

SUSTAINABLE ENERGY



Academy of Finland
Research Programme
SusEn 2008–2011



ACADEMY OF FINLAND
RESEARCH FUNDING AND EXPERTISE

SUSTAINABLE ENERGY (SUSEN) 2008–2011



SUSEN IN BRIEF



The challenges faced by energy research include, in particular, harmonisation of environmental effects and economic edge conditions as well as the optimal use of renewable natural resources for raw materials and energy. Energy solutions are key issues in terms of the present and future well-being of all mankind. Indeed, future energy solutions are significantly affected by their possible effects on human health and well-being.

The research programme will produce new and innovative scientific knowledge about energy technology, energy systems and energy efficiency. Another aim is to direct research to developing sustainable solutions as well as know-how in identifying future energy system alternatives. In the programme research is carried out from a multidisciplinary perspective, including such fields as bioenergy and nuclear power as well as medical and economic sciences.

AIMS OF THE RESEARCH PROGRAMME

- to generate new and innovative scientific knowledge in energy technology, the operation of energy systems and energy efficiency;
- to direct research to developing sustainable solutions in energy technology and energy systems, taking into account the environment and health issues;
- to develop expertise in energy production, transfer and use; and to develop know-how in identifying future energy systems alternatives and to curbing of climate change
- to create new multidisciplinary research teams and national and international networks in research;
- to increase the mobility of doctoral students and researchers;
- to improve international competitiveness of research and industry;
- to bring Finnish energy research up to international top level in certain research sectors; and
- to generate visible social impacts

The SusEn programme consists of the following core themes

- New technologies for energy production
- Effective energy system
- Energy use efficiency

Research into new technologies for energy production is mainly focused on

- Production of biomass fuels
- Other carbon-free production technology, such as wind power, solar power and fuel cell technology
- New generation nuclear power research and research in separating and storing carbon dioxide



Research into the effective energy system is mainly focused on

- Energy systems
- Energy economy and energy markets as well as research into energy consumption
- Reduction of environmental and health effects of energy systems
- Environmental issues related to energy policy and energy economy

Research into the efficiency in energy use

The need for energy can be considered a starting point for energy use. The research programme will examine the need for energy and the efficiency in its use:

- in economical production processes
- in final consumption of energy

Researching and developing energy-efficient technologies in energy use is an important focus of research.

Energy consumption and efficiency in production processes can be studied at the level of the whole national economy, in various sectors of production and the economy, at production plant level, or at production process level. Production energy consumption also includes indirect energy of domestic households and other types of final consumption. Research can focus on analysis of processes and structures, and be comparative by nature.

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futureimagebank.com,
Vattenfall

Layout: Sole Lätti





PROJECTS TO BE FUNDED

Algae for Biodiesel Production (ALGISEL)

*Tamminen Timo, Finland's Environmental Administration
Oksman-Caldentey Kirsi-Marja, VTT Technical Research
Centre of Finland*

Electricity Markets, Emissions Trading and Incentives in
Bioenergy Technology (BEET)

*Ollikainen Markku, University of Helsinki
Lankoski Jussi, Agrifood Research Finland
Stoddard Fred, University of Helsinki*

Biomass and Fuel Oil in Heating Systems: Greenhouse
Gas and Particle Emissions and Health Risks (BIOHER)

*Salonen Raimo, National Public Health Institute
Hillamo Risto, Finnish Meteorological Institute
Hirvonen Maija-Riitta, National Public Health Institute
Jokiniemi Jorma, University of Kuopio
Pekkanen Juha, National Public Health Institute
Tuomisto Jouni, National Public Health Institute*

Catalytic Decomposition of Wood (CaDeWo)

*Leskelä Markku, University of Helsinki
Tamminen Tarja, VTT Technical Research Centre of Finland*

Carbonates in Energy Technology (CARETECH)

*Zevehoven Ron, Åbo Akademi University
Eklund Olav, University of Turku
Fogelholm Carl-Johan, Helsinki University of Technology*

Reduction of Losses in Electric Drives (EFFDRI)

*Arkkio Antero, Helsinki University of Technology
Luomi Jorma, Helsinki University of Technology*

Forest-based Fuel and Material Demand and the Overall
Climatic Impacts (FOBIT)

*Pingoud Kim, VTT Technical Research Centre of Finland
Uusivuori Jussi, Finnish Forest Research Institute
Valsta Lauri, University of Helsinki*

Hidden Potential for Gross Reduction in the Energy
Demand and Emissions in Steelmaking (GREENSTEEL)

*Saxen Henrik, Åbo Akademi University
Holappa Lauri, Helsinki University of Technology
Härkki Jouko, University of Oulu*



SUS-EN RESEARCH PROGRAMME

New Type Nuclear Reactors (NETNUC)

Kyrki-Rajamäki Riitta, Lappeenranta University of Technology

Heikinheimo Liisa Sofi, VTT Technical Research Centre of Finland

Salomaa Rainer, Helsinki University of Technology

New, Innovative Sustainable Transportation Biofuels (SusFuFlex)

Lassi Ulla, University of Oulu

Keiski Riitta, University of Oulu

Kordas Krisztian, University of Oulu

Mikkola Jyri-Pekka, Åbo Akademi University

Concepts for Second Generation Biorefinery (TKK Bioref)

Hurme Markku, Helsinki University of Technology

Aittamaa Juhani, Helsinki University of Technology

Dahl Olli-Pekka, Helsinki University of Technology

Multiphase Fluidized Bed Processes in Sustainable Energy Technologies

Hypönen Timo, Lappeenranta University of Technology

Power Electronics in Smart Electricity Distribution Systems

Partanen Jarmo, Lappeenranta University of Technology

Economic-ecological Optimization of Timber and Bioenergy Production and Sequestration of Carbon in Norway Spruce Stands

Tahvonen Olli, Finnish Forest Research Institute

Synthesis and Durability of CNT Based MEAs for PEM Fuel Cells (Nanoduramea)

Kauranen Pertti, VTT Technical Research Centre of Finland

Kauppinen Esko, Helsinki University of Technology

Optimizing Lipid Production by Planktonic Algae (LIPIDO)

Tamminen Timo, Finland's Environmental Administration

Oksman-Caldentey Kirsi-Marja, VTT Technical Research Centre of Finland

Evaluation Platform for Polymer Solar Cells

Österbacka Ronald, Åbo Akademi University

Defects in Chalcopyrites - Advanced Characterisation (DECK)

Tuomisto Filip, Helsinki University of Technology

Novel Methods to Model and Reduce Toxic Element and Fine Particulate Emissions and Operational Problems in Co-combustion of Biomass and Coal

Aho Martti, VTT Technical Research Centre of Finland

Flexible Dye-Sensitized Solar Cells

Lund Peter, Helsinki University of Technology

Optimal Treatment Processes of Lignocelluloses to Bioethanol (OPTBIO)

Mikkola Jyri-Pekka, Åbo Akademi University

Peiponen Kai, University of Joensuu

Upgrading Biogas for Vehicle Use

Rintala Jukka, University of Jyväskylä

Mikkola Jyri-Pekka, Åbo Akademi University

Polysaccharide-based Biofuels and Smart Biomaterials: Sustainable Production Integrated with Pulp and Paper Processes

Fardim Pedro, Åbo Akademi University

Functional Genomics of Tree Biomass

Helariutta Yrjö, University of Helsinki



FURTHER INFORMATION

Academy of Finland

Saila Karvinen, PhD
Programme Manager
saila.karvinen@aka.fi

Academy of Finland, tel. + 358 9 774 881

Programme website:

www.aka.fi/energy



COOPERATION PARTNERS AND OTHER FUNDING AGENCIES:

National:



International:

Chile: Chilean National Commission for Scientific and Technological Research (CONICYT),

China: National Natural Science Foundation of China (NSFC),

Denmark: The Danish Agency for Science, Technology and Innovation (DASTI),

Germany: Forschungszentrum Jülich (PTJ),

Iceland: Orkustofnun,

Luxembourg: The National Research Fund (FNR),

Norway: The Research Council of Norway (RCN),

Poland: Ministry of Science and Higher Education (MSHE),

Sweden: Swedish Energy Agency (STEM),

Nordic Energy Research (NER)



ACADEMY OF FINLAND
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Vilhonvuorenkatu 6 • POB 99, FI-00501 Helsinki, Finland

Tel. +358 9 774 881 • Fax +358 9 7748 8299

www.aka.fi/eng • keskus@aka.fi