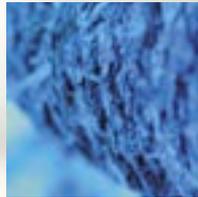




Bioenergy 2003 - 2005

Development of the Production and Use of Bioenergy
in the Baltic Sea Region

A short summary of the Final Report



Intro

BASREC – the Baltic Sea Region Energy Co-operation - was established 1999 by the Nordic Council of Ministers for Energy and the EU Commission. The co-ordination embraces the five Nordic Countries as well as the Russian Federation, Estonia, Latvia, Lithuania, Poland, Germany and the EU Commission. Since 2000 the work has been implemented in working groups on electricity and gas markets, climate change and energy efficiency.

A key issue for the Bioenergy Working Group and its four Actions have been how to connect to market players. Most bioenergy market players are small and medium-sized companies who have little time and resources for cooperative work such as this, even though they fully appreciate the results. Better contacts with the municipalities, plant owners and bioenergy producing companies would be one important task for the future work. The new database will help in that respect.

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The main version of the report is available at:
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www.cbss.st/basrec



Organisation and financing

Intro

Already in 1999 bioenergy and renewable fuels were especially mentioned as an important area for establishing a sustainable development in the energy sector in the Baltic Sea region. In 2002, an ad hoc working group was established with the task to elaborate a programme and recommendations for a bioenergy co-operation project during the years 2003 -2005, and to present it to the BASREC Ministers at their meeting in Vilnius in November 2002. The proposal was approved by the Ministerial Meeting and the BASREC Working Group on Bioenergy was formally established in June 2003. A more detailed programme and work plan had during spring 2003 been developed by the bioenergy group set up by the energy sector of the Nordic Council of Ministers (NCM), and the NCM allocated the financing for the work. The main emphasis was made on wood-fuel as forests are the dominating bioenergy source in the region. In some of the countries more than 50 % of the area is forest land.

BASREC Working Group on Bioenergy
Co-ordination of the Bioenergy 2003-2005 process has been conducted through the BASREC Working Group on Bioenergy. Co-ordination of projects, meetings, presentations, proposals and reports has been executed by the chairmen and secretariat. The Working Group has due to the task been multi-sectorial consisting of members from the energy, agricultural and forestry sectors.

The members of the BASREC Working Group on Bioenergy are:

Denmark: Jan Bünger, Morten Gylling, Morten Ingerslev.

Estonia: Ando Leppiman; **co-chair**, Rauno

Reinberg;
Finland: Aimo Aalto;
Germany: Christina Wittek; Andreas Kleine; Birger Kerckow;
Iceland: Ragnar Baldursson;
Lithuania: Giedre Vysniauskaite; Laura Kasnauskaite;
Latvia: Didzis Cinovskis;
Norway: Øyvind Leistad; Harald Birkeland;
Poland: Tomazs Surma; Grzegorz Wisniewski;
Russia: Alexander Podsevalov;
Sweden: Gudrun Knutsson, **chair**, Sven Risberg; Lars Andersson;
EU: Kyriakos Maniatis; Beatriz Yordi.

Assistants to the Working Group are the BASREC Head of Energy Unit Janis Andrew Folkmanis, the Project manager for Nordic Regional Energy Co-operation Peter Molander, and Project assistant Kaire Kuldpere. Editor of the final report is Professor Gunnar Wilhelmsen.

For each action identified within the framework of the Bioenergy 2003-2005 process, definite project proposals have been collected from interested parties and discussed in the Working Group. After the groups approval, applications have been presented to relevant programs and organizations. The main financing body has been the Nordic Council of Ministers. Co-financing and in kind contributions have also been given by countries (chairmanship, hosting of meetings and activities, etc) and administrative bodies involved in the different actions.

The main contacted bodies have been:

Action 1: Strenghtening Bioenergy Capacity
Building: The Estonian University,
www.tut.ee

Action 2: Development of Standards to Achieve Market Harmonisation in the Bioenergy Field: The Nordic Innovation Centre

through Nordtest,

www.nordicinnovation.net

Action 3: Joint Implementation of Bioenergy Projects: ECON Norway, www.econ.no and Fridtjof Nansen Institute through the BASREC Climate Group.

Action 4: Research, Development, Demonstration & Innovation Projects in Bioenergy: Nordic Energy Research, www.nordicenergy.net

The Baltic Sea Region and the Surrounding World

– The Working Group's views on:

- **Increased production and use of bioenergy**
The Working Group note that the surrounding world generally says an unambiguous “yes” to increased production and use of bioenergy - covering a wide scope of aspects of environmental impact, both with respect to the nutrient balance as a result of biomass production and with respect to the environment during remodelling of biomass to energy products (air pollution, ash handling etc.)
- **Collaboration between the energy, forestry and agricultural sectors**
The Working Group wishes to attach importance to collaboration between the energy, forestry and agricultural sectors.
- **Networking**
The Working Group finds that the networking activities between different professions should continue to be a highly prioritised activity.
- **Overlapping**
The Working Group finds that there is considerable overlap in the northern region between a number of professional and to some extent geographically orientated organisations

and institutions.

- **Focus on economy, trade and market**
The Working Group finds that summaries and analyses of available biomass in a national or regional context are still emphasised in reports, while the focus now should to a larger extent be on technological exploitation, economics and the market.
- **Information exchange and biomass action plan**
The Working Group wants to emphasise the importance of information exchange between countries on various initiatives that have been planned or carried out for increased use of bioenergy. The Working Group gives its support to the initiative of EU's Biomass Action Plan, and stresses the importance of prioritised proposals being followed up with a budget, a plan of action and designation of those responsible.
- **Regional planning**
The Working Group supports regional planning.
- **BASREC Working Group Actions**
The Working Group finds that its own work concerning increased expertise, standardisation, network development and joint implementation has broad support in the many resolutions and statements that are referred to in the main version of the final report.



Project activities and results

1st Action:

Manual for the improvement of competitiveness of biomass fuels in Baltic Sea Regions

A Manual (book and CD-ROM) for decision-makers in municipalities, heating companies etc. is under development, coordinated by the Tallinn University of Technology. The manual is to be presented in autumn 2005 and will be made available in English, Russian and Estonian. Seminars for introduction etc. are also planned.

Overall goal of the initiated project "Manual for the improvement of competitiveness of biomass fuels in Baltic Sea Regions" was knowledge transfer and capacity building in district heating sector in the Baltic Sea Region. The main activity of the project was the mentioned publication of a general manual, based on the experiences of bio-energy projects in EU, Nordic and BASREC countries including Russia. This manual should provide help as an extra-learning material for the specialists from the municipalities, operational personnel of enterprises and for the wide range of beneficiaries to develop entrepreneurs, more specifically engineers, technicians in DH companies and industry where biomass fuels are used or planned to use; responsible persons on energy planning issues in municipalities, i.e. decision-makers; forestry specialists dealing with biomass fuels preparation and handling; energy specialists in consulting companies and students on energy, energy economy and forestry fields.

One of the best methods for knowledge transfer would be a manual or handbook, which will concentrate best practice in bio-energy area from each BASREC countries to support better understanding of users. The aims of the project should primarily be reached by regional co-operation

regarding production and use of bio-energy.

Content of the manual will be:

- Explanation of terms, bio-energy legislation and energy taxation policies and biomass fuels resources, availability and consumption in BASREC, characteristics of biomass fuels, standardization process of biomass fuels in BASREC countries.
- Biomass fuels, i.e. wood fuels, straw and other biofuels, production technologies (wood chips and pellet production, peat production technologies).
- Bio-energy production technologies like combustion technologies, multi-fuel power plants and boiler houses, fuel storages and conveyors, biomass fuel ash characteristics and handling systems, cleaning of heat surfaces of biomass fuels burning equipment.
- Biomass fuels utilization impacts, socio-economic impacts, environmental impact, economic, commercial and employment impacts, quality of life, education and legislation impacts, impact on project partners, technological impacts.
- Planning of energy systems running on biomass fuels with emphasis on project funding and contracting, project dissemination, impact assessment, future trends and competitiveness of bio-energy.
- Examples on the following: Best practice in biomass fuel production, successful cases of energy production using biomass fuels, environmental impacts assessment of boiler house converted to biomass fuel, risk analysis of enlargement of biomass fuel boiler houses.

Main output will be the manual (book and CD-ROM) for developing and implementing bio-energy projects and thematic seminars. Compiled manual will have an electronic version that can be spread by BASREC website. After the project there is expected to induce the manual

user's network where people will change new information of bio-energy sector and ask the aid for their concrete problems, for example on operating of biomass boilers.

The following show the main results up to September 2005:

- We have updated our database of literature sources concerning biofuel production, transportation, handling and combustion technologies.
- The questionnaire has been sent out to DH boiler house owners to get information on results of biofuel projects. After receiving filled questionnaires our experts visited the boiler house and during interview to clarify following issues:
 - Typical situation before biofuel project: efficiency, technical conditions, emissions, heat price
 - Structure of expenses and heat price before and after biotechnology installationsPlanning mistakes: incorrect capacity, lack of local interest, too simplified technology, fuel availability
 - Find the reasons if some biofuel boilers have been shut down If there been some accidents find out their reasons
 - Qualification of boiler operators – need for knowledge and experienceHow risks of biofuel implementation have been reduced
- Detailed information on biofuel projects have been analysed and discussed on meetings in Tallinn University of Technology and Estonian Agricultural Academy. 12 best practice examples have been chosen for the Manual.
- The draft version in Estonian language has been completed and it contains 170 pages. More than half of illustrations are original photos or pictures. Preparation of English and Russian versions are ongoing and should be finalised in October 2005.

2nd Action:

Development of standards to achieve market harmonisation in the bioenergy field

Nordtest, which from this year on merged with the Nordic Innovation Centre was assigned to implement this task. This work is considered to be very important for the development of trade and cooperation in the region both as regards wood fuels and for the combustion equipment. Close co-operation and co-ordination with the ongoing work on standards for solid biofuels within the European standardisation organisation CEN is a must.

The overall objective was to create a basis for increased trade of products and systems in the bioenergy field between countries in the Baltic Sea region, thereby enhancing the use of biofuels in the region. The aim of the project was to establish contacts between relevant national organizations and Technical Committees within CEN, to prepare possible contributions to ongoing activities on solid biofuel standards and further to investigate the needs and possibilities for common test methods and rules regarding biofuels and biofuel machinery and systems.

The project established and operated a network for information exchange and communication between organisations from each country. It also gave review of present status in different countries as regards standards and regulations in the bioenergy field. The project carried out the initial study with contributions of network members. Based on this review, the form for cooperation with CEN was settled. Means of removing trade barriers in the Baltic Sea region were analysed in contact with relevant authorities in the different countries.



The work was concentrated on the analysis of existing standards and their suitability in the trade of solid biofuels. In addition, information on equipment standards for small-scale boilers and stoves were collected. A review of the current standards and future prospects has just been published.

European standardisation organisation, CEN, have been preparing 30 different technical specifications, which are presented in this report. These technical specifications have been drafted in co-operation with the leading bioenergy experts in Europe. They provide a good basis in the future for production, trading and use of solid biofuels. There are also CEN standards on equipment for the usage of biofuel. From the Baltic Sea Area only Denmark, Finland, Germany and Sweden have participated in the CEN work. It is essential that the knowledge of CEN standardisation work is transferred to the other Baltic Sea countries as well. This has been one of the major tasks in this project. Members of the project team have been participating in the CEN standardisation work.

There are also national standards in most countries and a survey, supported by interviews, was carried out to find information about existing standards and future needs in the Baltic Sea region. More than 170 standardisation contacts have been collected for information dissemination. A web-based questionnaire was elaborated and has been sent to experts in different countries around the Baltic Sea. Needs of future standards have also been discussed in the meetings and in the workshops: Several meetings have been organised with peat experts to draft Fuel Peat guidelines.

The CEN-standards and technical specifications can meet the major requirements of the standardisation needs for solid biofuels and

small-scale equipment. The CEN technical specifications for solid biofuels are currently being finalised and more experience from their implementation is needed. The need for a special information and training project for the Baltic countries and Russia has been identified. The reason is that the Baltic States have not participated actively in the CEN work and Russia is not even a CEN member.

The following additional standards were found to be urgently needed:

- Standard for storage and handling of solid biofuels.
- Standard for classification of ash from biofuels for the use as fertilizer.
- Standard for requirements and measurements for testing of 300 kW – 4 MW biomass boilers.
- Guideline for peat classification, sampling and analysis of properties

The growth in the use of biofuels that Europe has experienced during the past 10 – 15 years has implied a significant increase in the amount of biofuel handled. The size of the storages and transports as well as the number of locations where biofuel is handled and/or stored has risen markedly. The personnel operating these large amounts of biofuels work in a business with a very short history of experience. This assumption is confirmed by the fact that the market has seen a lot of fires in biofuel storages that could easily have been avoided by following simple rules for handling and storing. For this reason it is argued that a short standard or guideline for correct handling and storing of biofuels, based on existing (although rather limited) research, would prevent accidents and loss of biofuels through fires, and can furthermore prevent unnecessary deterioration of biofuel when stored.

There are currently several combustion equipment





standards for stoves and boilers up to 300 kW, because boilers of this size can be measured in laboratory condition, - but there is a need for a simplified method for field measurements for boilers of 300 kW up to 4MW. The published equipment standards cover quite well the needs of quality assurance of small biomass fuel fired appliances. There is a need for a simple standard for larger than 300 kW biomass systems, which has to be tested on field. For large power plants there exists a well established standard (DIN 1942), which is originally developed for power plants using fossil fuels. This probably needs some modifications to become suitable also for biomass fuel fired plants.

In the Baltic Sea region peat is commonly used together with biofuels in order to improve the biofuel combustion properties. There is also a significant international trade with peat in the region. Peat reduces slagging problems, fouling and corrosion. Especially when using wood fuels like logging residues, the use of peat is important to avoid combustion problems and down-time. The percentage of peat is dependant on the type of biofuel. Typically 15 – 20% peat is used. Guidelines on classification, handling, storage and testing of peat are needed to facilitate optimizing of biofuel combustion. The classification system and test methods should be similar to the CEN standards for solid biofuels. A guideline for fuel peat has been drafted with the help of producers and users of biofuels and peat in Finland, Sweden, Estonia, Latvia and Lithuania and of peat associations. The intention is to publish the results as a Nordtest report at the end of year 2005.

An information and training project in Baltic countries and Russia to spread knowledge on the CEN standards for biofuels and equipment is proposed as a future action. There is also a proposal for development of new and necessary standards.



The report (“Development of Standards to Achieve Marked Harmonisation in the Bioenergy Fields”), presentations from the workshops, the newsletters and the peat guidelines are published on the website on Nordic Innovation Centre at www.nordicinnovation.net and www.cbss.st/basrec

3rd Action:

Development of sector-baseline for energy related joint implementation projects

The work has been implemented in co-operation with the BASREC Climate Group in the work on developing a sector specific baseline for climate projects based on bioenergy. The project “Development of a sector baseline for energy related JI-projects in the BSR” involved the development of sector specific baseline for energy supply focuses on north-west Russia, particularly on renewable energy projects, including fuel switching from fossil fuels to bioenergy in electricity and heat production. Its principal objective was to propose standard baseline approaches that can be used to establish a sound basis for estimating the emission reductions and likely carbon revenue streams that can be anticipated for projects certain sizes and types within the Testing Ground cooperation in the Baltic Sea Region, i.e. not only in north-west Russia but with certain amendment and adaptation also in the Baltic states and Poland, as host countries and the Nordic countries and Germany as investor countries.

The project entailed the development of methodologies for determining baselines in these sectors, and application of these methodologies to case studies in the Archangelsk Region in north-west Russia. Baselines methodologies were developed taking into consideration the body of work that has been compiled on this topic for Clean Development Mechanism (CDM) projects, and in particular the consolidated baseline methodologies that were published by the CDM Executive Board in the course of 2004. In particular, the Combined Margin methodology for integrated electricity networks was adapted to the Russian context, where combined heat and power plants are common, and where new investment in generating capacity has been limited.

During the project a set of four Baseline Methodologies were developed, largely based on precedents set under the CDM. These methodologies are designed to cover a wide range of potential JI projects in the power and district heating sectors. The methodologies are for a) district heating projects, b) "brownfield" power projects, c) off-grid power projects and d) combined heat and power projects. In addition, the project group adapted the consolidated methodology for grid-connected renewables (the "Combined Margin") for application in countries such as Russia. The Combined Margin is used in several of the methodologies developed.

A set of four case studies have been developed illustrating the application of these methodologies. The case studies have been drawn from the Archangelsk region of north-west Russia. The Archangelsk Oblast is a useful case study area as it has a fairly self-contained electricity network (so allowing the Combined Margin to be determined for this region). In addition, the Oblast imports significant quantities of power from neighbouring regions (thereby illustrating the application of the method in a wide territory).

Future actions following from this work could comprise the application of the methodologies to specific JI projects in Russia and the Baltic countries. The project activities ended in January 2005.



A final report was submitted (ECON Report: R-2004-114 R Electricity and district heating emission baseline methodologies), and the report is available at:
www.cbss.st/basrec/documents/climatechange

4th Action:

International bioenergy-Research & Development sector co-operating through networking

The responsibility for this action was assigned the Nordic Energy Research. The project has listed and described 27 international scientific networks and programmes, and developed a database with 200 entries, covering diverse regional players in bioenergy.



The fact sheets are available at www.nordicenergy.net and the database is made operational and can be found on the web address: www.nedatabase.info/bioenergy/

In Action 4 the attempt was made to distinguish



between networks and databanks. Networks should have an active secretariat that advances contacts between individuals and/or institutions, while databanks refer to information banks in which one must to a large extent search actively for information. Thus about 70 networks and databanks were studied and a selection based on the following criteria was made:

- Three or more countries participate in the network / programme. Bilateral agreements and national networks are not included.
- Bioenergy is the main issue in the network. Other new, biobased products can be included.
- Focusing on Europe / the Baltic Sea region; however, some important, global networks are included.
- Bioenergy databanks are listed under Links.

The database being developed in Action 4 is a structured grouping of persons and institutions that are engaged in the production and use of bioenergy. The participants belong primarily to the Baltic Sea region, and are to a wide extent affiliated with research institutions. Public authorities, organisations and industry with links to bioenergy are also represented. Each separate actor is identified with name, addresses (post, e-mail and home page), and telephone and fax numbers. Professional information concerning the person in question is also given, for example workplace, professional interests and specialty, affiliation and language. In order to strengthen collaboration in this region, it is essential to develop a system in which actors are easily visible and readily available. A database with persons showing interest in bioenergy is considered a useful tool in this respect. The aim is to:

- Identify and profile bioenergy actors in a regional network.

- Arrange for a rational flow of information to and from the network.
- Establish efficient contact between the various participants within the network.

Nordic Energy Research started the process of testing the system by including about 100 participants from our address register and some Working Group representatives. From December 2004, when the network was installed on Internet, anyone could apply to join.

Until December 2004, the database was only an internal database for BASREC and the Nordic Council of Ministers (NCM), and was used for inviting to conferences and as a directory for direct contact between some of the participants in the network. All participants that Nordic Energy Research has registered in the network have been informed. They have been asked to check that the information given about them is accurate, and if necessary give additional information.

Anyone who does not wish that information is put on the Internet, but only made available internally via BASREC and NCM, can make this reservation on the application form. There are however checks in the system that will hinder others than BASREC and NCM from administering the mass sending of information.

At present there are about 160 participants in the database, but with a somewhat uneven distribution with respect to country. It will initially be a challenge to increase the figure somewhat, especially from countries in the region that are underrepresented today.

It is probable that the database will initially be used to a large extent as an internal database for BASREC and NCM. Later, one can expect an increased interest, both from individuals



Photo: Skogforsk

and organisations that wish to contribute to an upgraded communication and distribution of information in the region. If someone desires mass distribution to all or part of the address list, it will be the administrator who makes the final decision on by whom and if necessary how the database shall be used, as well as to what cost

The database is currently administered by Nordic Energy Research.

A final report is available from Nordic Energy Research (www.nordicenergy.net). (Nordic Energy Research: International Bioenergy – R&D Sector Co-operation Through Networking. Report no. 01/05, 46pp.)

Future

Taking into account the specific conditions in the Baltic Sea Region where district heating is a very common way of heat supply much of the emphasis of the work has been directed on the use of wood fuel for heat as well as on combined heat and power supply. The work laid down can form a basis also for practical application, inter alia in capacity building activities. During a new mandate close co-operation also can be established with the work on energy efficiency as a systematic approach especially in district heating projects comprising production, distribution and end-use of energy in buildings can provide economically attractive solutions. Together with projects for fuel-switching from fossil fuels to bioenergy for energy production, such "system projects" may also form suitable climate projects and meet the requirements and priorities set out by the BASREC Testing Ground Facility for Joint Implementation projects in the Baltic Sea Region.

The Working Group has discussed the possibilities for future activities based on the following:



- a) New projects should reflect higher-level political signals;
- b) Priority should be given to the possible need for a follow up of ongoing projects in "Bioenergy 2003-2005";
- c) In proposals for new projects, it is important to emphasise those projects that will clearly benefit from a regional co-operation in the Baltic Sea region, and which require a regional approach or solution.

The Working Group finds that its own work (Actions 1-4) concerning increased expertise, standardisation, network development and joint implementation has broad support in the many resolutions and statements that are referred to in the final report. The Working Group is referring to three key issues at the International Conference on Renewable Energies at Bonn in 2004:

- Policies for renewable energy market development
- Financing options for renewable energies
- Strengthening of human and institutional capacity

In order to follow up these higher-level aims, the Working Group suggest that BASREC focus on the following issues in coming years:

- Strengthening Bioenergy Capacity Building
- Development of Standards
- Joint Implementation of Bioenergy Projects
- International Bioenergy-R&D Sector Co-operation through Networking
- Financing and marketing options.

The Working Group would like to reflect the EU's ongoing work with a Biomass Action Plan, and would like to draw EU's attention to the conclusions in this report focusing on the conditions and needs in the Baltic Sea Region. The Working Group will consider making a change of priorities in the light of the proposals put forward within EU's plan. Thus the Working Group does also want to look into the potential of future co-operation with the different sectors within the Baltic 21.

Surrounding World

The European strategy for renewable energy sources identifies bioenergy as the most important renewable energy source for the future – a source of cleaner, more secure and sustainable power for Europe. As national programmes fund 90% of the bioenergy research in Europe, - coordinating them will improve outcomes (The ERA-NET Bioenergy). Media images, international fora and political decisions are characterised by extensive goodwill towards the removal of barriers against, and the stimulation of increased efforts for bioenergy. It is symptomatic that declarations of support and well-founded perceptions of increased production and use of bioenergy come from diverse political platforms and professional fora. Greater flexibility in the replacement of fossil fuels with renewable energy is desired in the energy industry, while environmental authorities focus greenhouse gases and bioenergy as a CO₂-neutral source of energy, forestry and agriculture desire a new source of income and new workplaces in country districts, and the transport sector is interested in a gradual replacement of petrochemical fuels.

The Final report will give the reader brief updates on higher-level political visions and goals from EU, OECD, EREC, IEA, NCM, Barents Euro-Arctic Council and the Baltic 21 Forest Sector.

Country Reports

Look into the country reports from 11 countries, written by the representatives in the Working Group. The reports have national key figures describing and commenting shortly production and use in each country, supplemented with up-to-date information on potential, goals and priorities. Updating on the most important public instruments and frameworks for stimulation to increased production and use of bioenergy. The country reports do also briefly describe regional joint actions and plans for future activities



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