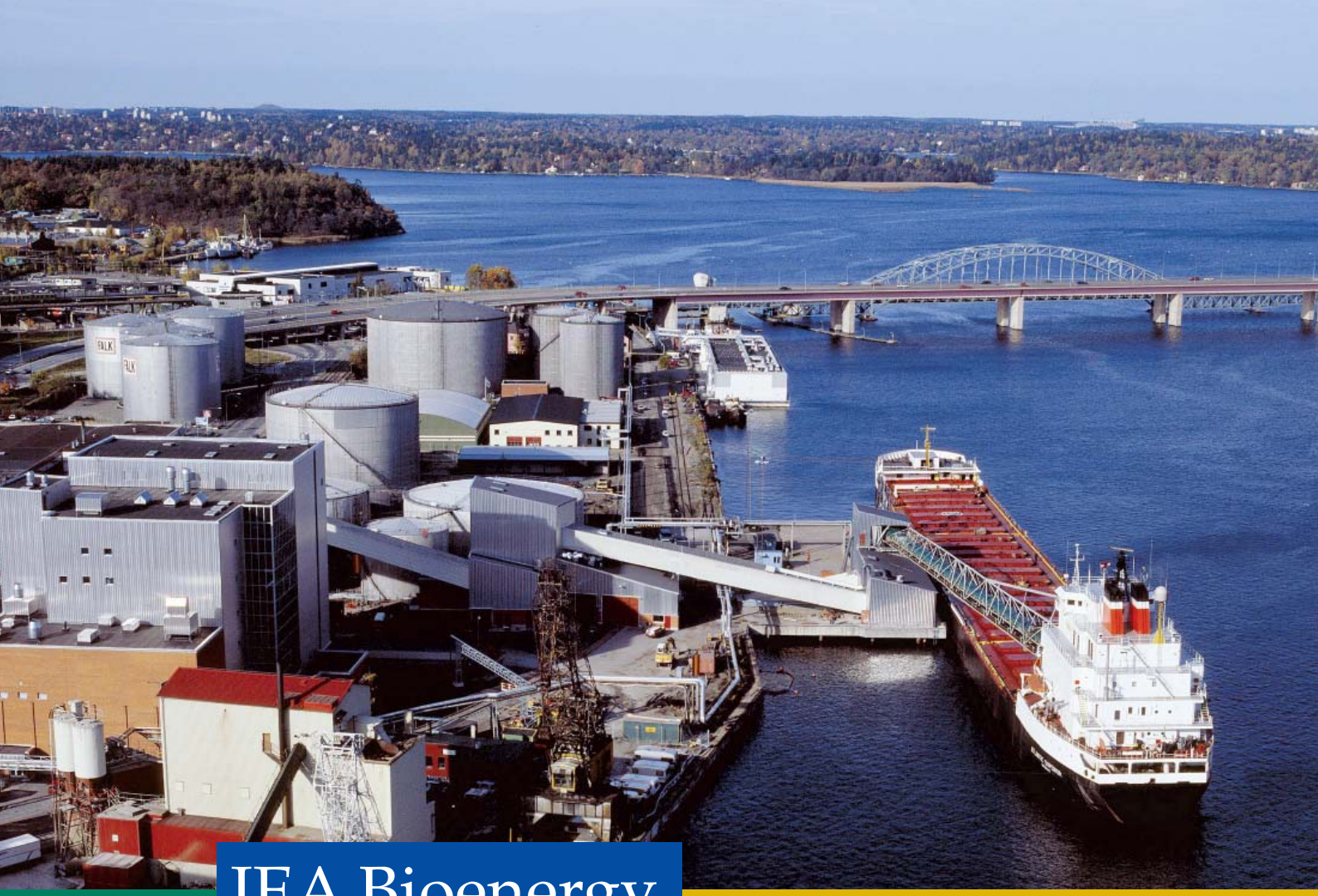


IEA Bioenergy

Strategic Plan 2010-2016

IEA Bioenergy's vision is to achieve a substantial bioenergy contribution to future global energy demands by accelerating the production and use of environmentally sound, socially accepted and cost-competitive bioenergy on a sustainable basis, thus providing increased security of supply whilst reducing greenhouse gas emissions from energy use.

IEA Bioenergy: ExCo: 2009: 03

Introduction

Biomass is material produced by photosynthesis, such as wood or plants. Biomass feedstocks used for energy include forestry and wood industry residues, agricultural residues, energy crops and the biogenic fraction of related municipal wastes. Bioenergy technologies use these resources to produce heat, electricity or solid, liquid, and gaseous biofuels which can substitute for fossil-based fuels.

IEA Bioenergy published its first Strategic Plan in 1995. This was seen as a 'living document' which would be amended to reflect the changing needs and aspirations of IEA Bioenergy and its Members. Accordingly, new plans were developed in response to changing circumstances. Now a fourth version has been produced. The drivers of the new Strategic Plan include:

- The increased emphasis on security of energy supply by Member Countries and the need to reduce dependence on fossil fuels.
- The increased emphasis on greenhouse gas mitigation through the use of bioenergy technologies by Member Countries.
- The need to develop sustainable, non-food biomass resources to be used in bioenergy applications that are environmentally sound and socially acceptable.
- The need for large-scale development and deployment of new or improved bioenergy technologies.
- The need to increase the strategic role of IEA Bioenergy and to support energy policy development.
- The need to enhance the support of IEA bodies in promoting their global energy and environment strategy.

In May 2009 the Executive Committee discussed priorities for future work and agreed that the most pressing issues included sustainability issues; the impact of bioenergy on land use change; R&D needs and priorities for the range of emerging bioenergy technologies; evaluation of new potential conversion technologies and crops; and issues associated with the practical implementation of bioenergy systems.

The potential of bioenergy

Bioenergy is already making a substantial contribution to supplying global energy demand, and can make an even larger contribution, providing greenhouse gas savings and other environmental benefits, as well as contributing to energy security, improving trade balances, providing opportunities for social and economic development in rural communities, and helping with the management of wastes, so improving resource management.

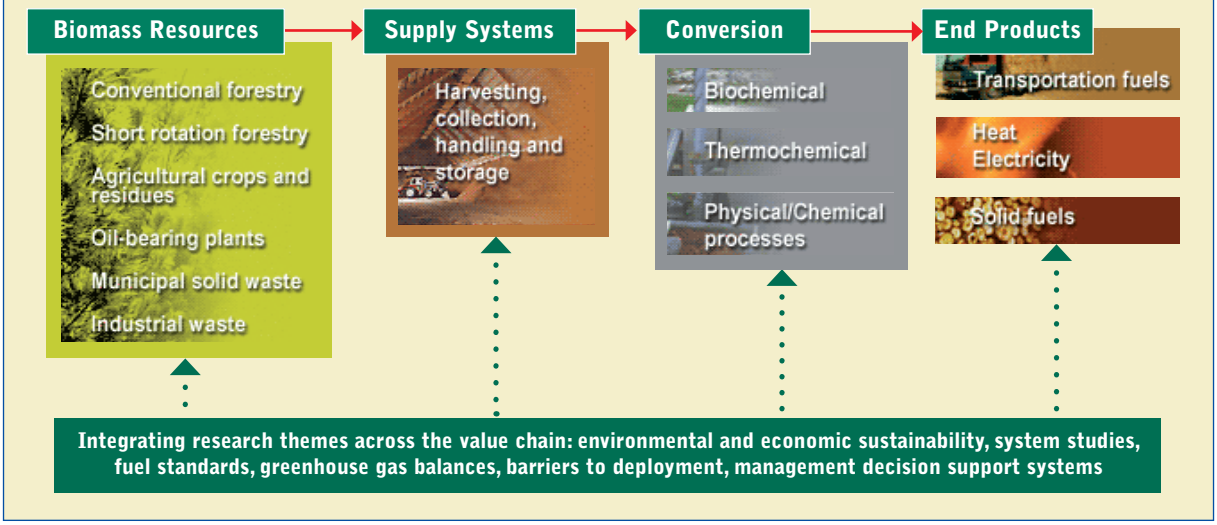
Estimates indicate that bioenergy could sustainably contribute between 25% and 33% to the future global primary energy supply (up to 250 EJ) in 2050. It is the only renewable source that can replace fossil fuels in all energy markets – in the production of heat, electricity, and fuels for transport.

However, increasing deployment of bioenergy also poses some challenges. The potential for competition for land and for raw material with other biomass uses must be carefully managed. Bioenergy must compete with other energy sources and options. Logistics and infrastructure issues must be managed, and there is need for further technological innovation leading to more efficient and cleaner conversion of a more diverse range of feedstocks. Policy makers and the public at large will need to be confident that expansion of bioenergy is sustainable.

There are many bioenergy routes which can be used to convert a range of raw biomass feedstocks into a final energy product (Figure below). Technologies for producing heat and power from biomass are already well developed and competitive in many applications, as are some first generation routes to biofuels for transport. A wide range of additional conversion technologies are under development, offering prospects of improved efficiencies, lower costs and improved environmental performance.

Avedøre Power Station, a 570 MW multi-fuel plant that can utilise natural gas, oil, and biomass in the form of straw, wood pellets and wood chips. Courtesy Thomas Scott Lund, Energi E2, Denmark.

Scope of Bioenergy RD&D



IEA Bioenergy Vision, Mission, and Strategy

The vision, mission, and strategy statements for IEA Bioenergy focus on overcoming the environmental, institutional, technological, social, and market barriers to the near- and long-term deployment of bioenergy technologies.

Vision: To achieve a substantial bioenergy contribution to future global energy demands by accelerating the production and use of environmentally sound, socially accepted and cost-competitive bioenergy on a sustainable basis, thus providing increased security of supply whilst reducing greenhouse gas emissions from energy use.

Mission: To facilitate the commercialisation and market deployment of environmentally sound, socially acceptable, and cost-competitive bioenergy systems and technologies, and to advise policy and industrial decision makers accordingly.

Strategy: To provide platforms for international collaboration and information exchange in bioenergy research, development, demonstration, and policy analysis. This includes the development of networks, dissemination of information, and provision of science-based technology analysis, as well as support and advice to policy makers, involvement of industry, and encouragement of membership by countries with a strong bioenergy infrastructure and appropriate policies.

Objectives and Actions

The vision, mission, and strategy of IEA Bioenergy will be accomplished by carrying out a number of actions to meet the objectives listed below. Performers of the actions will be the Tasks of the Implementing Agreement as well as competitively selected contractors. The quality of the outputs and the success of the plan will be monitored and evaluated by objective means at regular intervals.

Objective 1: *To promote the market deployment of technologies and systems for sustainable energy production from biomass.*

Actions:

- Identify and characterise the R&D priorities for bioenergy, including the scientific and technical innovations needed for new and growing markets.
- Identify those technologies that are ready for market deployment in the short, medium, and longer term time horizons, and prepare RD&D strategies for their support.
- Promote the deployment of technologies with important local, regional, and global socio-economic and environmental benefits that will contribute to a secure energy supply and job creation.
- Investigate technical and non-technical barriers to the market deployment of these bioenergy technologies.
- Encourage sustainable deployment of bioenergy technologies and applications in developing countries.

Objective 2: *To understand the potential for bioenergy to reduce greenhouse gas (GHG) emissions, and to identify and promote best practice solutions which lead to significant GHG savings.*

Actions:

- Develop and apply methodologies (including lifecycle analysis) for establishing the GHG impacts and benefits of the range of bioenergy systems.
- Identify strategies and policy options which optimise GHG savings, taking into account land use change.
- Promote the potential GHG benefits which can be delivered by bioenergy and the routes to delivering them.

Objective 3: *To advise policy and decision makers by providing scientifically sound and politically and commercially independent data and information.*

Actions:

- Take a leading role in policy analysis and in contributing to policy formulation in complex areas such as GHG emissions, sustainability issues and the discussion of food versus feed versus fuel. Analyse the ongoing international debates with relevance to bioenergy.
- Provide timely and reliable science-based information and data to assist policy and decision makers and make this information available through the most appropriate means.
- Evaluate regularly the impact of IEA Bioenergy's contribution to policy formulation and implementation and revise future work plans accordingly.

Objective 4: *To support policy development and deployment in Member Countries, and more widely, by communicating effectively with the relevant IEA bodies, industry, other key stakeholders in the IEA Technology Network, and other interested parties*

Actions:

- Raise awareness of and actively promote IEA Bioenergy, its activities and products through an effective communication strategy.
- Develop suitable products from the ExCo and the Tasks.
- Ensure the communication plan uses the best routes to reach target audiences.
- Develop mechanisms for receiving feedback from the relevant target groups, to gauge visibility and impact.
- Maintain and expand the IEA Bioenergy website and its links with the Task websites to maximise information availability and exchange via the internet.
- Archive published reports and documents with IEA Bioenergy and the IEA Energy Technology Data Exchange (ETDE).

Objective 5: *To actively encourage the maintenance and development of networks of participants involved in research, development, demonstration, deployment, and education, and to provide for the effective dissemination of information on bioenergy.*

Actions:

- Encourage and facilitate collaborative research, development, and demonstration through an effective programme of Tasks.
- Promote co-operative technology demonstration projects and share the information gained.
- Identify strategies that encourage existing Contracting Parties to expand their Task participation.

Objective 6: *To increase the involvement of industry in IEA Bioenergy.*

Actions:

- Continually adjust the Task work programmes to reflect industrial needs and to promote industrial co-operation.
- Transfer technology to industry through focused reports, case studies, industry days, seminars and workshops, and the internet.
- Identify and expand the involvement of supportive trade groups and industry associations where appropriate.
- Select subjects for the ExCo workshops of high industrial relevance and invite industrial experts as keynote speakers.

The AVR Waste-to-Energy plant at Rozenburg is one of the biggest waste incineration plants in Europe. On the same site, the new biomass energy plant (left) converts 150,000 t/a of demolition wood into 192 GWh/a of green electricity. Courtesy Mr Andre Rekveld, the Netherlands.

Objective 7: *To increase membership with emphasis on countries with a significant bioenergy RD&D infrastructure and appropriate policies.*

Actions:

- Identify potential new Member Countries and develop networks with appropriate representatives.
- Educate possible participants about the benefits of IEA Bioenergy participation through invitations to observe Executive Committee meetings and Task events such as workshops, study tours, and seminars.
- Present IEA Bioenergy and its results at national and international meetings.
- Support the development of global, sustainable, bioenergy policies by designing mechanisms that enable the involvement of countries with less developed bioenergy infrastructure and expertise, while maintaining a collaboration which is attractive to internationally leading countries and experts.

Objective 8: *To increase interactions with other global, multilateral energy and environmental programmes*

Actions:

- Contribute to the IEA's initiatives to develop global energy and environment policies by international networking and collaboration.
- Improve interaction within the IEA, particularly with the Renewable Energy Working Party (REWP) and other Implementing Agreements.
- Promote joint research, information exchange and technology transfer by international collaboration with other organisations such as the FAO and the World Bank, and UN programmes such as the international Intergovernmental Panel on Climate Change (IPCC), the Global Bioenergy Partnership (GBEP), and the International Renewable Energy Agency (IRENA).

Background

IEA Bioenergy is one of a number of Implementing Agreements established by the International Energy Agency (IEA) Secretariat and its Committee on Energy Research and Technology (CERT), through its Working Parties. The Implementing Agreements operate within an institutional structure comprising Implementing Agreement Executive Committees and Tasks, Working Parties, the CERT and the IEA Governing Board. The CERT provides support and overall guidance to the Working Parties. Each Working Party supports and guides the Implementing Agreements in their technology area. The Working Parties have a specific role in reviewing ongoing Implementing Agreements before the end of their term to furnish justification for their continuation. The relationship and management interaction between the three bodies, Implementing Agreement, Working Party, and CERT, are key in this process. The overall goal is to have Implementing Agreements which are contributing positively to the quality of the IEA energy technology collaboration programme and which add value to the national programmes of the Contracting Parties.

In the past 30 years, IEA Bioenergy has been at the forefront of world efforts to improve the efficient production, harvesting, and utilisation of biomass resources including related wastes. Bioenergy has increasingly been attracting attention as an important element of the energy programmes of most industrialised nations. This interest arises from the predicted climate change resulting from the emission of greenhouse gases and the role that bioenergy can play in alleviating these effects. New waste management strategies and changes in agricultural policies are other elements adding to the renewed interest in bioenergy.

As from January 2009 there are 22 Contracting Parties (Member Countries) to IEA Bioenergy. Based on the needs and priorities of the Member Countries, its current programme consists of 13 Tasks covering practically all aspects of bioenergy:

- Socio-economic Drivers in Implementing Bioenergy Projects
- Short Rotation Crops for Bioenergy Systems
- Biomass Production for Energy from Sustainable Forestry
- Biomass Combustion and Co-firing
- Thermal Gasification of Biomass
- Pyrolysis of Biomass
- Integrating Energy Recovery into Solid Waste Management Systems

- Energy from Biogas and Landfill Gas
- Greenhouse Gas Balances of Biomass and Bioenergy Systems
- Commercialising 1st and 2nd Generation Liquid Biofuels from Biomass
- Sustainable International Bioenergy Trade: Securing Supply and Demand
- Bioenergy Systems Analysis
- Biorefineries: Co-production of Fuels, Chemicals, Power and Materials from Biomass

In IEA Bioenergy, national experts from research, government, industry and other stakeholders work together with experts from other Member (and non-Member) Countries. This co-operation offers many benefits:

For research – to exchange information on recent developments in R&D, through meetings or state-of-the-art seminars, and to provide opportunities for collaborative R&D.

For industry – to be informed of technological progress as well as new projects, to work together to develop databases, handbooks, or models and to offer early participation of industrial partners in RD&D work.

For policy makers and decision makers – to gain an international perspective on progress in bioenergy, and to compile guidelines and standards and develop appropriate policy support and strategies.

For all market participants and especially the private sector – to identify and help remove technical and non-technical barriers to accelerated deployment of bioenergy technologies.

Vehicle fleets such as city buses have historically been diesel powered but are very suitable for the introduction of new fuels, e.g. biogas or ethanol. The performance and sustainability of liquid biofuels is a current RD&D focus.

Requirements for Success

Bioenergy can make an important contribution to future energy needs. The development and deployment strategy, however, will need to be based on careful consideration of its strengths and weaknesses, as well as the opportunities and threats it presents.

- Current bioenergy routes that generate heat and electricity from the sustainable use of residues and wastes should be strongly stimulated. These rely on commercial technologies, lead to a better use of raw materials through the reduction of residues and wastes, and result in clear GHG savings and possibly other emissions reductions, compared to fossil fuels. The development of infrastructure and logistics, quality standards and trading platforms will be crucial to growth and may require policy support.

- Further increasing the deployment of bioenergy, and in particular of biofuels for transport in the short term, should be pursued by:
  - Paying specific attention to sustainability issues directly related to the biomass-to-energy production chain, and avoiding or mitigating negative impacts through the development and implementation of sustainability assurance schemes.
  - Incentivising biofuels based on their potential greenhouse gas benefits.
  - Considering potential impacts of biomass demand for energy applications on commodity markets and on indirect land use change.
  - Defining growth rates that result in feedstock demands that the sector can sustainably cope with.

- Development of new and improved biomass conversion technologies will be essential for widespread deployment and long-term success. Public and private funding needs to be devoted to researching, developing and deploying the following:
  - For liquid biofuels – advanced technologies that allow for a broader feedstock base using non-food crops with fewer (direct and indirect) environmental and social risks, and greater greenhouse gas benefits.
  - For power and heat production – more efficient advanced technologies, such as gasification and advanced steam cycles, and technologies with improved economics at smaller-scale to allow for more distributed use of biomass.
  - Novel biomass upgrading technologies and multi-product biorefineries, which could contribute to the deployment and cost-competitiveness of bioenergy.

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Mr Birger Kerckow chaired a sub-committee comprised of Adam Brown, Josef Spitzer, Kyriakos Maniatis, Björn Telenius, and the Secretary to produce a draft for approval. Members of the IEA Bioenergy Executive Committee and Task Leaders provided detailed discussion and comment. The assistance of the Contracting Parties and industry in providing access to photographs is also gratefully acknowledged.

IEA Bioenergy

Further Information

If you are interested in finding out more about IEA Bioenergy, please visit the website or contact the Executive Committee Secretary Mr John Tustin.

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