BIOENERGY

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WORLD BIOENERGY ASSOCIATION

World Bioenergy 2008

From fossil oil in Norway to renewable oil in Ghana

World Bioenergy Association is born

Digging for green gold in Ghana

Homegardens can help save forests

Certification is the key for sustainability

Welcome to

WORLD BIOENERGY & CLEAN VEHICLES AND FUELS 2009

Conference & Exhibition on Biomass for Energy

14 - 18 SEPTEMBER 2009, STOCKHOLM - SWEDEN

"SPECIAL EDITION"

Photo: iStockphoto, Ugur Evirgen

World Bioenergy Association is born

CONTENTS

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At the end of May during World Bioenergy 2008 in Jönköping, Sweden, an invitation-only meeting was arranged with people engaged in bioenergy from all parts of the world. Of eleven people invited, six showed up for the meeting. These six participants decided to form the interim board of a new global body concerned with all kinds of bioenergy. The five remaining invitees were also asked to be members of the interim board. The name of this new body is the World Bioenergy Association (WBA). The board represents different kinds of bioenergy, as well as broad and deep knowledge in questions connected to bioenergy and biofuels. The board members also represent different parts of the world – all continents are included. You can find information about the board at WBA's website: www.worldbioenergy.org.

After this first board meeting a birthday party took place, and what a great party it was. Almost 300 people attended, and 13 organisations and companies signed up to become members of WBA. Many more asked for information, and we're currently working hard to get them what they need.

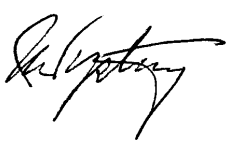
When we took the initiative to form this new association we felt unsure about how our proposal would be received. We called around and listened, and were met with a positive response. Our conclusion was that there is a need for a global, non-governmental association for bioenergy, just as there are already global organisations for many other kinds of energy.

With what remains a very small secretariat, we are working out many of the basic issues associated with launching a new organisation, such as registration, completing the board, forming statutes, rules and member fees, starting a website, producing information material and a magazine, as well as communicating with those who have already contacted us—and those who ought to.

First and foremost, however, the purpose of WBA is to spread information, to correct disinformation, to point out the road to a sustainable and climate neutral society in the energy field, and to develop all the issues we have listed in the action plan adopted in Jönköping (see the document on our website).

Even though we have many ideas and big ambitions, we remain humble before our mission, and we are depending on you all to help us identify the issues which we need to prioritise. Don't hesitate to e-mail me with your thoughts at: kent.nystrom@worldbioenergy.org! I look forward to hearing from you.

With best regards,



Kent Nyström
President, World Bioenergy Association

The World Bioenergy Association Birthday Reception

Almost half of the World Bioenergy Association's interim board was present for WBA's birthday party on May 28th, 2008. From the left, Tetsunari Lida from the Institution for Sustainable Energy Policies in Japan; Kent Nystrom, President and Chairman of the WBA board; Andrew Lang, Chairman of SMARTimbers in Australia; Sribas C. Bhattacharya, President of the International Energy Initiative in India; and Heinz Kopetz, President of the European Biomass Association in Belgium. Photo: Anders Haaker

Marcos Martin Larranaga from Avebiom in Valadolid, Spain (left) is first one to fill out his application for World Bioenergy Association membership and hand it in to WBA President Kent Nyström (right). Photos: Anders Haaker

Surapan Supadirekkul from Quantum International in Thailand was among the 300 people celebrating the World Bioenergy Association. Photo: Anders Haaker

A delighted Kent Nyström addresses the audience about what lies ahead for WBA (right). Photo: Anders Haaker

Introducing the WBA Board of Directors

You can find more information about the Board as well as contact details at: www.worldbioenergy.org

Sribas C. Bhattacharya, International Energy Initiative
Mr. Bhattacharya is the President of the International Energy Initiative, an NGO focused on further developing the analysis of sustainable energy development and translating these ideas into practice.

Douglas R. Bradley, Climate Change Solutions and Canadian Bionergy Association
Mr. Bradley supplies expert advice and develops business-based solutions for industry, NGOs, governments, and other organisations, specialising in bioenergy, greenhouse gas mitigation, and forest carbon sequestration.

Heinz Kopetz, European Biomass Association (AEBIOM)
AEBIOM is a non profit, Brussels-based international organisation represents 32 national biomass organisations in Europe with the mission of representing bioenergy at the EU-level.

William "Bill" Holmberg, American Council of Renewable Energy (ACORE)
ACORE is a Washington, DC-based non-profit organization which is convening industry leaders, publishes collaborative research, and facilitates communications among members, their stakeholders, and the media. With a focus on trade, finance and policy, ACORE promotes all renewable energy options for the production of electricity, hydrogen, fuels and end-use energy.

Tetsunari Lida, Institution for Sustainable Energy Policies (ISEP)
ISEP is an independent, non-profit research organisation, founded in 2000 by energy experts and climate change campaigners. Through their work they aim to provide resources and services to implement sustainable energy policies. Their main activities include the promotion of renewable energy, the improvement of energy efficiency, and the restructuring of the energy market.

Judi W. Wakhungu, African Centre for Technology Studies (ACTS)
ACTS is a Nairobi-based international intergovernmental science, technology and environmental policy think tank that generates and disseminates new knowledge through policy analysis, capacity building and outreach.

Jennipher Handoondo, Zambia National Farmers Union's Oil Seed Commodity Unit
Ms. Handoondo is the chairperson of the Zambia National Farmers Union's Oil Seed Commodity Unit. She's an expert on Oil Seed Commodity and promoting Jatropha on farm level in Zambia.

Australia – to be confirmed

South America – to be confirmed

Kai Johan Jiang, Dragon Power Group, Co., Ltd
Mr. Jiang is the Chairman and CEO of Dragon Power Group Co., Ltd, and Chairman of National Bio Energy Group Co., Ltd He also serves as an economic advisor to the Shandong provincial government.

Kent Nyström, President of World Bioenergy Association
Mr. Nyström is the former Managing Director of Svebio, Swedish Bioenergy Association. Svebio promotes bioenergy and consists of around 400 members, most of them enterprises active in producing, providing, and using biofuels (solid, liquid, gaseous) or manufacturing and using bioenergy equipment.

Secretariat:
Karin Haara, Executive Assistant to the President, World Bioenergy Association
Ms. Haara has been working in the field of biomass and bioenergy for Svebio since 1983. She has extensive experience promoting education and information programmes, organising conferences (national and international), as well as coordinating international projects and bioenergy export issues.

Some more information from a few members of the Board...

Name: Jennipher Handoondo

From: Choma, Zambia

Organisation: Zambia Nation Farmers Union

I am a member of the board because I want to: contribute towards the faster development of bioenergy in my country and worldwide.

Important issue at home right now: biofuels research on jatropha, a vision for the development of the biofuels sector, and ensuring that the proposed goals are in line with the National Energy Policy. Having the roles for all identifiable stakeholders (private sectors, NGOs, donors, local communities, etc.) assigned is also important for implementing the biofuels strategy.

Important issue globally right now: to clear up the controversy surrounding the potential environmental impact of bioenergy, especially when it comes to the jatropha plant.

Special interest/knowledge in the bioenergy area: resource assessment, policies and incentives.

Contact: jennipherhandoondo@yahoo.com

Name: Heinz Kopetz

From: Vienna, Austria

Organisation: European Biomass Association, Austrian Biomass Association

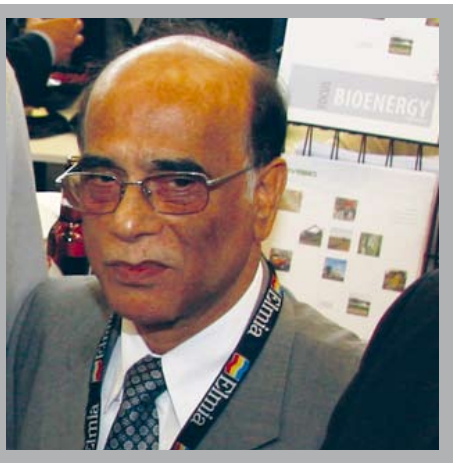
I am a member of the board because I want to: contribute to the sustainable use of biomass as a renewable energy source on a global scale and thus reduce CO_2 emissions.

Important issue at home right now: the new directive of the EU authorities on the future development of renewable energy sources in Europe.

Important issue globally right now: a balanced development of transportation fuels using the potential of world agriculture without harming the security of food supply.

Special interest/knowledge in the bioenergy area: The efficient use of biomass in the heating and electricity sectors. Three decades of experience in the field developing biomass as an energy carrier by developing information and training campaigns as well as government programmes to promote bioenergy in the fields of heat, electricity and transportation fuels.

Contact: hg.kopetz@netway.at



Name: S.C. Bhattacharya

From: Kolkata, India

Organisation: International Energy Initiative

I am a member of the board because I want to: contribute towards the faster development of bioenergy worldwide.

Important issue at home right now: establishing the Indian Bioenergy Association and building awareness about bioenergy's potential and benefits for India.

Important issue globally right now: to clear the controversy regarding environmental impacts of biofuels and actively participate in the food versus fuel debate. It is important to show that biomass can be used as a major sustainable energy source, can contribute towards reducing dependence on fossil fuels, generate employment, and can even increase biodiversity, for example by cultivating degraded land.

Special interest/knowledge in the bioenergy area: Thermochemical biomass conversion, resource assessment, policies and incentives.

Other comments: Accelerating the pace of renewable energy/bioenergy development has become particularly important in view of the currently prevailing high price of oil and the likelihood that high prices will continue in the future. I hope that the World Bioenergy Association will provide an effective forum to foster activities for the rapid commercialisation of bioenergy.

Contact: sribasb@gmail.com

Name: Douglas R. Bradley

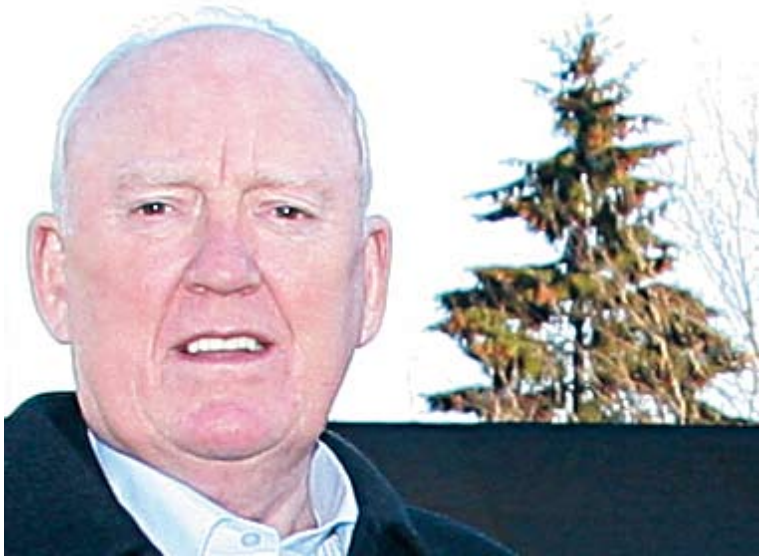
From: Ottawa, Canada

Organisations: Canadian Bioenergy Association (CanBio), and Climate Change Solutions, a private consulting firm

I am a member of the board because I want to: promote information exchange between Canada and Scandinavia to enable implementation of bioenergy development.

Important issue at home right now: due to changes in government and other reasons, climate change legislation in Canada has lagged behind Europe. However, governments are committed to reducing greenhouse gas emissions, and are now assessing what is the best legislation to achieve those reductions. Forestry provinces are looking at mechanisms to enable fair allocation of harvest residues.

Contact: douglas.bradley@rogers.com



Mr. Jan Reinås, chairman of the board, Biofuel AS. Photo: Anders Haaker

From fossil oil in Norway to renewable oil in Ghana

As the first jatropha farmer in Ghana, BioFuel Africa Ltd. (Ghana), a subsidiary of BioFuel AS (Norway), gained Environmental Protection Agency (EPA) approval in February 2008 to cultivate and plant jatropha in a 23,000 hectare area in the Northern Region of Ghana.

By Anders Haaker

All new agriculture projects above 40 hectares require approval from Ghana's EPA. If the project involves an energy crop such as jatropha, the limit is 10 hectares. Part of the EPA process involves a baseline study for the fauna, water, and soil, among other things. The baseline points will be continuously monitored to ensure that all activities are in compliance with the permit provided. BioFuel Africa is committed to community projects like water collection and harvesting, sanitary projects, health, environment, safety, in addition to adult and primary school education.

The local community will appoint representatives to a board which also includes members from BioFuel Africa Ltd. This committee will recommend projects to BioFuel Africa. In addition, the community will add with their own manpower, which is a very important contribution and creates local community ownership to the projects. Last, but not least, our activities should increase food production by the plowing of food production fields. In addition, land between jatropha rows will be converted into grassland for goats and sheep.

Private placement

In October 2007, First Securities (Norway) raised USD 6.5 million in a private placement to help the company develop further. The goal is to produce the first commercial oil in the fourth quarter of 2008, and within eight years to produce 25,000 barrels of jatropha crude oil per day.

Also in October 2007, Jan Reinås became Chairman of the Board of the Stavanger-based biofuel company BioFuel AS, which produces biodiesel from the cost-efficient jatropha plant.

"Mr. Reinas's long-standing international experience as well as the industrial competence he has gained from world-leading companies will be of great importance to us, especially for the phase we are currently entering," says BioFuel AS CEO Steinar Kolnes. Reinås was previously chairman of the board of Norsk Hydro, a major Norwegian oil producer which recently merged with Statoil.

The private placement is set to finance the cultivation of the first 20,000 hectares of arable land. The company has contracted 22,000 hectares of privately managed land and secured a letter of intent for 288,000 hectares. The organisation in Ghana presently includes sixteen Norwegian farmers with experience in large scale farming, ecologic farming, agronomy, and operations in developing countries. Together they will lead an organisation totalling 160 people.

The board consists of Jan Reinås, Finn Byberg, Arne Helvig, Stian Vemmestad, and Odd-Even Bustnes. Currently, the main shareholders are NorFuel AS (financed through SåkorninVest II, Rogaland Vekst, Radiance and Hafslund Venture), the founders, and a number of private investors.

Creating a workable, internationally applicable system for sustainability certification is vital to promoting public acceptance and a functioning market for biofuels. A German consulting firm is currently working on developing such a system and plans to present its results sometime in 2010.

By Dr. Norbert Schmitz

Certification is the key for sustainability

As production volumes and quota mandates for biofuels increase, sustainability risks increase as well. The recent unfavourable press reports which have nearly stopped biofuels development in its tracks serve as an important reminder that if biofuels are to succeed as an alternative to fossil fuels, they need to be produced in a sustainable manner. Moreover, it's more important than ever to reliably demonstrate that the advantages of biofuels exceed the cost of potential environmental damage caused by their production.

Artificial markets

Sustainability has proven itself to be a critical aspect of the biofuels debate now underway in the political arena. Currently, biofuels markets are more or less artificial, as demand is created by regulatory measures such as tax incentives or blending quotas for the fuel industry. Therefore, market development very much depends on political support.

However, the external effects of biofuels production are not currently covered by any existing market mechanism. Therefore, an instrument is required which addresses the most pressing sustainability issues of biofuels production.

Legislative developments

Legislation is in preparation requiring the use of sustainable biofuels, both on European level (Renewable Energy Directive, Fuel Quality Directive) and on national level (e.g. Biomass Sustainability Order in Germany). But so far, there is no system in place allowing users to distinguish between "good" and "bad" biofuels.

Germany's biofuels quota law, for example, states that "Energy products are to be recognised as biofuels only if the biomass production achieves specific requirements of sustainable agricultural management, or if it fulfils certain requirements for the protection of natural areas or if the energy production offers a certain potential avoidance of CO_2."

The European Union (EU), which wants to introduce a sustainability certification system, has similar ideas. Areas which contain large amounts of stored carbon or with high levels of biodiversity should not be transformed into areas for agricultural biomass production for biofuels. Moreover, the EU wants to minimize the use of conversion processes with low net energy yields, while at the same time doing more to promote second generation biofuels with better greenhouse emissions balances.

While several sustainability and certification initiatives are currently underway, such systems will only be effective if there is widespread international coordination. Otherwise, there is a risk of creating a complex web of certification processes which could require producers to go through multiple certifications and registrations. The ultimate outcome may be a lack of confidence – and perhaps compliance – with the various systems in place, as well as charges of international trade discrimination.

International Sustainability and Carbon Certification

By instead relying on a coordinated, multi-stakeholder approach, which includes companies and organisations from Europe, the Americas, and Asia, it may be possible to ensure sustainability along the biofuels production chain without hampering free trade.

In this context, the German Federal Ministry of Food, Agriculture and Consumer Protection, through its Agency for Renewable Resources (Fachagentur Nachwachsende Rohstoffe – FNR) is supporting the development and testing of an implementable certification scheme for sustainable biomass and bioenergy production. Known as the International Sustainability and Carbon Certification (ISCC) Project, the project is currently undergoing testing in a process-oriented pilot phase to explore how to create a workable, international sustainability certification system for biofuels. Managed by Meó Corporate Development GmbH, the certification project is a multi-stakeholder process. It involves stakeholders from all market participants along the value chain, including NGOs and research institutes from different countries. They participate in discussing and developing the sustainability criteria, standards, rules and procedures for certification. Finally, once the pilot phase is finished, the hope is that ISCC will evolve into an international and independent organisation in order to ensure confidence in sustainable biofuels.

The proposed certification system will focus on the most pressing sustainability issues, such as conversion of high carbon density and high nature value land. In addition, "major-" and "minor must"-criteria have been developed to more broadly assess sustainability. Plans are to ensure the

creation of a voluntary, cost-effective certification system which would also guarantee transparency, participation, democracy, and equity. Basing the system on internationally agreed standards and practices, as well as making it applicable for biomass irrespective of further use for fuel, feedstock or food will also be keys to its success. The proposal also includes the incorporation of already existing standards and the issuance of two separate certificates: one for sustainability of biomass production; and one for greenhouse gas emissions.

An operational framework

Implementing the ISCC project is challenging due to high complexity and conflicting interests. Therefore, the project is designed as a continuous learning process. Nevertheless, ISCC wants to offer a solution to the need for reliable certificates as soon as possible, as customers are already requesting a supply of sustainable biofuels despite the fact that the regulatory framework conditions are not in place yet.

While having an accepted and widely applied biofuels certification system is important, it is no substitute for good governance and regulation at the company and national level. Moreover, a certification system isn't likely to solve environmental problems such as conflicts over resource availability, nor will it protect from discrimination against smallholders. However, certification systems can provide the operational framework for verifying whether biomass and biofuels are cultivated and processed in a sustainable manner, which is an important step to the industry's continued development

In the end, the ISCC project will translate sustainability requirements set by politics into standards and guidelines for certification. The ISCC scheme will be used by producers along the value chain as proof of fulfilment of the sustainability requirements. These requirements will be first used for pilot certifications, which will in turn serve as the basis for recognised certificates. The certificates will be linked with the certified land as well and both will be recorded in a central registry, thus avoiding double or triple use of already certified areas. Thus, certification is a sensible approach to assuaging public doubts about sustainability in biofuels production and for encouraging best practices in this fast growing and increasingly important sector.

Dr. Norbert Schmitz is a consultant with the meó Consulting Team and Project Director for the ISCC.

Certification can help ensure that soybeans used for biofuels are produced in a sustainable manner. Photo: Tracy Tucker, iStockphoto

GEXSI has made the very first global market study of the jatropha industry. The result was presented in May and this is a summary of the results.

1 billion USD invested in the jatropha industry every year

The jatropha industy is in a very early stage of development. Until May 2008, no coherent overview of global activities in jatropha existed. For this first global market study, GEXSI interviewed more than 170 experts in 55 countries and collected 160 online questionnaires to create a first global inventory of jatropha projects. The general result is that the jatropha industry is still in a very early stage: very few projects are more than two years old and hardly any project can demonstrate significant production of jatropha oil yet.

Jatropha will see enormous growth

Although the industry is in its early stages, we could identify 242 jatropha projects, totalling approximately 900,000 hectares. More than 85 percent of the land cultivated is located in Asia. Africa counts for approximately 120,000 hectares followed by Latin America with approximately 20,000 hectares.

Five million hectares are expected by 2010. The number and size of jatropha projects currently being developed is increasing sharply. This is the case in almost all regions of the world which are suitable for jatropha cultivation. It is predicted that each year for the next 5 to 7 years approximately 1.5 to 2 million hectares of jatropha will be planted. This will result in a total of approximately 5 million hectares by 2010 and approximately 13 million hectares by 2015.

Assuming an average investment of 300-500 USD per hectare, the expected growth path of the industry will lead to worldwide investments totalling 500 million to 1 billion USD every year for the next 5 to 7 years.

Today, the global jatropha industry is dominated by government supported programmes and a few larger internationally oriented private players. We also see a trend of major oil companies and international energy conglomerates entering the field with plans for large-scale investments.

Two thirds of all projects analysed work with local outgrowers, often in combination with a managed plantation. Fifty percent of all project developers in Latin America and Asia opted for this combined approach. Pure plantation models are most frequent in Latin America (44 percent). In Africa, where two thirds of the projects integrate smallholders, pure outgrower models are as important as the combined model.

In our sample analysis, only 1.2 percent of areas planted with jatropha had been used for food production in the 5 years prior to the start of the project. Seventy percent of all projects analysed practise some form of intercropping. Therefore, jatropha cultivation supports food production if formerly unused areas are developed.

According to our data sample, only 0.3 percent of any cultivated areas were previously primary forest, and 5 percent secondary forests.

Political support for jatropha is strong

So far – especially in Asia – governments have been the main driver for jatropha cultivation and have developed specific jatropha programmes. Rising crude oil prices are now creating a strong demand for biofuels. Therefore, large oil and energy conglomerates are beginning to implement large-scale jatropha projects. In the course of this process, the focus of government regulation will shift towards more general frameworks for the biofuel sector.

Production for local markets is more important than export, especially in Asia. For domestic markets, the use of unrefined jatropha oil is seen equally important as the transesterification into biodiesel.

Most jatropha plantations have nurseries and apply cultivation techniques such as pruning or fertilisation. About half of the projects use some type of irrigation.

The majority of projects have not taken action to participate in a carbon offsetting scheme so far. This may be the case because accepted methodologies for certification are not yet in place.

The majority of projects are performing research on jatropha. However, there are great regional disparities: 85 percent of the projects analysed in Asia are involved with jatropha research, compared to 54 percent in Latin America and only 36 percent in Africa.

Read the full report at: www.gexsi.org

Glimpses from World Bioenergy 2008 in Jönköping

WORLD BIOENERGY 2008
Conference & Exhibition on Biomass for Energy
27 - 29 MAY 2008, JÖNKÖPING - SWEDEN
SVEBIO Elmia

Her Majesty Crown Princess Victoria cutting the ribbon to open the exhibition at World Bioenergy 2008. Photo: Elmia

Her Majesty Crown Princess Victoria (left) together with Maud Olofsson, Sweden's Minister for Enterprise and Energy and Deputy Prime Minister (centre), and Ambassador Alexandra Volkoff from the Embassy of Canada in Stockholm (right). Photo: Elmia

Tomas Kåberger, Director General of the Swedish Energy Agency, served as conference chairman. Photo: Elmia

Waldemar Pawlak, Poland's Minister of the Economy and Deputy Prime Minister (left) speaks with Maud Olofsson (right); Lena Söderberg, board chair of Swedish Bioenergy Association looks on. Photo: Elmia

Marcos Jank of the Brazilian Sugarcane Industry Association (UNICA). Photo: Elmia

One of the study tours went to the biogas plant in Jönköping. The plant uses sewage sludge and assorted household waste, and the biogas is up-graded to be used for cars and buses. Photo: Elmia

At the outdoor exhibition Egedal showed off its small Energy Planter for planting willow. Photo: Elmia

Above: David Smith, the Senior Executive of Forestry Operation with Willmott Forests came to Sweden from Melbourne to learn more about methods, machines and technology that may be applicable in Australia. Left: Pål Börjesson, from the Department of Environmental and Energy System Studies at Lund University in Sweden talked about energy balance in ethanol production. Right: Stump extraction is a new technique in the bioenergy supply system. A demonstration of stump extraction equipment. Photos: Sofie Samuelsson (left) and Anders Haaker (right)

The "show how" part of World Bioenergy 2008 included a visit to the advanced Jönköping Energi combined heat and power plant, which uses municipal waste as fuel and also includes a pre-treatment plant for biogas production. Photo: Elmia

Vermeer crusher shows how it converts branches, tops, and stumps to wood fuel. Photo: Sofie Samuelsson

Claes Krusell, Matz Jansson and Niklas Hansson from Teem Combustion Group (TCG) in Ulricehamn, Sweden distribute EnergyCabin in Sweden. Photo: Anders Haaker

Anders Haaker, editor of Swedish magazine Bioenergi, and Olof Arkelöv from Kanenergi test the first pellet-hybrid car from Precer, which runs on an electric engine powered by a wood pellet-fuelled Stirling motor. Photo: Sofie Samuelsson

Anders Ragnarsson from CBI shows his impressive chippers at the ABAB stand. Photo: Sofie Samuelsson

Smiling faces in the Eurofire stand. Photo: Sofie Samuelsson

Kent Johansson, former CEO of Sweden's Lantmännen Agroenergi and now with Graanul Pellets AB. Photo: Anders Haaker

Maya Forsberg from the Swedish Institute of Agricultural and Environmental Engineering spoke at the "Agricultural Biofuels and the Media" side event. Photo: Sofie Samuelsson

Swebo Bioenergy showed off its combustion equipment. The company recently attracted a venture capital investment from the Sustainable Technologies Fund. Photo: Sofie Samuelsson

Nick Quaytaal, from Freshfilter B.V. discusses a system to help maintain a truck cabin air quality.
Photo: Anders Haaker

Milan Tomic and Jakob Hirsmark from Neova, one of the leading biofuel suppliers in northern Europe. Photo: Anders Haaker

Anders Bruks, CEO of ABAB, (right) and the driver of the Rogbico big slash bundling machine.
Photo: Sofie Samuelsson

Bruks AB's chipping equipment in action. Photo: Sofie Samuelsson.

These damaged logs are no longer fit for saw mills or the pulp industry, but can still be used as fuel for heat or power production.
Photo: Sofie Samuelsson

Detail from the SPC small scale pellets production unit.
Photo: Sofie Samuelsson

Delegates see the removal of early thinnings during an afternoon session in the forest (top left). A compressing and high tilting carrier for transporting forest residue from final cuttings shows what it can do (top right). Delegates could also see a mobile chipping unit in action.
Photos: Elmia & Lars-Erik Larsson

Stina Jonsson from Gudhems Kungsgård has been cultivating energy crops for several years. Here she shows hemp that will later be pressed into briquettes. Photo: Sofie Samuelsson

See you next time at World Bioenergy 2009 14 - 18 September Stockholm, Sweden

... more details coming soon

Rather than scouring the forests for biomass suitable for household use, residents in the developing world's rural communities can meet many of their energy needs from their own homegardens.

By David Landes

A woman extracting biomass for domestic energy use from a rural forest near Lawachara National Park in Bangladesh. Photo: Sharif A. Mukul

Homegardens can help save forests

At times it can seem like the debates about bioenergy are focused on developing the latest technology or finding the optimal incentives for expanding the supply and markets for different biomass-based solutions.

Thus it can be easy to forget that for nearly 50 percent of the world's population bioenery is one of, if not the only, source of fuel and energy.

"Although economic development in many developing countries has progressed rapidly, alternatives to biomass fuels are still scarce in many rural areas," says Sharif Mukul from the Shahjalal University of Science and Technology in Bangladesh.

While people living in rural areas of the world's less developed countries may utilize bioenergy out of economic necessity, that doesn't mean that their bioenergy consumption patterns can't offer useful insights for others, as well as highlight some of the common challenges in effectively managing bioenergy resources.

Forests are vital resources

Since much of the biomass used by small rural communities comes from neighbouring forests, increased biomass utilization can lead to deforestation.

"Forests are still among the most vital sources [of biomass fuels] and provide the majority of the biomass fuel required in most developing countries. Extraction of these fuels is also one of the major causes of forest depletion in certain regions," says Mukul.

But as Mukul discovered during a 2006 field study in Lalpur, a small village in the Sadar upazila, a sub division of the Noakhali district in southern Bangladesh, some local communities have found ways to feed their biomass habits without stripping nearby forests – in part because most of the neighbouring forests are no longer productive.

Characterized by a primarily agrarian economy and a sizeable population with a low per capita income, Bangladesh exhibits many characteristics typical of the world's less developed countries. Natural forests cover about 17 percent of Bangladesh's land area, but the country also has one of the highest deforestation rates in Asia. As a result, forests aren't evenly distributed and are under threat in many parts of the country.

"In the northern and south-central regions, the country has no productive public forest from which people can meet their fuel requirements," according to Mukul.

"In those areas, it has been found that homegardens play a vital role in meeting households' demand for biomass energy."

Biomass for food and fuel

Homegardens consist of a collection of different plants, including trees, shrubs, vines, and herbaceous plants growing around a family's dwelling. A long-established way to provide families with biomass for food and fuel, homegardens play an important role in the livelihoods and economies of rural communities, says Mukul.

"They also play a potential role in forest conservation by providing for subsistence needs of local populations, which they may otherwise have derived from the forest," he adds.

In Bangladesh, about 80 percent of the rural population maintains homegardens which can meet many of their domestic fuel needs.

"In the context of the rapid loss of forest vegetation in the developing world, homegardens will have to play an important role as a substitute source of natural forest products, including biomass fuel. In fact, in some areas where forests have become scarce, homegardens already play an important role in meeting households' domestic fuel requirements for processing food."

Mukul spent his time in southern Bangladesh examining households' domestic fuel consumption patterns in the hopes of learning more about the potential contribution homegardens can make as an alternative energy source.

"It's helpful to understand the probable value of homegardens as an alternative energy source and to promote this productive system in areas where there has been a

shortfall in fuel for domestic use, or where deforestation is taking place due to the collection of biomass fuel from forests," he says.

A diverse assortment of plants

Mukul discovered that homegardens in Lalpur featured an incredibly diverse assortment of plants, including 37 species of trees, in addition to various types of grasses and shrubs.

Firewood was the most common form of biomass derived from homegardens, representing just over half of villagers' biomass consumption. Both dried leaves and dung cakes were used in significant quantities as well.

In addition, Mukul learned that more than half of households total energy needs were satisfied by biomass derived from homegardens, with biomass collected from neighbours or from public land accounting for about 30 percent combined.

The situation in Lalpur is indicative of Bangladesh as a whole, where 88 percent of wood products are drawn from homegardens.

"It's a very productive system, and suggests that trees outside of the forest can provide a significant proportion of wood and other kinds of biomass fuels," says Mukul.

Government has a role to play

He believes governments can do more to help nourish the homegarden model by helping poorer residents who have no land of their own and by filling government lands with plantations of fast-growing and high-caloric value species.

In many cases, there may be no alternative if governments are serious about preserving their forest lands.

"In developing countries with high population density, gathering of biomass fuel may cause serious deforestation because a majority of the forests are still communal and unregulated... as the supplies of firewood from public forests diminish, rural households are now required actively growing more of their own biomass fuel," says Mukul.

"Policy makers could make the country's vacant lands, such as river banks, or areas near roads and railways, available for marginalized people to plant trees under long term sharing agreements. Governments could also provide financial assistance and technical support," he added.

Opportunities for business

There are also opportunities for business to help make the utilization of biomass more efficient.

"Bioenergy companies could work on designing and promoting improved kilns that are more environmentally friendly as well as economically feasible. They could also promote new homegarden plant species that have high calorific values, with substantial growth and branching," says Mukul.

While not wanting to oversell the benefits that homegardens have for fighting deforestation, Mukul is confident they can be part of an overall strategy.

"Certainly homegardens are not a long-term solution to fight deforestation and they have little effect in areas where illegal extraction of valuable wood is the main reason of deforestation. They are more of an incentive for a very early stage. [But] promoting home gardens could be a useful strategy for saving forests in areas where they are declining due to large-scale biomass extraction," he said.

Mukul concludes by pointing out that improving socio-economic conditions in rural villages near threatened forests, as well as raising awareness about conservation, are equally, if not more important, for helping to stop deforestation.

"In the context of the rapid loss of forest vegetation in the developing world, homegardens will have to play an important role as a substitute source of natural forest products, including biomass fuel"

Biomass collection from forests is one of the main causes of deforestation in developing countries. Photo: Sharif A. Mukul

Vertical stratification of a rural homegarden near Noakhali, Bangladesh. Photo: Sharif A. Mukul

Ghana has a very favourable climate for growing plants for renewable fuels. Several international companies are attracted by this fact and are now investing in jatropha and sugarcane plantations. These plantations will soon be vitally important to Ghana.

By Ohene K. Akoto

Photo: Jatropha Africa

Digging for green gold in Ghana

Jatropha Africa Ltd. is a subsidiary of Lion Bridge Ventures in the United Kingdom, committed to the creation and expansion of biofuels plantations throughout the developing world. Our model creates a locally sustainable economy with high numbers of agricultural jobs, grid electricity, transportation fuel in the form of local biodiesel and the ability to participate in the world economy through export of renewable and biodiesel feedstock. Our goal is to achieve 3.79 million litres per year of feedstock by 2015.

Our commercial activities include growing seedlings, contract planting, harvesting, and selling oil seed as feedstock to biodiesel companies and farmers. We are committed to working in partnership with rural African communities and assisting people in their efforts to improve their own lives.

Jatropha Africa Ltd. projects focus on the inedible feedstock jatropha curcas linn. The company has secured 120,000 hectares of land with a lease of 50 years and currently has a one-year-old plantation with 40 farmers acting as outgrowers for Jatropha Africa.

Organic crop

The project allows jatropha to be used for biodiesel or as a feedstock for renewable diesel, while the meat of the plant can then be used to create grid electricity and/or ethanol. It can provide up to three harvests per year and produces four- to seven-times as much oil per acre as soybeans. Jatropha is also completely organic in its development cycle with great opportunities' to increase its yield through fertilizer, irrigation and research. It also requires a human harvest model and creates a high number of jobs.

Photo: Jatropha Africa

▶ FACTS ABOUT GHANA

Ghana, formerly known as the Gold Coast, won its independence in 1957, and has had a democratic government ever since. Ghana is located on West Africa's Gulf of Guinea, only a few degrees north of the Equator. It has an area of approximately 24 million hectares, with around 22 million inhabitants concentrated along the coast and in the principal cities. The capital city is Accra, with an estimated population of 3 million. Ghana's tropical climate features plains, scrubland, rainforest and savanna. About 70 percent of the land is arable and forested. Ghana has many natural resources, including gold, timber, diamonds, bauxite, manganese and fish. Its major industries consist of mining, lumber, fishing, aluminum and tourism.

This project alone could create over 40,000 jobs for the Ghanaian economy.

Fair trade

Jatropha Africa is working with other organisations to develop a strategy for improving the flow of information on best practices in rural finance and relevant training materials to those who have most need of access to this information. We are keen to promote fair trade and to provide the people of Aduamoah with a platform to enable them to sell their product directly to the world market. Tiger nut (Cyperus Esculentus) is an important crop for the people of Aduamoah in the Kwahu South District of
Ghana. It contributes to household subsistence and incomes.

Facts about Jatropha Africa

Jatropha Africa Ltd. is soliciting approximately USD 65 million for the development of available land, support equipment, a crushing plant, local biodiesel plant, generators, onwater logistics and other operational costs until cash flows are self-sustaining in approximately three years. From year four and through subsequent years revenue is projected to be USD 97 million with exceptional profitability.

Development of Jatropha around the world

Asia:
Jatropha has a strategic role for many governments in Asia. India uses several incentive schemes to induce villagers to rehabilitate waste lands through the cultivation of oil bearing trees such as jatropha. In China, the national oil companies are the dominant players in jatropha project development. Myanmar is also pursuing a rigid national plan for jatropha expansion.

Africa:
The governments in Senegal, Mali, Nigeria, Ethiopia and (in particular) Zimbabwe have formulated policies which explicitly focus on the promotion of jatropha. Other countries, including Ghana, Tanzania, Malawi and Kenya, actively promote investments in renewable energies or facilitate land access for interested investors.

Latin America:
Specific targets or programmes on jatropha have been developed by the Mexican and the Colombian government, among others. There are also high hopes that the Brazilian government will include jatropha in its social biofuel programme. This would have a great impact on project development in Brazil and the overall dynamics of the jatropha industry in Latin America.

References: Gexsi, Global Market Study on jatropha,London/Berlin:2008

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Meeting the challenge of global carbon management

By David Landes

While increasing demand for bioenergy complicates efforts to achieve greenhouse gas emissions targets, the challenge is by no means insurmountable, according to Jan-Erik Petersen of the European Environment Agency.

It's no secret that the world's expanding population and corresponding resource needs present a host of complex environmental management challenges. More people means more food and more energy use, which in turns means increased greenhouse gas emissions, more pressure on forests, water supplies, and the ecosystems which account for much of the world's biodiversity. And as more countries develop plans for expanding and exploiting domestic sources of bioenergy, the global carbon management picture becomes even more complicated.

"The world's forest, grassland and agricultural ecosystems not only help to fulfill human society's needs for food, energy and materials but also harbour a wealth of biodiversity of intrinsic and utilitarian value," according to Jan-Erik Petersen of the European Environment Agency. While not arguing against the pursuit of policies directed toward harvesting more of the bioenergy potential stored in forests and fields around the world, Petersen urges caution, pointing out that stakeholders must seek to achieve a delicate balance between the competing demands on the world's usable land. "The likely future impacts from climate change and the increase in food demand over the coming decades requires careful reflection about which human needs the available agricultural land area should primarily be used for without endangering its future productivity and ecological functions," he says.

When examining the potential impact of energy production from biomass, Petersen says it's important to take into account both the greenhouse gas balance over the entire energy production cycle, as well as the associated pressures on natural resources and biodiversity. "The effects of direct and indirect land use change associated with the production of biomass for energy are critical for both issues," he says. Petersen argues that rising food prices and the projected increase in global demand for food in the decades ahead mean that one can no longer assume energy cropping won't generate land use changes. Consequently, previously assumed benefits for the greenhouse gas balance associated with different biofuel options may no longer be valid.

The question which needs to be answered, therefore, is how large the various direct and indirect land use effects are likely to be, and how they can be measured. Fortunately, work in tackling this question is already underway, as evidence by two recent studies which represent important steps in carbon loss modeling related to the conversion of forests, grasslands and idle land into energy crops. One project, led by Fargione, shows that greenhouse gas balance improvements associated with South American sugar cane start to disappear when the crop is grown in land converted from forests. The second, led by Searchinger, uses an agro-economic model (the CARD system) to demonstrate the importance of global displacement effects related to ethanol produced from corn and switch grass in the United States.

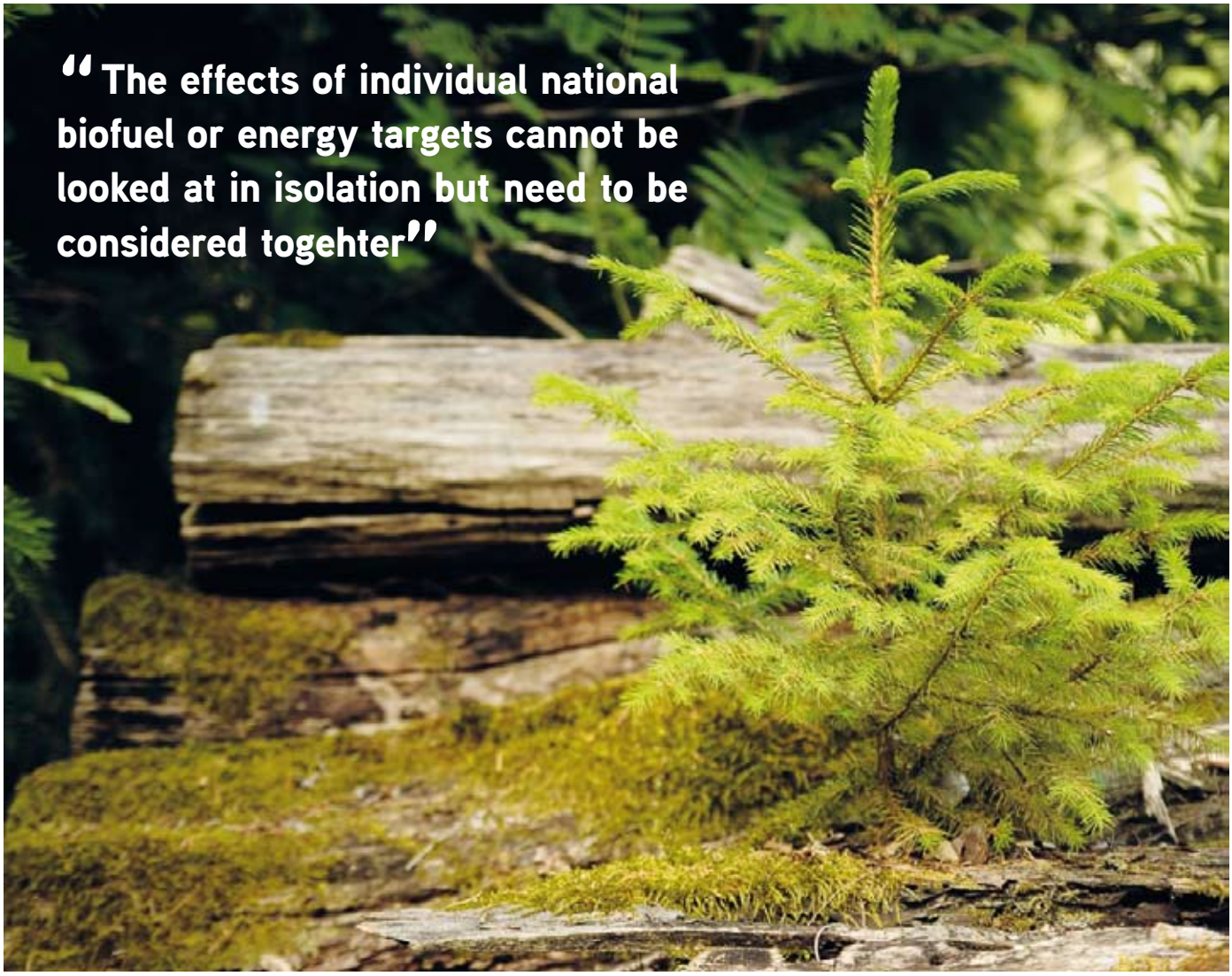

Photo: Jonas Gustafsson

The study shows that, under certain assumptions, carbon emissions from converting forests or grasslands to energy crops may actually lead to higher green house gas emissions compared to fossil fuels, when viewed over a 50 year time horizon. "A crucial, question with regard to the overall green house gas balances for different bioenergy pathways is whether they are likely to engender indirect land use change from carbon rich land cover types to arable energy crops," says Petersen. "In this context, the effects of individual national biofuel or energy targets cannot be looked at in isolation but need to be considered together," he adds.

While Petersen points out that greenhouse gas emissions associated with changes in land use are relatively easy to model, investigating the impact of using crops for bioenergy on biodiversity and natural resources requires more comprehensive on-the-ground monitoring and modeling. Thus policymakers and industry face a difficult challenge in navigating the additional carbon cycle challenges presented by the opportunity of bioenergy crops. But Petersen argues there is reason for cautious optimism.

An appropriate mix of policies to support bioenergy production, as well as advances in technology will likely lead to an expansion in the number of available feedstocks, as well as improve the greenhouse gas balance and energy efficiency for second generation bioenergy. The key, however, will be to introduce policies which reduce land use-related greenhouse gas emissions associated with harvesting energy from biomass. "Increasing global food demand and the necessary public and economic support for maintaining and improving carbon sinks will likely limit the land available for biomass production, at least for arable energy crops," says Petersen.

As a result, he argues, policymakers must bear in mind that current bioenergy targets may ultimately increase rather then reduce greenhouse gas emissions, depending on the associated level of land use change. In addition, it's important to continue the search for feedstocks which minimize competition with food markets and which maximize emissions reduction. New models, he says, "need to analyse the interaction between food, feed, biomass, and material markets" as well as the environmental impact associated with biomass production in different parts of the world.

Another important consideration is examining the effects on possible markets for carbon, which Petersen sees as vital for judging the comparative societal benefits between using land for food, biomass, or as carbon sinks.

"We need to consider how best to combine the carbon sink functions of agriculture and forest land with their productive functions, and how to provide economic compensation to land owners/managers that forego economic benefits from land use conversion," says Petersen.

Just because fossil fuels figure prominently both in Russia's economy and energy production doesn't mean bioenergy can't also play an important role. With 23 percent of the world's forest resources and a growing demand for biomass-based fuels, Russia has the potential to be a major player in bioenergy as well.

By Mr. Keijo Mutanen and Dr. Olga Rakitova

Russia: An emerging force for bioenergy?

Everyone knows that fossil fuels matter a great deal to Russia. The country is home to the largest natural gas, the second largest coal, and the third largest oil reserves in the world. In addition, Russia is the world's third largest energy user and the largest producer of oil and gas in the world, with exports playing an important economic development role throughout the country.

As a result, biomass continues to play a relatively minor role in Russia's energy system. Currently, the wood harvesting and processing industry comprises only 4.4 percent of Russia's industrial production even though 23 percent of the world's forest reserves can be found in the country. Moreover, biomass represents only 1 percent of Russia's total energy consumption – including residential use.

Slow development

Russia's energy picture is also characterized by a lack of efficiency, due in part to an aging infrastructure and subsidies which distort the fuel and energy markets. It actually takes Russia three times more energy than the European Union (EU) to produce one unit of GDP. Thus market developments – especially when it comes to bioenergy – happen extremely slowly, despite Russia having one of the world's largest biomass supplies.

There are other factors besides cheap fossil fuels which also inhibit the development of Russia's bioenergy sector. For starters, there are a host of political and institutional problems which complicate the move to bioenergy. Russia's investment climate can also make it difficult to come by the necessary capital and attract interested investors willing to help support new projects. Logistical issues due to Russia's vast size, poor infrastructure, and a general lack of information also make bioenergy development more complex than it appears at first glance. More fundamental, however, is the dominance of a culture based on fossil fuels and large scale production systems, which contributes to a lack of information about, and availability of, new bioenergy-based business models.

Russia's Ministry of Fuel and Energy recently estimated the commercial potential for renewable energy use in Russia is over 200 million tonnes of oil equivalent (Mtoe), or about one quarter of Russia's annual energy consumption. According to the same estimate, however, biomass energy potential only amounts to about 25 Mtoe, or 8 percent of Russia's overall renewal energy potential. Compared with the amount of forest and the forestry industry's investment potential, the ministry's figure appears rather conservative.

In another estimate, the International Energy Agency (IEA) projects that around 30 percent of Russia's national power generation may be covered by combined heating and cooling plants (CHPs) since many cities have district heating networks. While most Russian CHPs are currently fueled with gas, coal, and/or oil, there is great potential to replace coal or oil in smaller heating plants with wood or peat. Some smaller plants (less than 10 megawatts) have already been built. In addition, the production of wood pellets has grown throughout the past decade, driven primarily by fast growing export markets such as the EU.

Recognising potential

Thus, there are signs that the potential for Russia's bioenergy sector is gaining recognition and that some actors are in fact taking small steps forward. Nowhere is this more apparent than in Northwest Russia, one of the country's most progressive areas when it comes to bioenergy.

The region has 15 million inhabitants and a 2200 kilometre long border with the EU, mostly with Finland. It is home to over 14000 million cubic metres of raw wood, representing 17 percent of Russia's forests and 60 percent of the forests located on Russia's European side.

Despite the bounty of forests, wood represents only 2.8 percent of the region's energy use, including residential usage. The potential for annual harvesting is over 100 million cubic metres, compared with current harvesting of only about 45 million cubic metres. While most of Northwest Russia's wood is exported as raw wood, the regions first pellet and briquette plants were installed a few years ago.

A comparison with Finland provides a useful illustration of the magnitude of Northwest Russia's bioenergy potential. Today, Finland produces seven times more energy from wood than Northwest Russia, when measured as a percentage of total energy used. This is the case despite the fact that Northwest Russia actually has a total forest growing stock that is more than seven times larger than Finland's. In other words, if one looks at what Finland has accomplished with its forest resources, it's easy to see the bioenergy potential of Northwest Russia.

The region has set a goal to increase its use of bioenergy, hoping to have 16 percent of all its energy derived from bioenergy by 2020. There are already over 30 pellet manufacturing plants in Northwest Russia that have total capacity to produce over 500,000 tonnes of pellets annually. Currently, a great deal of pellet production is exported, but local use is starting to pick up as well. Moreover, the region's ecological, social and economical problems could at least be partially addressed by implementing biomass utilization for energy on a large scale.

Unique partnership

The region is also leading by example through forming a partnership between the Wood Industries Confederation of Northwest Russia and Russia's Ministry of Natural Resources. The two organisations are teaming up to develop a programme for developing wood biomass and bioenergy which deals with all aspects of the process from production to utilization, and which also tackles some of the technical, commercial, economic, social, and marketing issues associated with the push towards bioenergy.

While progress remains slow and uneven, it's safe to say that bioenergy has a bright future in Russia. The country signed the Kyoto Protocol in 2006, committing it to reducing greenhouse gas emissions. Russia also recently decided to sharply increase export duties for raw wood which will effectively end the export of raw wood out of the country. In addition, Russia recently implemented several pilot projects as a part of a national energy programme to increase awareness of bioenergy. These actions point to a likelihood of increased domestic and foreign investments in the forest industry as well as the bioenergy sector. The results of these initial steps may not be known immediately, but they point to the emergence of new and vibrant markets for a wide range of bioenergy products throughout the country, and especially in Northwest Russia.

Mr. Keijo Mutanen is Managing Director at Firotec Ltd. in Finland. Dr. Olga Rakitova is Executive Director of the National Bioenergy Union in Russia.

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