

Commercializing Liquid Biofuels from Biomass



Task 39
IEA Bioenergy

INSIDE THIS ISSUE

From the Task	1
Feature: Finland	3
Reports & Research	9
In the News	11
IEA Bioenergy News	12
Upcoming Meetings	17



From the Task

From Jack Saddler and Jim McMillan, Task Co-Leaders

Welcome to the third of the 2010 Issues of the IEA Bioenergy Task 39 Newsletter! Our international network of “biofuels experts” continues to be highly relevant and the synergy resulting from the expertise and different perspectives that our members bring to the “biofuels debate” has been more evident this year than ever before!

The outputs of our work (newsletters, websites, news, commissioned reports, themed and business meetings, etc) are well cited and several reports and websites, particularly the pilot/demo plant work coordinated by our Austrian colleagues and the Algal biofuels report authored by our US and Australian colleagues, have contributed much needed information on the status and potential of biofuels.

In the last month or so, many of our network members have also contributed to the “Biofuels Roadmap” that is being coordinated by the IEA secretariat headquartered in Paris, with the eagerly anticipated final report being circulated in February/March, 2011. This newsletter is going out as many of our Task 39 Country Representatives return home from our most recent Task 39 business meeting that was held in conjunction with the Bioenergy Australia Annual General Meeting in Sydney, Australia.

We want to thank Task 39 member Les Edye and ExCo member, Steve Schuck for arranging an excellent and informative meeting while demonstrating that climate change was alive and well in Australia with record rainfall occurring (but not in our meeting location!) in many parts of Eastern Australia! We also want to thank our many colleagues from around the world who made the long journey to Australia. We now have a greater appreciation of the travel travails that our Antipodean colleagues have to make when they make the journey to our European based Task 39 meetings!

Task 39 Representatives - ExCo* (Executive Committee*) and Country Representatives

Australia

Stephen Schuck*
Les Edye

Austria

Josef Spitzer*
Manfred Wörgetter

Brazil

Ricardo Dornelles*
Paulo Barbosa
Viviana Coelho

Canada

Ed Hogan*
Jack Saddler

Denmark

Jan Bunger*
Michael Persson,
Henning Jørgensen

Finland

Kai Sipilä*
Tuula Makinen
Niklas von Weymar

Germany

Birger Kerckow*
Hans Juergen Froese

Japan

Tatsuo Hamamatsu*
Shiro Saka

Netherlands

Kees Kwant*
John Neeft

New Zealand

Elsbeth MacRae*
Ian Suckling

Norway

Peter Nilsen*
Karin Øyaas
Judit Sandquist
Gisle Johansen

South Africa

Thembakazi Mali*
Bernard Prior
Emile van Zyl

South Korea

Soosung Hwang*
Jun Suk Kim
Jin Suk Lee
Seonghun Park

Sweden

Asa Karsson*
Bärbel Hahn-Hägerdal
Kenneth Werling
Guido Zacchi

United Kingdom

Kieran Power*
Tony Sidwell

United States

Paul Grabowski*
Jim McMillan



*We welcome your
feedback on the layout
and scope of the
Newsletter & website –
Please Contact Us
with feedback!*



Next year promises to be as productive and as interesting as was 2010, with our next Task 39 business meeting being held in conjunction with the “Biotechnology for Fuels and Chemicals” Symposium in the first week of May, Seattle, USA, with our network helping coordinate a session on “International progress in the commercialisation of Advanced Biofuels”. We are still working on the details of the Task 39 meeting for the latter part of 2011, which we hope will be hosted by our colleagues in Brazil, and we will confirm with our network members early in the New Year, once the dates, location and theme are finalised. Thank you all again for your continued contributions to the Task 39 network and we wish you all best wishes for the season!

- Jack Saddler and Jim McMillan

Editor's Notes

From Jana Hanova, Task Coordinator

Welcome to the 26th Issue of the Task 39 Newsletter. As the year winds down and, hopefully, you might have time for more leisurely reading (!) I encourage you to read one of the three Task 39 commissioned reports on the public access version of the newly updated [Task 39 website](#). We also hope to soon post a, “hot-of-the-press” report on the sustainability of biodiesel. For those of you who make use of our networks website you will have seen that IEA Bioenergy Task 39 has undergone an extensive re-branding in an effort to enhance our image and update the Newsletter and the Task 39 website (www.task39.org).

As you know, in each Newsletter issue we try to highlight at least one of our member countries. We recently profiled Japan, Denmark and most recently ABE fuels in the United Kingdom. In this current newsletter we have featured an article from Finland. We want to particularly thank our Finnish Task 39 country representative, Tuula Mäkinen, for finding time in her hectic schedule to share her thoughts on Finland's biofuel policies and recent advances in the biofuels area.

One of the great strengths of the Task 39 network is the different perspectives and complimentary expertise that is evident within our member counties. In the upcoming, 2011, issues of the newsletter we hope to be able to share other country perspectives, such as those from South Korea and Brazil, as well as updating you on the various meetings and reports that will be coordinated by our Task members. Please send me an email with your feedback and input on our newsletter, website, reports, etc. This is always gratefully received!

~ Jana Hanova

Task 39 Management

Operating Agent (Agency)
Task Leader (Agency)
Associate Task Leader (Agency)

[Ed Hogan](#) (Natural Resources Canada)
[Jack Saddler](#) (Univ. of British Columbia, Canada)
[Jim McMillan](#) (National Renewable Energy Lab, USA)

Subtask Leads:

(Biochemical conversion, N. America)
 (Biochemical conversion, EU)
 (Thermochemical conversion)
 (Policy issues, EU)
 (Policy issues, North America)
 (Implementation Issues)

[Jim McMillan](#) (NREL, USA)
[Michael Persson](#) (Inbicon, Denmark)
[Tuula Makinen](#) (VTT, Finland)
[Tony Sidwell](#) (British Sugar, UK)
[Warren Mabee](#) (Queen's University, Canada)
[Manfred Wörgetter](#) (BLT Wieselburg, Austria)

Task Co-ordination:

(Coordinator, newsletter editor, webmaster)
 (Demonstration plant database manager)

[Jana Hanova](#) (Univ. of British Columbia, Canada)
[Dina Bacovsky](#) (BIOENERGY 2020+, Austria)

Finland - Recent Progress in Transport Biofuels

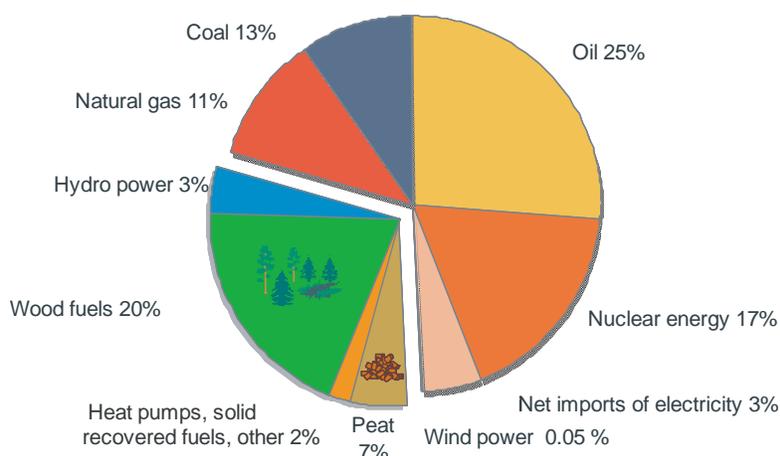
By: **Tuula Mäkinen** (tuula.makinen@vtt.fi)
Nils-Olof Nyland (nils-olof.nyland@vtt.fi)

VTT Technical Research Centre of Finland
 VTT Technical Research Centre of Finland

1. Goals and promotion of bioenergy and transport biofuels

Bioenergy is the most important renewable energy source in Finland, as it currently comprises more than 20% of the nation's total energy supply. Finland's extensive forest industry accounts for around 70% of all bioenergy usage while bioenergy itself is typically used for industrial and municipal heat and power production. Biomass resources mostly originate from forest operations, either forest residue from thinning or logging, or are by-products of wood processing industries (spent cooking liquors of pulp mills, sawdust and bark) [1, 2, 3].

As a member of the European Union, Finland follows regulations and targets for energy and emissions set by the EU. For Finland, the EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources sets a national overall target of 38% energy from renewable sources in gross final consumption of energy by 2020. Finland will strive to meet this goal, although the share of renewable energy in 2005 was already 28.5%.



Total energy consumption by energy sources 1 469.6 PJ (408.2 TWh)

Source: Energystatistics 2008

E. Alakangas, VTT

Figure 1. Bioenergy is the most important renewable energy source in Finland.

This 38% target is ambitious and reaching it will require new measures for promoting the use of renewable energy. The government's long-term climate and energy strategy [2], issued to Parliament in November 2008, is based on the renewable energy target set in the Directive 2009/28/EC. With respect to the role of bioenergy, increasing the use of wood-based fuels is considered to be one of the key strategies to increase the share of renewable energy. In particular, a considerable increase in the use of forest chips is expected. However, the use of energy crops such as reed canary grass and agricultural by-products is also being promoted. Other efforts that will be pursued with increased efforts will be to more efficiently utilize recycled fuels as an energy source. Substantial growth is anticipated for biogas and biofuels as well as the already well established solid biofuels such as pellets. The new measures proposed by the government include the introduction of a feed-in tariff scheme for wind power, electricity production from biogas and electricity production from wood fuel.

Finland's national action plan for promoting renewable energy [3] was published in summer of 2010, as required by the Directive 2009/28/EC. In addition to setting targets for renewable energy production, the goal of renewable energy use in transportation was targeted at 20% by 2020. The use of biofuels will mainly be promoted through a biofuel distribution obligation. The aim is to set the biofuel distribution obligation as high as 20% by 2020 (this takes into account the double counting of biofuels produced from wastes, residues and lignocellulosic raw material referred to in the Directive). Use of biofuels will also be promoted by means of a tax reform which was proposed by the government in the autumn of 2010.

On January 1 2008, an Act enforcing increased use transport biofuels was announced. The Act obliges distributors of transport fuels to supply a minimum percentage of transport biofuels annually. However, the obligation is flexible and allows for regional and seasonal concentration differences. The mandate also provides fuel distributors with flexibility to decide how they can best fulfill the targets. For example, distributors could transfer all or part of their obligation to another company. In 2008, the minimum share of biofuels supplied for consumption by transport fuel distributors was 2% of the total energy content of road transportation fuels. In 2009 through to 2010, the minimum share increased to 4%.

In 2009, two briefings on energy and climate change were organized. In March the Ministry of Transport and Communications presented its 2020 climate policy for the transport sector and it suggested that biofuels could yield a 10% reduction in GHG emissions by 2020. The report also states that the most efficient way to cut GHG emissions is the renewal of an efficient passenger vehicle fleet. When the government presented its long term (2050) energy and climate policy in October of 2009 it called for increased energy efficiency, increased use of biofuels, and electrification of transport. A reduction target to 20-30 g of Carbon/km for passenger vehicles use is set to be achieved by 2050.

In autumn of 2010, the government presented two energy bills, one of which requires a change to the current legislation on transportation fuel excise duties. According to the proposal, taxation levels of transportation fuels would be adjusted based on the fuels energy content, relative CO₂ emissions and its impact on local air quality. Paraffinic diesel and methane would receive credits for reduced local emissions, with the amendments being enacted gradually from the beginning of 2011, resulting in lower taxation of fuel ethanol. The second energy bill proposal specifically focuses on the promotion of biofuels. A biofuels obligation of 6% for 2011 to 2014 has been proposed with a gradual increase to 20% by 2020.

2. Current biofuel production and use

In 2009, Finland's diesel consumption reached 2 177 000 tonnes per year, while petrol consumption was 1 714 000 tonnes [4]. In the same year, Finland's consumption of biofuels was 79 000 tonnes of oil equivalent (toe) of biodiesel (hydrotreated vegetable oil HVO) and 66 000 toe of ethanol [5]. As Finland produces 220 000 tonnes of biodiesel/yr, this exceeds its current internal usage with the balance exported to Europe. In contrast the country imports most of its bioethanol from Southern America as internal ethanol production levels are about 4 million litres [5].

Neste Oil initiated the first biodiesel plant (hydrotreated vegetable oil, HVO) in Finland with production commencing in May 2007. The plant can produce up to 170 000 tonnes/a high-quality transport fuel (NExBTL) from hydrotreated vegetable oils and animal fats. In 2009, Neste Oil

doubled its NExBTL production capacity at the company's Porvoo refinery. The company is currently marketing diesel fuel with 10-20% NExBTL under the name Green Diesel in Southern Finland [6].

Another company, St1 Biofuels, has produced transportation bioethanol from food and feed industry waste streams since 2007. In 2010, the company had several small plants in operation, each with an annual capacity of about 1-1.5 million liters of ethanol. The St1 concept uses small decentralized production units that are located close to waste raw material suppliers, and the process uses waste materials containing starch, sugars or low concentrations of ethanol as feedstocks. Currently planned production facilities will further diversify the range of feedstocks, which will soon include sorted biowaste, municipal waste, and agricultural by-products. Bioethanol produced at these facilities is transported to a centralized dehydration plant where the last traces of water are removed [7].

St1 launched its RE85 ethanol fuel at the same time as high concentration ethanol and FFV cars were introduced to the Finnish market (in 2009). Vehicle importers like Ford, Saab and Volvo are now actively promoting FFVs. Although the vehicle registration system does not account for FFVs, the number of FFVs at the end of 2010 is anticipated to be in the order of 1 000 units. There are some 700 natural gas vehicles in Finland, using some 5.5 million m³ of methane annually. Only one small refueling station currently provides biogas, so the amount of biogas used for transport is currently negligible [8, 9].

3. Research and development

Biofuels R&D efforts in Finland have primarily focused on the development of production technologies for advanced transport biofuels. Several Finnish research institutes and universities such as VTT Technical Research Centre of Finland, University of Helsinki and Aalto University, are actively participating in both national and international projects.

VTT Technical Research Centre of Finland is one of the leading European research institutes engaged in developing new biofuel technologies. For example, VTT is an acknowledged leader in the development of gasification gas cleanup technologies for synthesis gas production and biochemical based ethanol production. VTT's expertise spans across the whole biofuels production value chain from raw material procurement and availability, thermochemical and biotechnical processing of biomass, biofuel use in vehicles, process optimization, through to feasibility studies and sustainability assessments [10].

A broader Finnish effort to develop new biorefining competencies and technologies is currently coordinated under the umbrella of the BioRefine - New Biomass Products programme [11, 12]. This initiative was launched in 2007 by Tekes, the Finnish Funding Agency for Technology and Innovation and it harnesses an extensive network of national research institutes, universities, and enterprises. This programme it is due to run until the end of 2012. Goals of the BioRefine programme are to develop commercial value-added products, new processes or business concepts that utilize biomass in a variety of forms and the programme also strives to develop related technologies, equipment production and services.

As announced in October 2010, the total amount of funding available for projects was about €175 million and it is hoped that the total available for all projects will reach about €200 million by

2012. The amount available for enterprise projects was about €137 million, of which Tekes' funding was €53 million, and the total amount available for research projects was about €38 million of which Tekes' funding was about €23 million.

All the research projects foster industry collaboration, and at minimum, involve business partners at the steering group level. As is typically the case, individual research projects are part of larger project consortia. In the first phase of the programme, the majority of the projects focused on the RD&D aspects of transport biofuels. For example, the programme accelerated the production and demonstration of transport fuel technologies including synthesis-gas route biofuels and new liquid biofuel concepts that integrate a fluidized-bed boiler and fast pyrolysis. GHG emissions and other environmental impacts were also assessed.

The Ministry of Employment and the Economy and Tekes is also implementing a special development programme in close cooperation with the BioRefine programme. The focus of this initiative will be to help establish pilot and demonstration projects for new technologies. Under this programme, new projects amounting to €9 million were launched in 2007. €5 million per year was allocated to the programme for 2008-2010.

It should also be noted that VTT has initiated a research programme, "TransEco", that focuses on transport energy efficiency and renewable energy. TransEco is supported by four ministries, several governmental and municipal agencies, and by industry. Optimizing biofuels as well as electric vehicles for cold operating conditions is a core activity at TransEco [13].

4. Demonstration activities of advanced biofuel production and use

4.1 Syngas-based biofuels (BtL)

Several Finnish industrial consortia are commercializing the so-called syngas route for producing transport biofuels. In this particular Finnish approach to biofuel production the syngas facility is planned to be integrated with traditional pulp and paper production facilities (Figure 2).

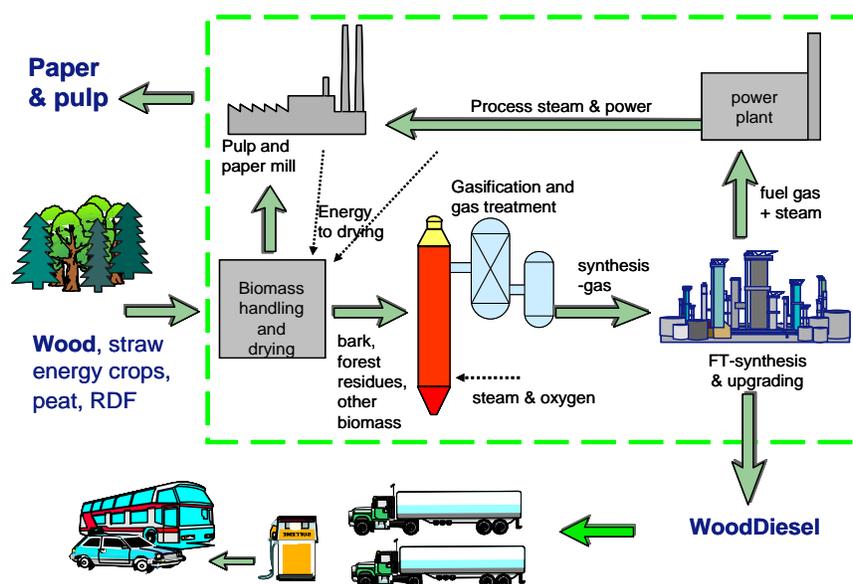


Figure 2: Integration of biomass-based diesel production at pulp and paper mills (Source: VTT).

The Neste Oil's and Stora Enso's joint venture, NSE Biofuels, will soon commence environmental impact assessments for a commercial-scale biorefinery based on this application at both Porvoo and at Imatra in Finland. The two locations are seen as potential sites for a unit capable of producing approximately 200 000 tonnes of renewable diesel per year from wood biomass [14].

The demonstration plant (Figure 3) owned by NSE Biofuels and located at Stora Enso Varkaus Mill, has been operational since June 2009. It should also be noted that Stora Enso and Neste Oil have partnered with Foster Wheeler and VTT Technical Research Centre of Finland in this development and demonstration work. The biomass to liquids (BtL) demonstration facility utilizes forestry residues for feedstock and includes a 12 MW gasifier. The plant is being used to develop technologies and engineering solutions for commercial-scale plants. The demonstration process units integrates all stages of biorefining including biomass drying, gasification, gas cleaning and testing of Fischer-Tropsch catalysts [15, 16].



Figure 3: The NSE biofuels demonstration plant in Varkaus, Finland (Source: Stora Enso & Neste Oil).

Another industrial consortium led by UPM, cooperating with Andritz and its associated company Carbona, is developing gasification technologies and syngas purification. Pilot tests were carried out at the Gas Technology Institute (GTI) facility in Chicago, USA. An environmental impact assessment for a biorefinery facility producing advanced biofuels has been carried out in Kuusankoski and Rauma in Finland and at the UPM Stracel paper mill site in France. The raw material to be used for the production of advanced biodiesel would mainly consist of energy wood such as logging residues (Figure 4), wood chips, stumps, and bark [17].



Figure 4. Bundles of logging residues (Source: UPM).

The Metsäliitto Group and Vapo have a joint project which is exploring the possibilities of a wood-based biofuel factory in the Baltic Sea region. An environmental impact assessment has been completed for four potential production sites at Kemi and Äänekoski in Finland, Jönköping in Sweden and Kunda in Estonia. The plant would use various types of forest energy waste, peat from forest-drained boglands, and reed canary grass as raw materials. The end products would be synthetic biofuels and biogas, produced using sub-processes based on e.g. gasification and Fischer Tropsch technologies [18].

4.2 Advanced ethanol production

Through other initiatives, UPM is developing a new bioethanol and energy production concept that utilizes commercial and industrial waste. The concept has been tested in pilot runs in co-operation with VTT Technical Research Centre of Finland and Pöyry. UPM is also coordinating an EU-funded project (FibreETOH) for demonstrating the concept. Partners working on this project include AB Enzymes, Skandinavisk Kemiinformation, Pöyry, Lassila & Tikanoja, ST1 Biofuels, Roal and VTT Technical Research Centre of Finland [17].

In 2008, Chempolis started a demonstration biorefinery plant in Oulu which utilizes agricultural residues to produce biomass products and biochemicals. In the initial phase, the focus was on paper fibres and pulp. However, because of increased international interest in biofuels, the company started production of bioethanol in the spring of 2010 [19].

4.3 A public transport demonstration of renewable diesel fuel

It is recognized that biofuels can be helpful in reducing GHG emissions as well as reducing local emissions. In the OPTIBIO project, a PPP partnership initiated by the Helsinki Regional Transport group, the goal is to verify the feasibility of high concentration biofuels as fuels for captive urban fleets. The emission reductions and long-term effects on bus engines of using biofuel are studied in detail, to ensure that all the benefits of premium-quality renewable diesel are taken advantage of in order to maximize the benefits to urban air quality.

The three-year trial includes around 300 buses using a blend of approximately 30% renewable diesel and 70% fossil diesel and a small number of buses using 100% renewable diesel. The buses operate in the Helsinki Metropolitan Area. The demonstration project started in 2007 and the partners are Helsinki Region Transport, Neste Oil, Proventia Emission Control, VTT Technical Research Centre of Finland, Helsinki University of Technology, and Scania. Using the renewable diesel fuel NExBTL, Neste Oil has a significant and positive impact on emissions, since the fuel generates substantially less particulate matter and NO_x emissions than conventional diesel fuel [20].

4.4 High concentration ethanol optimized for cold conditions

St1 and VTT Technical Research Centre of Finland have worked together on optimizing high concentration ethanol fuel formulas for cold conditions. Formulations that enable cold starts even down to -25°C have been developed. Not only do the improved fuel formulations facilitate cold starting but they also significantly reduce cold start emissions. St1's RE85 fuel, currently sold at 7 stations in greater Helsinki, has been modified accordingly. St1 (Figure 5) now has plans to start marketing the RE85 nationwide [13].



Figure 5. St1 Etanolix plant in Närpiö (Source: St1).

4.5 Biomass based fuel oil production

Metso, UPM and VTT Technical Research Centre of Finland have developed a new concept for the production of biomass-based fuel oil using a fast pyrolysis process intended to displace fossil fuels in heating and power generation. The production has been undergoing testing at the Metso R&D

Centre in Tampere, Finland, since June 2009 [21, 22]. The energy company Fortum joined the consortium latterly, to bring energy producer and end-product user expertise into the R&D project [23].

The consortium has developed a biomass-based fuel oil production process which is integrated into a conventional fluidized bed boiler. Combining bio-oil production (Figure 6) to an existing biomass based power plant creates significant cost and efficiency advantages as well as new business opportunities. Through several months of pilot testing and utilization of the 2 MW plant at the R&D Centre the partners have improved the bio-oil production methods and process efficiency.

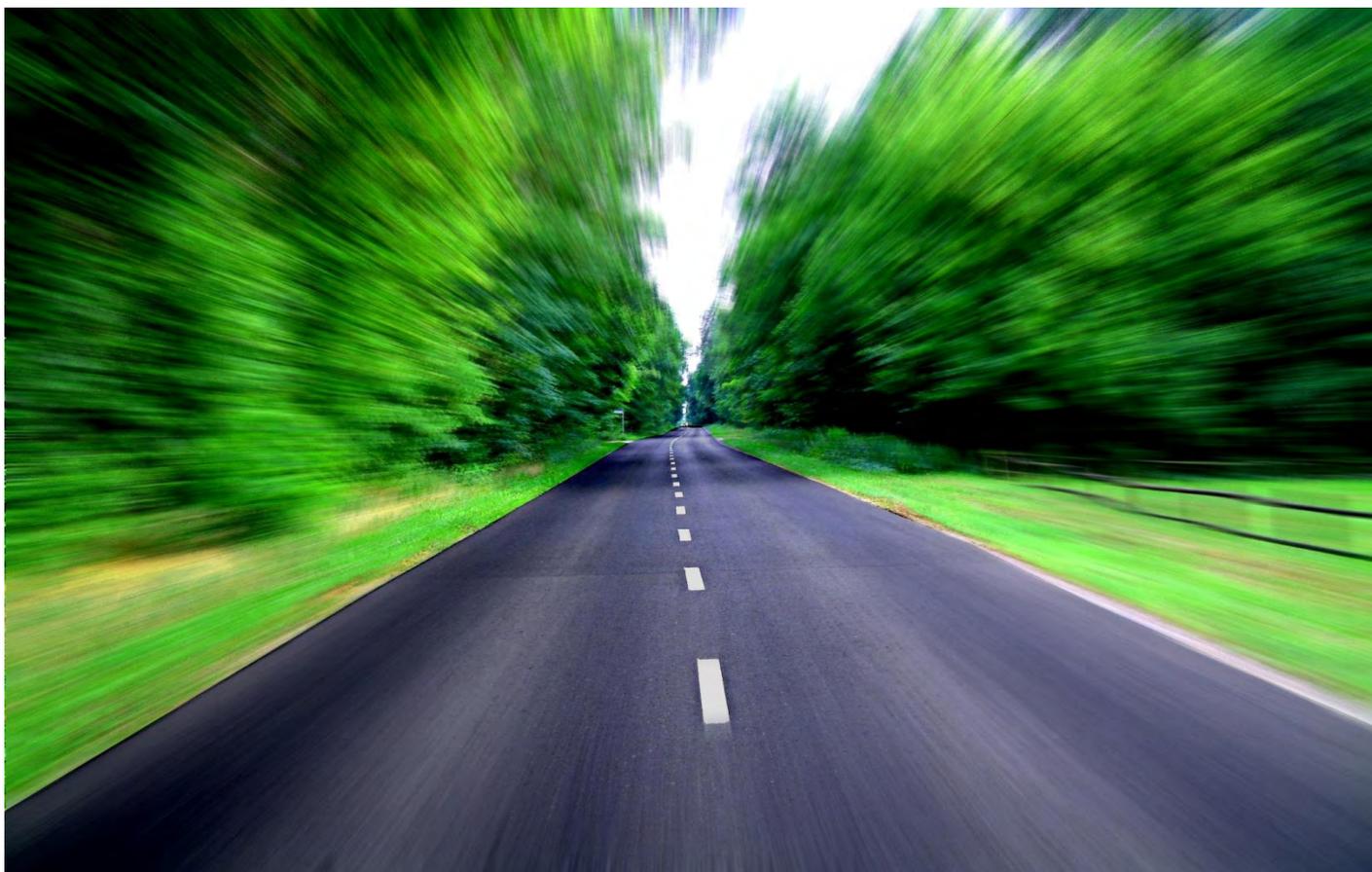


Figure 6. Biomass-based fuel oil by pyrolysis (Source: Metso).

References

- [1] Ministry of Employment and the Economy. 2009 Report on promotion of the use of biofuels and other renewable fuels for transport in Finland required pursuant to Directive 2003/30/EC. Report. 22.12.2009
- [2] Long-term Climate and Energy Strategy. Government Report to Parliament 6 November 2008. The English Summary.
- [3] Ministry of Employment and the Economy. Energy Department. Finland's national action plan for promoting energy from renewable sources pursuant to Directive 2009/28/EC. 30.6.2010.
- [4] Finnish Oil and Gas Federation. 2010. <http://www.oil-gas.fi>
- [5] Eurobservér. Biofuels barometer. July 2010.
- [6] Neste Oil. 2010.NExBTL diesel. The company web pages <http://www.nesteoil.com/default.asp?path=1,41,11991,12243,12335>
- [7] St1 Biofuels. 2009. Waste-to-Ethanol Concept. The company web pages. <http://st1.eu/index.php?id=2876>
- [8] NGV Global. 2010. <http://www.iangv.org/tools-resources/statistics.html>
- [9] IEA Advanced Motor Fuels. 2010. www.iea-amf.vtt.fi.
- [10] VTT. 2010. Bioenergy and biofuels. http://www.vtt.fi/research/area/bioenergy_and_biofuels.jsp
- [11] Mäkinen, Tuula; Leppälahti, Jukka. 2010. Finnish biorefine - new biomass products programme - RD&D on biofuels and biorefining in Finland. 18th European Biomass Conference and Exhibition, Proceedings of the International Conference held in Lyon, France 3 - 7 May 2010. pp. 2070-2074
- [12] Mäkinen, Tuula; Alakangas, Eija; Kauppi, Marjo (eds). 2010. BioRefine Programme 2007 - 2012. Yearbook 2010. Helsinki, Tekes. 189 p. Tekes Review; 276/2010
- [13] TransEco. 2010. www.transeco.fi

- [14] Neste Oil. 2010. Press Release: Neste Oil and Stora Enso launch environmental impact assessment for a new renewable diesel plant. <http://www.nesteoil.com/default.asp?path=1,41,540,1259,1260,13292,15988>
- [15] Stora Enso 2009. Press Release: Stora Enso and Neste Oil inaugurate biofuels demonstration facility at Varkaus in Finland. <http://www.storaenso.com/media-centre/press-releases/2009/06/Pages/stora-enso-and-neste-oil.aspx>
- [16] Neste Oil. 2009. Press Release: Neste Oil and Stora Enso inaugurate biofuels demonstration facility at Varkaus in Finland. <http://www.nesteoil.com/default.asp?path=1;41;540;1259;1260;11736;12772>
- [17] UPM. 2010. Biofuels. <http://w3.upm-kymmene.com/upm/internet/cms/upmcms.nsf/pkv/biofuels?OpenDocument>
- [18] VapOil. 2010. <http://www.biodiesel-hanke.fi/en/en/?id=2066>
- [19] Chempolis/Tekes. 2009. Third generation demonstration biorefinery in operation. Article on the Tekes web pages. <http://www.tekes.fi/en/community/Success%20stories/416/Success%20story/667?name=Third+generation+demonstration+biorefinery+in+operation>
- [20] Neste Oil. 2009. The company web pages. <http://www.nesteoil.com/default.asp?path=1,41,11991,12243,12326,12711>
- [21] Metso. 2009. Press Release: Metso and UPM develop biomass based bio-oil production. <http://www.metso.com/news/newsdocuments.nsf/Web3NewsDoc/C89A8AC3F77ABD29C22575CF003111F5?OpenDocument&ch=ChMetsoWebEng&id=C89A8AC3F77ABD29C22575CF003111F5&>
- [22] UPM. 2009. Press Release: Metso and UPM develop biomass based bio-oil production. http://w3.upm-kymmene.com/upm/internet/cms/upmcms.nsf/prv/Metso_and_UPM_develop_biomass-based_bio-oil_production?OpenDocument
- [23] Metso. 2009. Press Release: Metso, Fortum, UPM, and VTT are jointly developing a clean energy alternative with domestic bio-oil. <http://www.metso.com/news/newsdocuments.nsf/web3newsdoc/4AA4186AD7B97A4AC225767E00305FBB?OpenDocument&ch=ChMetsoWebEng&>



Reports and Research

Current Status and Potential of Algal Biofuel Production

This report examined the technical and economic feasibility of generating algal biomass for the production of liquid biofuels. Algal biofuels have the potential to replace a significant portion of the total diesel used today with a smaller environmental footprint. In addition, algal biofuel production can be carried out using marginal land and saline water, placing no additional pressure on land needed for food production and freshwater supplies. [More...](#)

A strategy for competitive, sustainable and secure energy

On 10 November 2010, the European Commission released the [Communication "Energy 2020 - A strategy for competitive, sustainable and secure energy"](#) report.

The new energy strategy focuses on five priorities:

1. Achieving an energy efficient Europe;
2. Building a truly pan-European integrated energy market;
3. Empowering consumers and achieving safety and security;
4. Extending Europe's leadership in energy technology and innovation;
5. Strengthening the external dimension of the EU energy market. [More...](#)



Why the push for drop-in biofuels?

Despite the past focus on biodiesel and ethanol, there is now increasing attention being paid to the production of so-called "drop-in" biofuels. Drop-in biofuels are biofuels that closely resemble current gasoline, diesel or jet fuel that are currently produced from refined oil. They are termed 'drop-in' biofuels as they could be used in the current distribution and consumption systems without significant modification. This is a major advantage, as the article describes. [More...](#)

Advanced biofuel study says investments will rise

A new study, "What's Next for Alternative Energy," suggests that advanced biofuels will soon be viable and established in the next few years, "or certainly before 2020." Completed by a Boston Consulting Group that boasts clients in the oil and renewable energy sectors, the study reviewed a number of renewable energy sources including electric vehicles, on- and off-shore drilling, solar energy and cellulosic ethanol. [More...](#)

The sustainability of biofuels in view of the EU renewable energy directive

Those groups interested in producing biofuels that will be used in the EU must make sure that the fuels will meet GHG emission reduction minimum limits in the medium term while surviving without subsidies in the long-term. They will also have to confirm that they have access to the land required to produce the feedstock for the biofuel. [More...](#)

Pathways to UK Biofuels

A Guide to Existing and Future Transport Biofuels - The purpose is to offer a simple guide to the pathways available for the production of transport biofuels. It is intended to facilitate strategy planners and policy makers in decision making regarding the future of biofuels in the UK.

The guide includes:

1. Existing pathways for the production of biofuels
2. Alternative pathways to current biofuel products
3. Pre-commercial products that are currently not feasible [More...](#)



In the News

~ IEA Bioenergy Task 39 launched its new and redeveloped website ~
~ Please let us know what you think www.task39.org ~

Industry Developments

Petrobras, Novozymes to team up for biofuel - paper

Brazil's Petrobras and industrial enzymes producer Novozymes are expected to announce a partnership to develop advanced biofuels, Danish business daily Borsen said on Friday. The newspaper cited Novozymes Chief Executive Steen Risgaard as saying that partnering with Petrobras would send an important signal to political decision-makers about development of the industry. [More...](#)

First to Make Next-Generation Biofuels Available

Transforming agricultural residues into advanced biofuels for cars has become a reality making its world premiere at 100 filling stations across Denmark. Made available from today by Statoil, this new E5 biofuel called Bio95 is a mixture of 95 per cent gasoline and 5 per cent biofuel. It is derived from wheat straw collected on Danish fields after harvest and produced by DONG Inbicon, the world's biggest demonstration facility with enzyme technology from Novozymes. [More...](#)

POET welcomes final USDA rule that will help launch cellulosic ethanol

POET to pursue BCAP certification for three ethanol plants - POET stated the Biomass Crop Assistance Program (BCAP) will help launch the biomass market near the site of their planned cellulosic ethanol plant. "The 85 farmers we have contracted with to deliver 56,000 t of biomass this fall are nearly finished harvesting, so the final BCAP rule comes not a day too soon." [More...](#)

Pilot-scale cellulosic plant opens in Norway

Norway-based cellulosic ethanol technology developer Weyland commenced production at its 200,000 liter (approximately 53,000 gallon) pilot-scale production facility in Bergen, Norway. The plant will be used to demonstrate the company's acid hydrolysis production process, paving the way for a commercial-scale project. The company also plans to market its technology to producers worldwide. [More...](#)

Lignol announces modification to DOE funding

British Columbia-based Lignol Energy Corp. announced that the U.S. DOE has informed its U.S. subsidiary, Lignol Innovations Inc., of a modification to its cooperative agreement. Approximately \$4 million has now been obligated by the DOE as a contribution during phase one of the agreement. Prior to the modification, the funding was set at \$1.56 million. [More...](#)

The 50 Hottest Companies in Bioenergy for 2010-11

In Florida, renewable fuels and chemicals developer Amyris took the #1 spot in the 2010-11 "50 Hottest Companies in Bioenergy" rankings, published today in Biofuels Digest, the online daily bioenergy news service. 2) Solazyme, 3) POET, 4) LS9, 5) Gevo, 6) DuPont Danisco Cellulosic Ethanol, 7) Novozymes, 8) Coskata, 9) Codexis, 10)and Sapphire Energy round out the top 10. [More...](#)

Sweet Success for Brazil

Following the initial success of the world's first use of sugarcane-based ethanol in a gas turbine system, GE has received a contract from Brazil's federal energy company, Petrobras, to convert a second unit at the site to burn this alternative fuel. The power plant serves the city of Juiz de Fora, located northwest of Rio de Janeiro. "Petrobras and GE formed a successful partnership for the conversion of a first aeroderivative gas turbine at UTE Juiz de Fora (MG) for dual-fuel operation—natural gas or ethanol," said Maria da Graça Foster, Petrobras director of gas and energy. [More...](#)

Brazil airline successfully tests aviation biofuel

Brazil's largest airline announced that it has successfully conducted what it called the first experimental flight in Latin America using aviation biofuel. TAM Airlines said in a statement that the 45-minute flight of an Airbus A320 using biofuel made from the seeds of the *Jatropha curcas* tree took place Monday off the coast of Rio de Janeiro. According to Business Week, the flight is the first in Latin America and the sixth worldwide. Japan Airlines, Virgin Atlantic, Air New Zealand and KLM have held similar experimental flights. [More...](#)

Policy and Standards News

Putting algae's promise into perspective

This article explores several frequently encountered claims about the potential promise of algae-to energy systems. The goal was to provide a perspective on the way algae-derived biofuels are portrayed in the popular and scientific press while providing an objective analysis of these claims, based largely on several well-respected LCAs published in the past year. The hope was to provide accurate information for ongoing discussions on this topic. [More...](#)



Ethanol: I Love You, You're Perfect, Now Change

Just twelve months ago the US Department of Energy announced \$564 million in grants to integrated biorefinery projects for pilot, demonstration, and commercial scale facilities. However, most projects have yet to receive their full funding. US Secretary of Energy Steven Chu added to the ongoing debate on the sustainability of biofuels when at the National Press Club he stated that he does not consider ethanol "an ideal transportation fuel". [More...](#)

EPA finalizes 2011 RFS volumes

In November, the U.S. EPA finalized the volume requirements for next year's renewable fuel standard (RFS), reducing the requirements for cellulosic biofuels, but maintaining the overall ethanol volume target. The EPA report stated that the targeted 6.6 million gallons of cellulosic biofuel, is a high enough to provide an incentive for growth within the industry but low enough to balance the uncertainty surrounding actual production levels. "The task of projecting the volume of cellulosic biofuels that could be produced in 2011 is challenging," the EPA stated in its ruling. [More...](#)

OPEC pans biofuels programs in industrialized nations

OPEC has sharply criticized some of the biofuels programs of industrialized countries as it raised its forecast for global oil demand next year. The report stated, "Although these government subsidies are helping the biofuel industry, the negative effect on the environment is vast and the programs place a burden on the public budget". The report also stated that the OPEC biofuel mandates "negatively affect both South America's and Asia's environment as most of the supply is imported from these two regions" [More...](#)

Oil Output Likely Peaked in 2006, Will Be Replaced by Biofuels, IEA Says

Global production of crude probably peaked in 2006, and increasing demand will have to be met from more-difficult-to-extract forms of oil such as tar sands, [International Energy Agency](#) Chief Economist Fatih Birol said. Global energy use is set to increase by 36% over the next 25 years as developing countries raise the standard of living of their citizens by boosting demand for transport, air-conditioning and electronic goods, the IEA estimates. [More...](#)

EPA grants 15 per cent ethanol waiver

Biofuel industry urges agency to start looking at richer ethanol blends - The Environmental Protection Agency (EPA) has passed a waiver enabling a higher blend of ethanol to be sold for new vehicles. Following an 18 month petition from industry groups, the agency will allow fuel containing up to 15 per cent ethanol (E15) to be sold for cars and light trucks made in 2007 and later. The waiver updates an original decision made in the 1970s to allow a 10 per cent ethanol blend. [More...](#)

CRFA unveils Canadian industry report card

The Canadian Renewable Fuels Association released an industry report card during its 7th annual Canadian Renewable Fuels Summit, held in Gatineau, Quebec, highlighting the nation's recent successes and offering an outlook for biofuels progress in Canada. The report, titled "Growing Beyond Oil - Delivering Our Energy Future," was released to conference attendees, industry stakeholders and government officials, and is the first comprehensive review of Canada's biofuels industry. [More...](#)

1.1.1 Biofuels Use Falls Short of Directive's Goal

Total 2009 biofuel use amounted to 12.1 million tonnes of oil equivalent (Mtoe), which represents a four per cent share across all road transport fuels estimated at 300 Mtoe in 2009. The EU needs to raise biofuel consumption by six million tonnes of oil equivalent in 2010 if it is to reach the Directive's goal (5.75 per cent). According to the EurObserv'ER estimates, the slowdown in the growth of European biofuel consumption deepened again. Biofuel use in transport grew by 18.7 per cent between 2008 and 2009, against 30.3 per cent between 2007 and 2008 and 41.8 per cent between 2006 and 2007. [More...](#)

Sustainability News Items

USGS Finds 'Unintended Consequences' to Water from Corn Grown for Biofuels

According to a [new report from the U.S. Geological Survey](#) (USGS), Unintended Consequences of Biofuels Production: The Effects of Large-Scale Crop Conversion on Water Quality and Quantity, growing corn for biofuels production is having unintended effects on water quality and quantity in northwestern Mississippi. USGS researchers found that more water is required to produce corn than to produce cotton in the Mississippi Delta, requiring increased withdrawals of groundwater from the Mississippi River Valley alluvial (MRVA) aquifer for irrigation. This is contributing to rapidly declining water levels in the aquifer. In addition, increased use of nitrogen fertilizer for corn in comparison to cotton could contribute to low dissolved oxygen conditions in the Gulf of Mexico, the report revealed. [More...](#)



Biofuels: Can the Energy Be Sustained?

US Geological Survey scientists present papers regarding the scope and impacts of increased biofuel production in the US. As both corn and corn plant residue are substantial sources of material from which to produce biofuels, the effects of their cultivation and harvesting methods will impact soil fertility and ecosystem integrity. In addition, under conventional management practices, corncob removal has little influence on soil fertility. [More...](#)

Africa: Food vs Fuel debate continues

The director of Friends of the Earth raises concerns about a proposal for reducing greenhouse gas emissions: biofuels. The answer may lie somewhere between the opposing positions. The organization suggests that to gain the maximum emissions reductions while conserving forest cover and biodiversity, biofuel feedstock should come from municipal and industrial waste, residues from crops and sustainably harvested wood, and from perennial plants grown only on degraded land. [More...](#)

South Africa to look at maize for biofuels

Previous policy forbids use of maize for energy. South Africa will review its biofuels policy to include maize to allow farmers to use their surplus crop for energy production, the agriculture minister said. The government unveiled blending ratios for biofuels three years ago but said maize, S.Africa's staple food, could not be used in the production of biofuels in order to ensure food security and keep a lid on high prices. ". [More...](#)

Enerkem meets environmental assessment requirements for its Mississippi waste-to-ethanol plant

Assessment further reinforces Enerkem's position as a first-mover in the commercial advanced biofuels sector. Enerkem, a waste-to-biofuels company, announced that its wholly-owned U.S. affiliate successfully concluded the U.S. federal environmental assessment requirements for its Mississippi waste-to-ethanol plant, which allows the Company to move forward with the project. [More...](#)

Commission launches public consultation on Indirect Land Use Change (ILUC) and Biofuels

The EC has launched a public consultation on Indirect Land Use Change (ILUC) and biofuels, which will run from 30/07/2010 to 31/10/2010. Comments are invited from all biofuels stakeholders and the wider public. [More...](#)

Commission sets up system for certifying sustainable biofuels

The EC will encourage industry, governments and NGOs to set up certification schemes for all types of biofuels, including those imported into the EU. It laid down what the schemes must do to be recognized by the Commission. This will help implement the EU's requirements that biofuels must deliver substantial GHG reductions and should not come from forests, wetlands and nature protection areas. [More...](#)

European Industrial Bioenergy Initiative (EIBI) launches November 2010

An EIBI Team has now been established including representatives from industry, Member States and the European Commission. Following meetings in September and October 2010, the EIBI Team has finalized the [EIBI Implementation Plan](#), and the initiative was formally launched at the [SET Plan Conference](#), under the Belgian Council Presidency, on 15th-16th November 2010. [More...](#)

Certification Criteria for Sustainable Biomass

World Bioenergy Association will present certification criteria for sustainable biomass for energy on Monday 6 December at a press conference at COP16 in Cancún. Biomass for energy has a huge potential to reduce emissions from fossil fuels, which has been shown in a previous paper from WBA, the association said. To mobilize this potential, it is necessary to ensure that production can be done in a sustainable and environmental-friendly way. [More...](#)



RD&D & Funding

Australian scientists find biofuel gene

Researchers at an Adelaide University have successfully isolated a gene that could see commercially viable quantities of biofuel produced. The gene has been identified as causing production of the renewable algae responsible for underground crude oil resources. [More...](#)

Engineered Bugs Help Generate Biofuels

The versatile organism *Lactococcus lactis*, the workhorse bacterium that helps turn milk into cheese, may also be valuable in helping us better understand how microbes turn the organic compound cellulose into biofuels. New research from Concordia University, published in the journal *Microbial Cell Factories*, suggests the bacterium can be engineered to transform plant material into biofuels or other chemicals. [More...](#)

Baking Soda Boosts Oil Production in Algae

Montana State University (US) researchers have discovered that baking soda can dramatically increase algae's production of the key oil precursors for biodiesel. The same ingredient that causes cookies to rise in the oven, the same agent that calms upset stomachs and removes odors from refrigerators is the elusive chemical trigger that scientists have sought since the early 1990s, said Rob Gardner, an MSU graduate student in chemical and biological engineering and a native of Afton, Wyoming. [More...](#)

EERA Launches New Energy Research Programmes

The European Energy Research Alliance, EERA, has launched three new joint energy research programmes on carbon capture and storage and also new materials for nuclear power and bioenergy. More than 1,000 scientists from across Europe are currently involved in joint programmes to accelerate the development of a new generation of energy technologies. After the launch of the first four joint programmes in June this year, EERA now strengthens, expands and optimises the EU's energy research capacity by jointly implementing Pan-European research programmes in accordance with the strategic energy technology plan, the SET-Plan. [More...](#)

Global Biofuel Alliance formed

The Global Biofuels Alliance is a non-profit organization will work to “give a voice to the producers, traders, feedstock providers, and equipment manufacturers of the emerging biofuel industry.” Made up of ten founding members from various energy sectors including energy trading companies, start-up biodiesel companies and large biodiesel production facilities, the alliance has already set its sights on the hottest topic in the biodiesel industry. “The biodiesel tax credit is a key agenda.” [More...](#)

Technology and Innovation

Railway in Hyogo Unveils Biodiesel-Fueled Train

Japan's first train to run on biodiesel fuel, in this case refined edible oil, has taken to the tracks in Hyogo Prefecture. Hojo Railway Co., a third-sector entity financed by the city of Kasai and other organizations, started the environmentally friendly train service to attract tourists and help alleviate the company's deficit. [More...](#)

US Pacific National Lab to work on 'drop in' jet biofuel

New Zealand company LanzaTech has announced plans to work with the Pacific Northwest National Laboratory to convert its biofuel products into a replacement jet fuel. LanzaTech said creating so-called “drop-in” fuels would be a “key enabler” for the biofuel industry. “The biofuels that will succeed must be compatible with existing engines, pipelines and refineries. LanzaTech's integration of the fuels and chemicals value chain enables economic viability, as well as being environmentally sound.” [More...](#)

Algae Biodiesel Project for Chile

Algae Fuels S.A. has developed second generation biodiesel from microalgae in its pilot plant in Mejillones in Chile. Algae Fuels is a venture between E-CL, Copec, Pontificia Universidad Católica de Chile, Rentapack and Bioscan. The project has attracted total investment of CLP 6.836 million (\$14.1 million), of which CLP 3.245 million (\$6.7 million) was provided by InnovaChile, according to a report on FIS. [More...](#)

China Integrated Energy Biodiesel Business Growing

Since commencing production in its 100,000 metric ton (MT) biodiesel production facility in October 2007, China Integrated Energy has grown its biodiesel business steadily. With the recent acquisition of the 50,000 MT biodiesel production facility in Chongqing City and the upcoming completion of a new 50,000 MT biodiesel production facility in Tongchuan City, the Company will double its biodiesel production capacity to 200,000 MT per annum. [More...](#)

New Advanced Algae Centre in New Mexico

OriginOil has been selected to help build a new Advanced Algae Centre devoted to algae commercialization. Sustainable Resources, Inc. (SRI) has agreed to contract with OriginOil to plan and deploy the new centre. The Centre will be located on the site of the original Aquatic Species Programme in Roswell, New Mexico. [More...](#)

Biogas from Sugar Beets

Interest is focusing both on mixing beets in with other substrates and on using beets alone in mono-fermentation. For the sugar beet to be used as a substrate in the biogas fermenter, the beet must first be prepared with appropriate machinery and equipment and be ensiled for the feedstock. [More...](#)

Upcoming Task 39 Meetings

The following is a tentative schedule of Task 39 meetings over the course the next two years (2010-2012):

- Australia - December 2010 (w/Bioenergy Australia) *completed*
- Seattle, USA - 1-5 May 2011 (Business meeting/Special Session, 33rd Symposium)
- Brazil - August 2011
- Denmark - April/May 2012 (possible joint-Task meeting 39, 42, 43)
- Austria - September 2012 (possible Multi-task conference)



Visit Task 39 at www.task39.org

We invite you to [submit a NEWS item](#) for the next IEA Bioenergy Task 39 Newsletter