pain at the pump, EIA cuts back sharply on projections for flex-fuel and all-electric vehicles. Where are the alternatives? [More...](#)

### E2 report estimates advanced biofuel production through 2015

A report recently published by Environmental Entrepreneurs (E2) shows that the biofuel industry is well-positioned to meeting demand under the California's Low Carbon Fuel Standard (LCFS). The LCFS requires a reduction of 10 percent of the carbon intensity of California's transportation fuels by 2020 and provides an incentive to produce advanced biofuels. [More...](#)

### The Potential Role of Biofuels in Commercial Air Transport - BioJetFuel - IEA Bioenergy Task 40

[This report](#) provides only an overview and not a detailed analysis of biofuel use in commercial aviation or so called "biojetfuels". It describes the framing conditions of the aviation industry, discusses future feedstock and cost expectations and estimates the potential effects of biojetfuels on international biomass and biofuel trade in the medium term.

### Energy Department Announces New Funding to Reduce Cost of Producing Advanced Drop-in Biofuels

[The Funding Opportunity Announcement \(FOA\)](#) addresses "Conversion Technologies for Advanced Biofuels" and focuses on understanding of basic or fundamental principles. The results of previous work should validate analytical predictions and lead to innovations that help overcome key technical barriers to improved yield and economic feasibility of producing biofuels via thermochemical, direct liquefaction pathways (i.e. fast pyrolysis, ex situ and in situ catalytic fast pyrolysis, hydrolysis, hydrothermal liquefaction, and solvent liquefaction).

Specifically, this FOA will focus on: (a) carbon efficiency: fractionation systems in bio-oil processing; (b) hydrogen efficiency: H<sub>2</sub> production, use, and transfer in biomass liquefaction and bio-oil upgrading; and (c) separations efficiency: technologies for use and mitigation of the aqueous fraction of bio-oil.

### Johnson Matthey, NREL agree on 5-year, \$7M effort on pyrolysis

In Colorado, Johnson Matthey and the National Renewable Energy Laboratory announced a five-year, \$7 million effort to economically produce drop-in gasoline, diesel and jet fuel from non-food biomass feedstocks. The goal is to improve vapor phase upgrading during the biomass pyrolysis process in order to lower costs and speed production of lignocellulose-based fuels - a key technical milestone in producing hydrocarbon fuels from biomass for about \$3 per gallon, which is a 2017 DOE goal. [More...](#)

## In the News

### Policy and Regulatory Developments

#### EPA denies appeal to waive US Renewable Fuels Standard

The U.S. Environmental Protection Agency (EPA) announced that the agency has not found evidence to support a finding of severe “economic harm” that would warrant granting a waiver of the Renewable Fuels Standard (RFS). The decision is based on economic analyses and modeling done in conjunction with the U.S. Department of Agriculture (USDA) and U.S. Department of Energy (DOE). [More...](#)

#### Floating US Biofuels: Should the Navy Support a New Industry?

Touting the biofuels industry as the nation's road to gain energy independence, the U.S. military wants to help move it forward. But government committees have proposed bills to block investment, arguing that it is too expensive and risky. Is the military the industry's only hope for scale? [More...](#)

#### The Brazilian Biodiesel Program

Brazil's Biodiesel Production and Use Program (PNPB) is a near perfect reflection of the country's push for energy security and economic growth. The program is an initiative of President Luis Inácio Lula da Silva's government (2003-2010) to integrate a drive for energy security in the electricity generation and transportation fuel sectors with sustainable rural development. It incorporates both large-scale agribusiness and family farms across the entire span of this continent-sized nation. [More...](#)

### Sustainability



#### New Commission proposal to minimise the climate impacts of biofuel production

The Commission published a proposal to limit global land conversion for biofuel production, and raise the climate benefits of biofuels used in the EU. The use of food-based biofuels to meet the 10% renewable energy target of the Renewable Energy Directive will be limited to 5%. This is to stimulate the development of alternative, so-called second generation biofuels from non-food feedstock, like waste or straw, which emit substantially less greenhouse gases than fossil fuels and do not directly interfere with global food production. For the first time, the estimated global land conversion impacts - Indirect Land Use Change (ILUC) - will be considered when assessing the greenhouse gas performance of biofuels. [More...](#)

### Industry News

#### Italy's largest refiner to use Honeywell's UOP/Eni Ecofining process technology at Venice refinery

Innovative project marks first conversion of a process unit producing petroleum-based fuel into a unit for renewable fuel. UOP LLC, a Honeywell (NYSE: HON) company, announced on Nov. 12, 2012 that Italy's largest energy company, Eni S.p.A., will produce renewable diesel using Honeywell's UOP/Eni Ecofining™ process at its facility in Venice. [More...](#)

#### Era of 100% petroleum-free aviation debuts with first all-biofuels flight in Canada

In California, Aemetis announced at Advanced Biofuels Markets the world's first flight segment on 100% renewable, drop-in biofuel, conducted by the National Research Council of Canada using its Falcon 20 jet. The drop-in fuel was produced using Agrisoma Resonance Energy Feedstock, a dedicated industrial oilseed that was launched at commercial scale in 2012 across a broad region of western Canada. [More...](#)

### Oil giant Petronas signs with LanzaTech to turn waste CO2 into sustainable chemicals

In Malaysia, LanzaTech and the Malaysian national oil company, Petronas, announced they will work together to accelerate the development and commercialization of technologies to produce sustainable chemicals from carbon dioxide (CO2) and natural gas. The joint development agreement builds on the relationship between the two companies established earlier this year when Petronas Technology Ventures, the venture arm of Petronas, invested in LanzaTech as part of the company's Series C round.

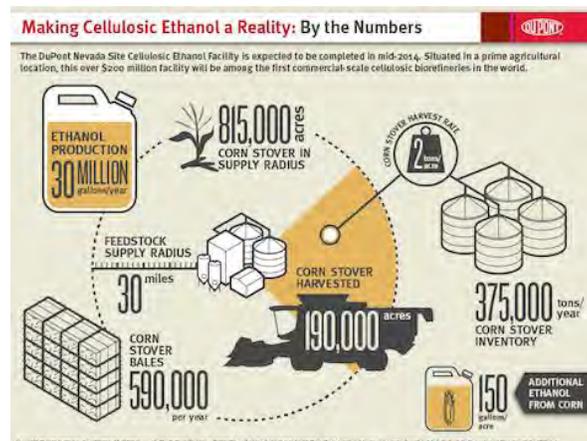
[More...](#)

### Gevo to switch back to ethanol production, from biobutanol, at Minnesota integrated biorefinery

In Colorado, Gevo announced that, while making significant progress towards economic production levels, the company does not now expect to achieve its desired year-end run rate - instead it has delayed hitting that target into 2013. [More...](#)

### Fibria invests \$20 million to form strategic alliance with US-based Ensyn for production of cellulosic liquid fuels and chemicals in Brazil

FIBRIA has established a strategic alliance with Ensyn Corporation ("Ensyn"), a private company incorporated in Delaware, USA. This alliance includes a US\$20 million equity investment in Ensyn by FIBRIA and the establishment of an equally-owned joint venture to be incorporated in Delaware for future investments in the production of cellulosic liquid fuels and chemicals in Brazil. [More...](#)



### DuPont breaks ground on world's largest Cellulosic Biorefinery

30 million gallon plant in Nevada, Iowa will expand central Iowa's energy exports, add to local grower economy. In Iowa, DuPont broke ground today on its \$200 million, 30 million gallon cellulosic biofuels facility in Nevada, Iowa. Expected to be completed in mid-2014, the new facility produce cellulosic ethanol from corn stover. Iowa Governor Terry Branstad was on hand to celebrate the official beginning of construction on the facility, adjacent to the Lincolnway Energy grain ethanol plant. [More...](#)

### INEOS Bio 8MGPY cellulosic ethanol facility in Florida begins producing renewable power.

INEOS Bio, an advanced bioenergy technology company, announced that its Indian River BioEnergy Center facility, a JV project with New Planet Energy (private), has started production of renewable power for its own use and for export to the local community. At full production, the project is expected to produce 8 MGPY of advanced cellulosic bioethanol and 6 MW of renewable power using renewable biomass including yard, vegetative, and agricultural wastes. [More...](#)

### Engineering begins on logen-based cellulosic plant in Brazil

Ottawa-based logen Energy Corp. announced an initial investment by Raízen Group to develop a commercial cellulosic ethanol project in Brazil. Raízen, a joint venture between Royal Dutch Shell and Cosan SA is the world's largest producer of sugarcane ethanol. logen Energy, a joint venture with Shell and logen Corp., operates a demonstration facility in Ottawa where it has produced over 2 million liters (560,000 gallons) of cellulosic ethanol as it refined its process since 2004. [More...](#)

### The Chemtex, Crescentino Plant is complete.

The Chemtex second generation 40,000 ton/y bioethanol plant located in Crescentino (Italy) is expected to be operative by the end of 2012. The plant is designed to produce bioethanol through hydrolysis and fermentation of cellulose and hemicellulose starting from lignocellulosic biomass (Arundo donax or wheat straw). The technology development target is to design an energy efficient process able to produce bioethanol and to demonstrate at commercial scale an innovative technology. [More...](#)

