

Airneth Report 12

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Airneth seminar 'Future of oil in the aviation industry'

10 December 2009

Bilderberg Europa Hotel - The Hague, The Netherlands





Summary of the workshop

On 10 December 2009, Airneth organized a seminar to discuss the development of the oil market and the future role of alternative fuels for aviation. The main conclusions of this meeting can be summarized as followed:

- As long as the global population grows (mainly China/India) and as soon as the economy starts to recover, the demand for energy will continue its growth path.
- The provision of oil for the future is not secure due to political, logistical and economic instability.
- The geopolitical landscape and international energy market have changed. Upcoming markets gain more influence in the energy market and the use of fossil fuels has shifted from developed to developing countries.
- Technological development in alternative fuels for aviation is necessary with regard to long term sustainability, but the best way to manage the existing energy quantity on short term is by saving energy and fuel efficiency.
- Every party involved has to take its responsibility for the climate and form coalitions between various levels of societies and government, to establish a new energy framework and sustainable aviation.
- Production of kerosene from algae oil still has to develop. Not only a technological innovation, but also a system change to urban farming is needed for the production of algae oil.
- Even if urban farming becomes a success, it will never be the ultimate answer for the energy problems we are currently facing in aviation.

The presentations of this workshop are available at the Airneth website:
http://www.airneth.com/index.php/cat_view/33-activities/94-10-12-09-future-of-oil-in-the-aviation-industry.html

Introduction

Crude oil price has been extremely volatile in the recent 18 months. The price of crude oil reached a peak in Summer 2008 of more than \$ 147 per barrel. It fell below \$ 34 in February 2009, but has now again more than doubled from then. Economic recovery will further stimulate demand for oil. At the same time, oil production capacity is falling by several percent per year. The question is if this will lead to new peaks in the price of crude oil.

High oil prices have large implications for aviation. Whereas other industries are able to save on fossil fuels or have energy substitutes available, aviation will keep tied to kerosene for many years, if not decades.

Airneth organized a meeting where a number of speakers addressed the future demand and supply for oil. Implications for aviation were sketched. In this report we



have summarized the results of this seminar.

The views expressed in this document are not necessarily those of Airneth. Airneth has summarized the results of the meeting as accurate as possible. Any errors in this report remain ours.

International oil markets and the role of bio fuels – Lucia van Geuns (Clingendael Institute)

In her presentation, Lucia van Geuns addresses the worldwide demand and supply for energy. She gives an overview of the major bottlenecks in the future supply of energy, originating from changes in the geopolitical landscape and international energy market.

The financial crisis has delayed the global increase in the demand for energy. As long as the global population grows and as soon as the economy starts to recover, the demand for energy will continue its growth path. Non-OECD states (mainly China, India and the Middle East) will be responsible for 87% of the growth in energy demand between 2006 en 2030. In the same period, 97% of the extra CO₂ emissions will originate from non-OECD states.

Fossil fuels will continue to dominate the fuel mix. Oil will remain the leading fuel. Renewable energy and other non-fossil energy sources grow fast but will take account of only a small share of the energy market.

Chinese and Indian oil companies are competing for reserves with other majors oil companies but they do not always have a profit motive (in the short term) but a (government) assignment to secure flows to China/India.

There are insecurities regarding the future provision of oil. These insecurities are:

- More import from politically and economically instable energy producing countries
- Competition with other consuming countries
- Traffic bottlenecks on trade routes
- Diversification and the search for alternative fuels is difficult because of the limited production of durable energy
- Limitations in energy policy instruments

Current changes in the geopolitical landscape and international energy market are:

- Upcoming markets such as India and China, have led to a system change on economic and political level.
- These new states prefer to trade on a bilateral bases instead of the ruling multilateral or global way of established countries. That is why we see a shift from globalization/multilateralism into bilateralism.
- OECD countries show lower growth in the use of fossil energy. We see that developing countries have more interest in the use of fossil energy. There is a relative shift to developing countries regarding the need for fossil energy.



- Governments of energy producing countries have professionalized the management of their raw materials.

Technological development is necessary for coping with the future demand for energy, but the best way to manage the energy challenge is to reduce energy consumption using existing technology. Investments in energy production are uncertain in the current economic climate and will depend on the time span of the recession.

Road to sustainable aviation fuels – Dirk Kronemeijer (KLM)

KLM has recently performed a test flight, using biofuels for one of the aircraft engines. Dirk Kronemeijer discusses KLM's policy to reduce its energy consumption.

Air France-KLM have developed a climate change action plan in which alternative fuels are key to bridge the mid-term gap from fossil fuel to alternative fuels, by means of breakthrough technologies. To reach 20% reduction of CO₂ (from 2005) in 2020, Air France-KLM should change one third of yearly fuel consumption into bio fuels.

The biofuels of KLM should be ecologically sustainable without competition with food supply, deforestation, but with respect for biodiversity. The KLM judges these criteria in close cooperation with the WWF. Biofuels have to be an interchangeable alternative with fossil kerosene. Then, no adjustments are needed for the engines, aircraft and infrastructure. Furthermore, bio fuels have to be affordable.

On 23 November 2009, KLM had the first demo flight with bio kerosene. Together with North Sea Petroleum and Spring Associates, KLM started a bio fuel consortium. This consortium will work together to develop sustainable fuels for aviation.

Not only KLM, but many parties have to take their responsibility. The government has to support the right development climate by legislation and subsidies.

More information about the KLM demo flight with bio kerosene:
<http://www.klmbiofuels2009.com/index.htm>

Shell energy scenarios 2050 – Ewald Breunese (Shell Nederland B.V.)

Ewald Breunese sheds light on the way Shell sees the future of energy demand and supply in its energy scenarios 2050. He asks the question if the future will surrender to energy nationalism and reactive change, or will coalitions between



various levels of societies and government begin to add up to a new energy framework.

The energy resources are estimated to be about 480 exajoule (10^{18} joule) per year (in 2007). The primary energy is converted to the energy we consume. This convergence may take place through refining or other processes to give liquid, solid or gaseous fuels. The other route is through power generation where the primary energy is converted to electricity. In 2007, total final consumption for the world was estimated at 335 exajoule per year. This means we lose approx 30% of the primary energy we put into the system.

As countries become wealthier, the world will be consuming more than 1.5 times the energy compared to today by 2025 and double the amount compared to today by 2050. Direct CO₂ emissions from energy could rise dramatically. Changes in energy use are necessary. On the other hand, supply will struggle to keep pace. Environmental stress and the rise of CO₂ emissions, which will lead to even more global warming, will increase even more.

Will national governments simply seek to secure their own energy supplies: a world of ‘scramble’? A world where political activity at national level is particularly dominant, which will result in a world colored by energy nationalism and reactive change.

Or will new ‘blueprints’ emerge from coalitions between various levels of societies and government, ranging from the local to the international, that begin to add up to a new energy framework? A world which explores the power of emerging coalitions with shared interests and the benefits of taking action before it’s too late.

Shell energy scenarios explore the world through these two contrasting outlooks. Their purpose is to help people question and review the forces that determine their energy futures.

What is clear, is that remaining on traditional pathways of energy use, “business as usual” is not sustainable, in terms of meeting such demand and in terms of the potentially catastrophic effects of emission growth. No single technology can provide the answer.

Governments and the regulatory arena will play a significant role in shaping what ultimately the energy system looks like in the decades to come and the consequences for the climate.

Urban Farming, Long Term future with Algae? – Carel Callenbach (Ingrepro B.V.)

Energy extracted from algae have been frequently mentioned as a potential fuel substitute for aviation. Carel Callenbach is director of an algae producing company. He discusses the potential of algae in meeting future energy needs in



general and in the aviation sector in particular. He highlights that algae production is not the ultimate answer to the energy shortages.

From a sustainability perspective, growing algae has a number of advantages. Algae have a ten times higher growth rate than traditional crops and there is not much competition with other crops. Algae can clean dirty water. The bio mass of algae contain numerous valuable ingredients. Working with algae is CO₂ neutral, has a low energy use, output is clean water, and algae oil is a by-product.

With respect to producing algae oil, the value chain starts with collecting dirty water where algae can grow. The growing amount of algae can be used to produce algae oil, which can further be developed into bio kerosene.

Since urban farming of algae is in its initial phase and is dependent on the waste producer, it is still hard to have a breakthrough in production. Therefore, it has not been applied on a large scale yet. Even if urban farming became a success, it will never be the solution for the energy problems we are currently facing.

Production of kerosene from algae oil still has to develop. Not only a technological innovation, but also a system change to urban farming is necessary to develop bio fuels.

Main issues during the panel discussion

- What should the government do to encourage the development of bio fuels?

The government could subsidize the production of bio fuels and give incentives for the business firms to innovate as well. Raw materials for production of bio fuels can also be cultivated in the Netherlands or Europe, instead of third world countries.

There are European policies regarding this issue, which seem to work well. Some EU states are better equipped to cultivate bio mass, these states need to be stimulated by the EU and overall goals for bio fuels have to raise.

- Investments for the production of oil are declining, which will lead to higher oil prices.

Oil companies do not have much influence over investments of producers. However, there is a change in investment policies in OPEC and Middle East countries. Next to harvesting the oil, they are increasingly interested in refining the oil before selling. This way, these countries will have more influence on the price and availability of oil.

- The Emission Trading System (ETS) is a blueprint scenario in which CO₂ emissions can be traded. This could mean that the aviation sector does not need bio fuels.

Next to the ETS, there is also EU legislation. This legislation makes the use of renewable energy compulsory. This way CO₂ emissions are being reduced and plans for alternative energy is being stimulated. Hence, the development and marketing of



bio fuels is secured. Commitment by government authorities offers certainty to investors, which makes it possible to reach the compulsory amount of bio fuel.

- Low oil prices are important, but efficiency even more.

Energy savings are profitable. In the automobile industry it is really common to produce green label cars. In the aviation industry new airplanes are built lighter because they are more fuel efficient. With high energy prices, the drive to create more fuel efficient airplanes increases. The higher fuel prices have encouraged KLM to be actively involved in the production of oil. This is called backward integration.

- What are the effects of artificial high oil prices?

Keeping the oil prices artificially high occurs in countries with a more centralized economic system, such as China, Indonesia and India. This would not work in an open system like in the EU. Hedging does occur in the EU, but when oil prices decline, the popularity of hedging also shrinks.

The program and presentations concerning this seminar can be found on our website www.airneth.com.