Biomass Outlook 2014: Is Biomass About To Go Bang?

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Biomass offers a multitude of advantages in a world increasingly focused on both renewable heat and grid stability. For the market to really catch alight more needs to be done to foster a liquid international trading market, but how far can bio go?

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LONDON -- Traditional biomass accounts for some 9 percent of the world's total energy requirements, still more than is provided by modern renewables collectively. Nonetheless, modern renewables, and modern biomass with it, is catching up fast. The share of traditional biomass fuels has remained fairly static over the last decade or two, while modern renewables have soared.

Renewable energy is the fastest growing source of electricity generation, according to the International Energy Agency's (IEA) International Energy Outlook 2013 Reference case, projecting an average 2.8 percent per year growth from 2010 to 2040. For example, the U.S. Energy Information Agency (EIA) projects renewable energy consumption for electricity and heat generation in all sectors of the U.S. to increase by 2.2 percent in 2014, compared with 3.6 percent growth in 2013.

However, while traditional biomass use remains static, this sets the context for a significant increase in bioenergy demand for modern applications. Widely anticipated in the coming years, it's being driven by high oil prices, climate change and renewable energy policy action and security of energy supply concerns. Since bioenergy spans a vast range of resources from wood and pellets through to energy crops and waste streams it offers a diverse and often readily available energy resource.

Bioenergy also presents an opportunity for rural development and for the agricultural sector in particular, potentially helping to meet key social development goals. Indeed, bioenergy signals a significant new market for agricultural producers.

As with any fledgling market, there are inevitably issues to be overcome if bioenergy is to truly thrive. For instance production of agricultural products such as maize when used for bioenergy have become an issue of contention for some – think of the food versus fuel debates of years past– while others have questioned the sustainability and greenhouse gas balance of some energy crops, for instance poorly sited palm oil plantations. Sustainability issues aside, there is also a requirement for the further development of a flexible international trading market for biomass and related products, such as pellets, to securely match supply and demand in various global markets. Along with hydropower and geothermal, biomass power and heat is, nonetheless, among the most mature renewable energy technologies, with large potential markets for second generation biofuels from agricultural and forestry waste streams and from energy crops grown on otherwise unproductive land.

A Future Market for Biomass

Even a casual analysis suggests that renewable energy markets are projected to grow strongly in the coming decade and beyond, led by policies such as European Commission 2020 Directives to Member States, which are expected to accelerate the development of renewable heating for example.

Energy policy will remain a key influence in the future development of bioenergy markets. In particular, analysis such as REN-21's latest Global Financial Report (GFR), highlights a range of future policies to support renewable heating and cooling in buildings as well those addressing the integration of variable output renewables. Measures include the possible development of new market rules for balancing services, demand response and other grid reliability services, which would favor the development of controllable thermal generation, such as biomass.

Biomass also offers a key mechanism for the use of renewable energy in industrial applications and has largely dominated the sector to date as far as renewables are concerned. Though most often seen in applications where there is both a ready stream of process waste materials and a considerable demand for heat and process steam - such as bagasse from sugar mills or wood residues from the pulp and paper industries – there is evidence that technological developments are set to expand the use of bioenergy in industrial settings. There are also opportunities for the chemical industry to utilise solid biomass and liquid biofuels as industrial feedstocks for organic chemistry in the future.

As a result, the IEA's 2012 World Energy Outlook, for example, projects that, by 2035, bioenergy use for heating could grow by more than 60 percent.

Outlook on Biomass

The EU is by far the biggest pellet consumer worldwide, burning some 15 million tonnes in 2012. According the latest available figures from Aebiom, the European biomass energy association, biomass accounted for 8.4 percent of the total final energy consumption in Europe in 2011, while in some Baltic countries, such as Estonia, Latvia, Finland and Sweden, the figure is above 25 percent. The trade group adds that EU pellet consumption for heating has grown by more than one million tonnes per year since 2010.

Looking ahead, in a recent Aebiom forecast scenario, in 2020 the overall share of renewable energy in Europe will have reached 20.7 percent, with biomass, including transport, covering 56.5 percent of total energy.

Their analysis of the European Member State National Renewable Energy Action Plans (NREAPs) concludes that the total contribution of bioenergy in 2020 will be 138.3 Mtoe, with heating by far the most important sector - accounting for 65 percent of the total while transport accounts for 21 percent and electricity 14 percent.

Another perspective on the future for the European bioenergy supply chain comes in a new report from Rabobank. It concludes that increasing competition for solid biomass, such as wood pellets, will create space for relatively novel biomass sources to enter the market. They argue that the practical challenges of using agricultural residues such as straw and stover will be

overcome because their supply costs will be among the lowest. Consequently Rabobank believes that agricultural residues will have an increasing role in the use and potentially trade of biomass for energy by 2020.

"The importance of bioenergy will continue to grow in Europe as it is one of the cheapest renewable energy options, and one of few to supply continuous renewable heat and power on a large scale," explains Rabobank analyst Paul Bosch. "However, as the price of solid biomass increases, the search for non-forestry alternative biomass options will continue to rise."

Their analysis finds the business case for agricultural residues compelling, concluding that compared with wood pellet co-firing, dedicated agricultural residue-fired plants could save between EUR 15 million and EUR 63 million, before taking subsidies into account.

Bosch continues: "Supply chain issues, which can arise from sourcing from a large number of suppliers, have so far prevented the widespread exploitation of agricultural residues, but with demand for bioenergy on the rise globally and a slow supply response, the question is whether bioenergy producers can afford not to tackle these issues."

Signaling an opportunity for a positive outlook he concluded: "Initiatives in the UK and Denmark are showing that the business case for agricultural residues in bioenergy projects can work, on a relatively large scale, indicating the potential to replicate similar projects across Europe."

In considering a global forecast for bioenergy in the coming years, a recent study from the International Renewable Energy Agency (IRENA) and the German Biomass Research Centre (DBFZ) “Biomass Potential in Africa,” is perhaps instructive.

At IRENA’s behest, the DBFZ collected recent studies assessing bioenergy potential in Africa, compared their various methodologies, benchmarked the results, and identified the key elements. The organization concluded that the studies show an enormous range of calculated biomass potentials, for example representing a productive area range of 1.5 million to 150 million ha. Similarly, the various assessments indicate a potential for energy crops from 0 PJ/yr to 13,900 PJ/yr, between 0 PJ/yr and 5400 PJ/yr for forestry biomass, and 10 PJ/yr to 5254 PJ/yr for residues and waste in Africa by 2020.

The analysis drily observes: “Due to the large range in results presented by the reviewed studies, no definite figures regarding the availability of biomass in Africa can be provided.”

But then, as much in Africa as anywhere else, with resources, demand, markets and technology, like nature itself, bioenergy really is a world of possibilities

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