

Tomorrow's Technology Today



Acknowledgements

Authors: **Greg Spencer** • **Jerome Simpson**

Design and layout: **Tricia Barna**

Editing and proofreading: **Rachel Hideg**

Publisher: **The Regional Environmental
Center for Central and Eastern Europe (REC)**

Printing: **Typonova**

This and all REC publications
are printed on recycled paper.

Photo credits: **KIC InnoEnergy** • **Gábor Kardos**

The REC is implementing the project
“Supporting KIC InnoEnergy in its outreach
and take-up activities in the new EU and
beyond (SKYE)”, a 24-month KAVA (KIC Added
Value Activity) funded by KIC InnoEnergy.
Through this project the REC chiefly targets
potential master’s degree students and
entrepreneurs/innovators, although it goes
beyond this remit, publishing, for example, a
product/service catalogue and an investors’
inventory, and performing secretariat services
for KIC InnoEnergy.

Contents

02 Introduction

06 Clean Coal Technologies

12 Energy from Chemical Fuels

18 Renewable Energies

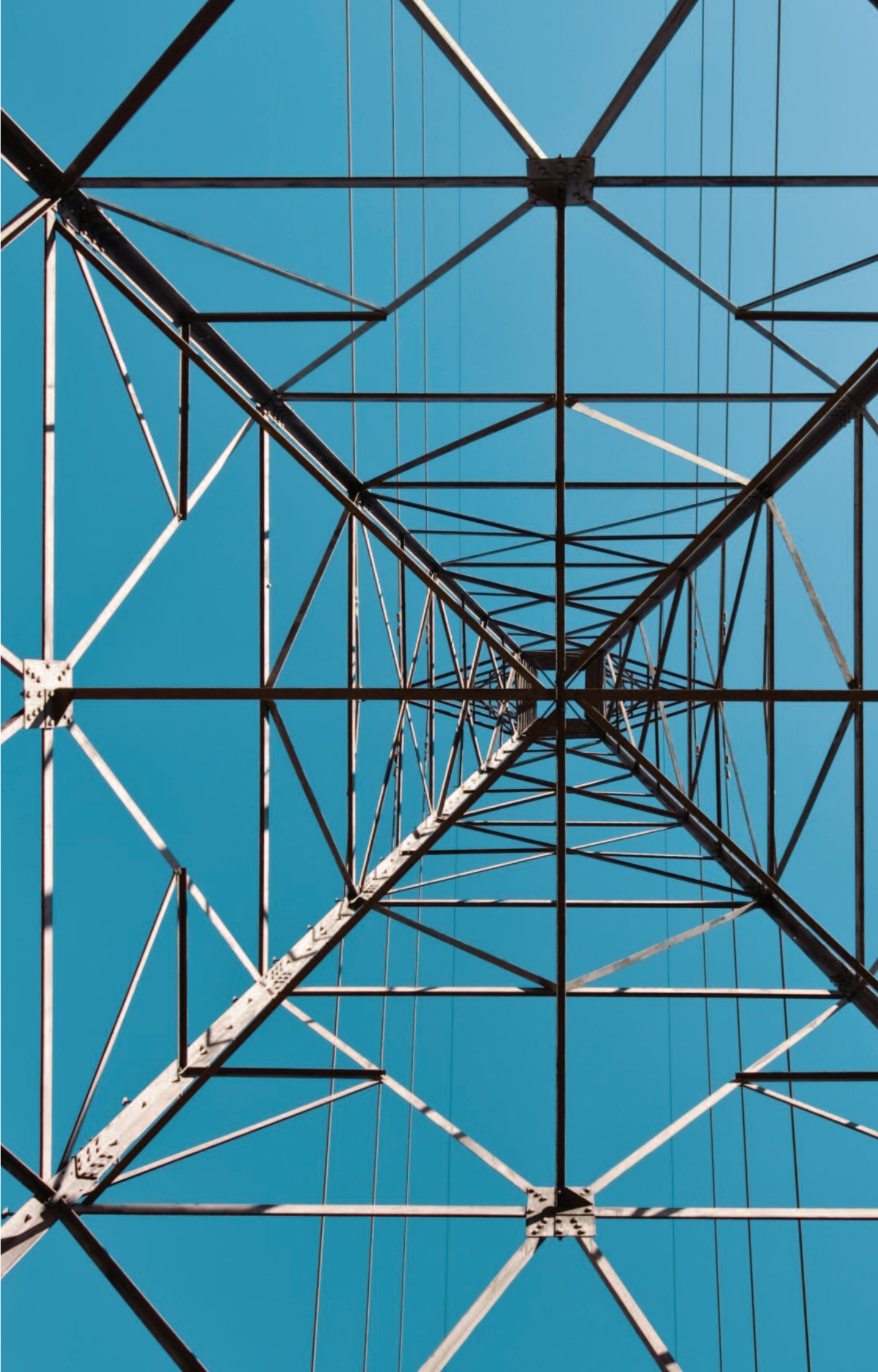
26 Smart and Efficient Buildings and Cities

32 Smart Electric Grids

38 Sustainable Nuclear and Renewable Convergence

46 About KIC InnoEnergy

50 Annex





Introduction

KIC InnoEnergy's ambitious support programme helps companies to commercialise their technological innovations. The projects implemented in each of its technology areas transform knowledge into marketable products and services within the sustainable energy field.

Towards realising European Union policy targets

October 2014 saw the adoption of new targets that require European Union (EU) member states to ensure that renewables contribute 27 percent of the energy utilised by 2030, while a 40 percent cut in greenhouse gas emissions compared to 1990 levels and an increase in energy efficiency by at least 27 percent have also been agreed. As a result, 28 countries in Europe now have climate targets post-2020.

Günther Oettinger, energy commissioner between 2010 and 2014, stated prior to the adoption of these targets: “Our aim is to give the right signal to the market and encourage further investments in energy-saving technologies to the benefit of businesses, consumers and the environment.”

The new targets also mean that EU member states can set the wheels in motion for low-carbon investments, while European energy ministers — like Lithuania’s, who, in March 2014, urged Europe “to look at how it can further diversify its energy sources” — can look forward to greater European energy security.

The new targets are part of the so-called 2030 framework for climate and energy policies¹, which aims to build a competitive and secure energy system that ensures affordable energy for all consumers, increases the security of the EU’s energy supplies, reduces dependence on energy imports and creates new opportunities for growth and jobs.

The EU’s existing energy technology policy is the so-called Strategic Energy Technology (SET) Plan², which aims to accelerate the development and deployment of cost-effective low-carbon technologies while respecting Europe’s 2020 Energy Strategy³ and 2050 objectives,⁴ an agenda tackling climate change, energy security and the competitiveness of European companies.

The SET Plan addresses the challenges faced by this sector (including global competition, underinvestment, delays in marketing new products and social acceptance) by increasing research, encouraging the commercial implementation of existing technologies and supporting the development of a new generation of low-carbon technologies. Its efforts are implemented across eight thematic fields related to sustainable energy, corresponding to those of KIC InnoEnergy.

Looking ahead, the European Commission published a communication in May 2013 setting out a strategy to enable the EU to have a world-class technology and innovation sector fit to cope with the challenges up to 2020 and beyond.

Its so-called Innovation Union is one of seven flagship initiatives of the Europe 2020 Strategy for smart, sustainable and inclusive growth.⁵ The plan aims to make Europe a world-class science performer; remove obstacles to innovation (such as expensive patenting, market fragmentation and skills shortages); and revolutionise the way the public and private sectors work together through so-called innovation partnerships. National innovation targets will help to measure progress to this end.⁶

KIC InnoEnergy activities

KIC InnoEnergy, one of the Knowledge and Innovation Communities (KICs) fostered by the European Institute of Innovation and Technology (EIT), is a leading engine for innovation and entrepreneurship in the field of sustainable energy. Through its Innovation Projects, it aims to make a positive impact on the market and on society by identifying and transforming available know-how into new marketable products and services in the sustainable energy field. It supports Innovation Projects in eight sustainable energy thematic fields:

- Clean Coal Technologies
- Electricity Storage
- Energy Efficiency
- Energy from Chemical Fuels
- Renewable Energies
- Smart and Efficient Buildings and Cities
- Smart Electric Grids
- Sustainable Nuclear and Renewable Convergence

Regional offices oversee the work implemented in each field to ensure it fits within the respective roadmaps.⁷ These in turn are fully aligned with Europe's SET Plan.

Since its establishment in 2009, KIC InnoEnergy has invested in over 40 new products and services that will impact industrial processes, markets and society. This publication introduces all under one cover for the first time — in layperson's terms. It will especially interest potential customers but at the same time illustrates the Innovation Projects and initiatives in which KIC InnoEnergy typically invests.

This publication is structured according to six of KIC InnoEnergy's eight thematic fields, since, at the time of publication, just six of the categories had projects in the implementation phase. Each section begins with an introduction to the scope of work within the field. Short project summaries then describe the innovations and describe their environmental benefits and economic potential. Participating partners are referenced and contact details are provided for the lead partner should readers wish to make further enquiries. The information provided summarises content already available on KIC InnoEnergy's website: www.kic-innoenergy.com/innovationproject/.

NOTES

- 1 http://ec.europa.eu/clima/policies/2030/index_en.htm
- 2 http://ec.europa.eu/energy/technology/set_plan/set_plan_en.htm
- 3 <http://ec.europa.eu/energy/en/topics/energy-strategy/2020-energy-strategy>; and http://ec.europa.eu/europe2020/pdf/targets_en.pdf
- 4 Of interest here are the Roadmap for moving to a competitive low-carbon economy in 2050 (http://ec.europa.eu/clima/policies/roadmap/index_en.htm); the Energy Roadmap 2050 (http://ec.europa.eu/energy/energy2020/roadmap/index_en.htm); and the Transport White Paper (http://ec.europa.eu/transport/themes/strategies/2011_white_paper_en.htm), which reflect the EU's goal of reducing greenhouse gas emissions by between 80 and 95% below 1990 levels by 2050.
- 5 http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=keydocs
- 6 See also the Europe 2020 Innovation Union's scoreboard at: http://ec.europa.eu/enterprise/policies/innovation/facts-figures-analysis/innovation-scoreboard/index_en.htm and country reports at: http://ec.europa.eu/enterprise/policies/innovation/facts-figures-analysis/innovation-scoreboard/country-reports_en.htm
- 7 <http://cip.kic-innoenergy.com/thematic-roadmaps,3.html>





Clean Coal Technologies

In addition to clean coal and gas technologies, this thematic field focuses on the new paradigm for carbon management. Due to the growing demand for electricity worldwide, it appears there is no avoiding the exploitation of coal, the most abundant and least expensive fossil fuel in the world.

Responsible use of this resource requires the technological development of heat and electric energy production, and innovation in the production of chemicals and liquid fuels derived from coal.

The rate of new energy technology development depends on several factors. The most important of these, aside from the growing demand for energy, is the rapidly growing environmental requirement to reduce emissions of NO_x , SO_x , particulate matter and, of course, CO_2 .

The priorities of this thematic area have been defined according to their potential for lowering energy costs, satisfying market demand, lowering CO_2 emissions and integrating production networks in the period 2013 to 2020. They include:

- developing advanced energy and syngas production technologies that enable the optimised use of available fossil fuel resources, biomass, waste and unconventional gases;
- enabling coal power plants to adapt to the time-specific technology options with regards to efficiency, CO_2 capture potential and operational effectiveness;
- developing a widely accepted and economically justified strategy for carbon capture and storage (CCS) and distributed energy production based on fossil fuels and waste;
- preserving a secure clean energy supply for Europe through the delivery of prospective extensions of natural resources, such as unconventional gas, with a special emphasis on shale gas; and
- increasing operational efficiency and safety in power production and industrial processes.

PROJECTS

1

Advanced Near-Zero-Emission Coal-Fired Power Plant — ACoPP

The ACoPP project addresses power plants fired by hard coal or lignite and seeks to develop advanced steam conditions, advanced concepts for utilising waste heat, and new ways of reducing CO_2 emissions to nearly zero while operating at high efficiency. In order to reach these targets, the project will exploit advanced technologies such as calcium looping (CaL), which strips CO_2 from flue gas via a reaction between CaO and CO_2 to form CaCO_3 ; oxyfuel combustion; and flue gas conditioning for CO_2 capture. The combination of a post-combustion (i.e. CaL) and an advanced oxyfuel system will be evaluated. This should reduce the cost per unit of CO_2 reduction. The ACoPP project develops technologies for power stations that run on bituminous coal and brown coal with the use of integrated CO_2 emissions reduction technology (oxyfuel combustion) to minimise exhaust emissions while maintaining maximum efficiency.

CONTACT

Sylwester Kalisz

+48 32 237 11 63

sylwester.kalisz@polsl.pl

Partners

- Institute of Combustion and Power Plant Technology (IFK), University of Stuttgart, Germany
- Bay Zoltán Foundation for Applied Research, Hungary
- AGH University of Science and Technology, Poland
- Central Mining Institute (GIG), Poland

- Częstochowa University of Technology, Poland
- Rafako SA, Poland
- Silesian University of Technology, Poland
- Wrocław University of Technology, Poland
- Instituto Superior Tecnico, Portugal
- KTH Royal Institute of Technology, Sweden

2 Construction of Small-to-Medium-Capacity Boilers for the Clean and Efficient Combustion of Biomass for Heating — BioEcoMatic

When biomass is converted to concentrated fuel, the process should minimise financial, environmental and social costs. The BioEcoMatic project develops a new sun-tracking device to be integrated with a biomass boiler in a combined system that saves biomass during the summer for winter heating. Different optics, heat absorbers and transparent covers for the tracking device are being investigated. In the 250 kW to 500 kW range, heating boilers using straw or other baled biomass do not meet today's efficiency and emissions standards. BioEcoMatic investigates technologies that will meet these requirements while being adaptable to existing units.

Partners

- Deutsches Biomasseforschungszentrum gemeinnützige GmbH (DBFZ), Germany
- GH University of Science and Technology, Poland
- Metalerg Sp. z o.o. SKA, Poland

CONTACT

Janusz Cieslak
+48 71313 57 14
janusz@metarg.pl

3 Development of a Coal Gasification Technology for High-Efficiency Fuel and Power Production — CoalGas

CoalGas will demonstrate a new procedure for removing mercury from combustion gases. Because mercury control is influenced by coal properties and chemistry, plant configuration, pollution control devices, flue gas conditions and plant operations, it is expected that, in the long term, this innovative process will be valuable for various end users, including power plants, installations that make gaseous fuels from coal, and cement factories. It will be suitable for fuel mixtures (i.e. composite fuels) derived from low-quality hard coal or brown coal and biomass with additives for high fuel qualities. The produced fuels will be used in gasification and combustion processes. A patent has been filed for a multi-cyclone dryer, and another patent is expected for the technology for composite fuel production. A sales campaign has already been launched to identify potential customers. Market analysis shows that costs should be recovered within five years of the product launch.

Partners

- AGH University of Science and Technology, Poland
- Central Mining Institute (GIG), Poland

CONTACT**Janusz Gołaś**+48 12 617 22 49
jgołas@agh.edu.pl

- EKO-GAW, Poland
- ICHPW Institute for Chemical Processing of Coal, Poland
- Katowicki Holding Węglowy SA, Poland
- PROMONT Sp. z o.o., Poland
- Syngaz Sp. z o.o., Poland
- Tauron Wytwarzanie SA, Poland
- Zakład Aparatury Pomiarowej KWANT Sp. z o.o., Poland

4

Efficient Coal-Fired Stoker Boiler — EcoStoker

Stoker boilers, which use mechanical means to feed coal into their firing chambers, remain standard sources of energy for district heating and industry, particularly those of medium to high capacity (10 to 50 MWt). Despite their maturity in design and operation, certain weaknesses (e.g. loose grates, relatively small combustion chambers and high levels of excess air) make it difficult to operate them efficiently and conform to the new emissions regulations contained in the Industrial Emissions Directive. The EcoStoker project aims to:

- develop and implement (pilot and proof of concept) internal jet-pump ventilators that are patented but not tested on industrial scale, which would achieve smooth flow patterns in the combustion chamber and the injection of reactants, thus lowering emissions;
- develop and implement (pilot and proof of concept) a patented waste heat recovery system not tested on industrial scale, which would improve efficiency; and
- estimate the market potential of the above technologies.

Partners

- Fabryka Kotłów SEFAKO SA, Poland
- Silesian University of Technology, Poland
- Tauron Wytwarzanie SA, Poland

5

Multi-fuel Energy Generation for the Sustainable and Efficient Use of Coal — SECoal

The SECoal project is dedicated to innovative approaches to the co-utilisation of different sorts of fuel of various origins and quality in conjunction with coal-based power generation. In response to industry demand it aims at the rapid delivery of innovative technological solutions and products that can be immediately deployed by power utilities.

The project deals with low-quality agricultural residues, energy crops, solid recovered fuels from waste, off-gases such as coal mine methane (CMM), glycerine and liquid biofuels with variable viscosity. These are burned with hard and brown coal for large-scale, efficient and sustainable electricity production and combined heat and power production. To that end, a combination of experimental-scale and full-scale trials will assist in the creation of modelling tools that will describe multi-fuel combustion in various firing technologies, including pulverised coal (PC) and circulating fluidised bed (CFB) technologies.

Partners

- Électricité de France (EDF)
- Institute of Combustion and Power Plant Technology (IFK), University of Stuttgart, Germany
- Bay Zoltán Foundation for Applied Research, Hungary
- Częstochowa University of Technology, Poland
- Innowacyjne Przedsiębiorstwo Wielobranżowe Polin Sp. z o.o., Poland
- Institute of Chemical Engineering, Polish Academy of Sciences
- Jagiellonian University, Poland
- Krakow University of Technology, Poland
- Silesian University of Technology, Poland
- Wrocław University of Technology, Poland
- KTH Royal Institute of Technology, Sweden

CONTACT

Sylwester Kalisz

+48 32 237 11 63
sylwester.kalisz@polsl.pl

6 New Materials for Energy Systems — NewMat

NewMat is a large project that concerns the role of materials science in innovative sustainable energy systems. The anticipated implementation of new materials will lead to an enhancement of existing technologies and to the introduction of innovative technologies in energy production. New materials with improved properties, including better resistance to aggressive environments, will significantly increase efficiency in clean energy production. Transformational advances in materials will improve efficiency at fossil fuel power plants, facilities that make gaseous fuel from coal (gasification plants), nuclear power plants, renewable energy installations, and smart grids and storage infrastructure. Ultimately, these advances will help countries to meet targets set in future energy policy.

To develop new materials, cross-disciplinary studies involving materials science, mechanics, physics and chemistry will be carried out. The key objectives of the project are to:

- develop and share the expertise of the research community and industrial partners on new materials for clean energy systems; and
- train a new generation of engineers and researchers.

Partners

- Électricité de France (EDF)
- Grenoble Institute of Technology (Grenoble INT), France
- Institute of Combustion and Power Plant Technology (IFK), University of Stuttgart, Germany
- Bay Zoltán Foundation for Applied Research, Hungary
- AGH University of Science and Technology, Poland
- Jagiellonian University, Poland
- Rafako S.A., Poland
- Energias de Portugal, S.A. (EDP)
- Instituto Superior Tecnico, Portugal
- KTH Royal Institute of Technology, Sweden
- Uppsala University, Sweden
- ABB Power and Automation Technologies, Switzerland

CONTACT

**Aleksandra
Czyrska-Filemonowicz**

+ 48 12 617 29 29
czyrska@uci.agh.edu.pl





Energy from Chemical Fuels

This thematic field focuses mainly on the production, transportation, storage and utilisation of synthetic fuels from raw materials (i.e. feedstock) such as coal, fuel oil and natural gas and biogenic energy resources such as wood, straw and algae. These fuels are also known as chemical energy carriers and may be produced using surplus energy from renewable energy sources (RES).

Work in this thematic field is implemented according to the thematic roadmap available at: http://cip.kic-innoenergy.com/download/CIP15_Annex_1A_ECF.pdf

Projects in this area seek to advance the state of the field by:

- upgrading and standardising fuels from different feedstock;
- developing methods to use these fuels (e.g. combustion systems and power plants);
- optimising the combustion and co-combustion of such fuels in existing power plants;
- converting fuels into higher-value chemical energy carriers (syngas/producer gas);
- feeding chemical energy carriers into existing distribution and storage chains; and
- implementing instruments and methods to control fuel conversion processes in order to minimise emissions and maximise energy efficiency.

Projects in this thematic field may also explore new technologies and processes to bridge the intermittent availability of renewables. They may include:

- the implementation of fuel conversion systems with high fuel and load flexibility to compensate for the fluctuations in energy supply from RES (e.g. solar or wind);
- the decentralised use of such installations to improve load balancing in the distribution grid;
- the conversion of biomass-based feedstock (replacing feedstock based on fossil fuels) into chemicals; and
- the use of energy carriers either as temporary energy storage or as inputs for the chemical industry (e.g. syngas, hydrogen, methane etc.).

These technologies contribute to the low-carbon strategy of the EU by reducing CO₂ at competitive costs and supporting the integration of transient RES into a stable energy supply system.

PROJECTS

1

Breeding Programme for the Development of a New Improved Camelina Variety — Nicava

The main challenge in the biofuels industry is to ensure a competitive and reliable supply of sustainable raw material with high GHG emission reductions. This raw material (i.e. feedstock) accounts on average for 80 percent of producers' costs. Additionally, there is increasing awareness that feedstock employed for biofuel production should comply not only with environmental principles (such as GHG emissions reductions), but also with economic and social criteria. End users and regulators are not willing to support biofuels produced from food crops or those requiring changes in land use, either directly or indirectly.

Camelina is a non-food feedstock that can be cultivated on marginal or fallow land in arid regions. As such, it is very attractive to biofuel producers. It is cost competitive with food feedstock such as soy and rapeseed oil and achieves GHG emissions reductions of over 60 percent. Because it can be cultivated on dry land that has little current utility, it does not threaten changes in land use. The Nicava project will develop a new camelina variety called CCE1. Its higher productivity and oil content will lower production costs and GHG feedstock emissions. Its higher drought resistance means greater reliability and availability of the crop, and therefore of feedstock supply. Once developed, the new camelina variety will be registered at European level with the Community Plant Variety Office (CPVO).

Partners

- Agragen LLC, Finland
- BIOTEHGEN, Romania
- Camelina Company Espana (CCE), Spain
- Instituto Técnico Agronómico Provincial SA (ITAP), Spain

CONTACT

Yuri Herreras Yambanis

+34 91 733 90 53
yhy@camelinacompany.es

2 Demonstration of Efficient Biomass Use for the Generation of Green Energy and Recovery of Nutrients — DeBugger

DeBugger addresses one of the main challenges of exploiting the energy potential in livestock manure — the very high moisture content and the presence of pathogens and inorganic pollutants. With the DeBugger technologies, most of the materials can be used for energy generation and phosphate recovery, adding potentially thousands of GWhs of energy from biomass to European grids. This can reduce coastal and inland water pollution by stopping the excessive application of organic fertilisers near livestock farms. DeBugger's first innovative product is a closed-loop steam dryer for biomass slurries, which may save up to 75 percent of the energy required to evaporate water from biomass slurries and sludge. The second innovation is the dual circulating fluidised bed (DCFB) gasifier used for thermal gasification of the dry substrate.

Partners

- Outotec, Finland
- Karlsruhe Institute of Technology (KIT), Germany
- University of Stuttgart, Germany

CONTACT

Ludwig Hermann

+49 6171 9693 379
ludwig.hermann@outotec.com

3 Development and Market Implementation of PID and FID Tar Analysers — DeMiTar

Tars in synthetic fuel gas (producer gas) pose major challenges in gas production systems because, due to their viscous nature, they can clog process equipment and the engines and turbines they fuel. Determining the tar content of a gas is therefore very important in research and application, but the task is made complex by the big variation in the properties of tars and gasification devices. Standardised measuring methods are thus required for comparability. DeMiTar aims to further develop a semi-continuous online tar analyser, based on the flame ionisation detection (FID) technique, and a continuous online tar analyser based on the photo ionisation detection (PID) technique. Both analysers would be tested in the lab and at industrial gas-making installations. The project also aims to develop a business model to bring the analysers onto the market.

Partners

- Ratfisch Analysensysteme GmbH, Germany
- Steinbeis-Europa-Zentrum, Germany
- University of Stuttgart, Germany
- Biomass Technology Group (BTG), The Netherlands
- KTH Royal Institute of Technology, Sweden

CONTACT

Heiko Dieter

+49 711 685 68921
heiko.dieter@ifk.uni-stuttgart.de

4

Development of Concepts for SNG Synthesis to Store Volatile Electric Energy Produced from Renewable Resources — DemoSNG

The increasing use of renewable energy sources with fluctuating production levels (e.g. solar and wind) gives rise to increasing demand for energy storage capacities. The required storage capacity in Germany alone is expected to be 10 to 25 TWh. Chemical energy storage is more efficient than other alternatives, because large amounts of energy can be kept in a small amount of space. As the energy storage capacity of the natural gas infrastructure is higher than 100 TWh, the conversion of energy into gas is the best way to address long-term energy storage needs. DemoSNG looks into possible business models for the supply and regulation of energy and the production of chemical fuels. Its products will include a new process for producing methane, a new power-to-gas concept and a new process for purifying hot gas. It will generate several opportunities for spin-off businesses for participating companies.

CONTACT

Dominic Buchholz

+49 721 608 42693

buchholz@dvgw-ebi.de

Partners

- Deutscher Verein des Gas- und Wasserfaches eV (DVGW), Germany
- Karlsruhe Institute of Technology (KIT), Germany
- gasNatural fenosa, Spain
- Cortus Energy, Sweden
- KTH Royal Institute of Technology, Sweden

5

Extended Gasifier Technologies for a Wide Range of Biomass — XGaTe

Turning biomass into gas (i.e. gasification) is one of the most efficient ways of making it a useful fuel, particularly in the case of bio-waste. However, the process requires dry biomass. A process called hydrothermal carbonisation (HTC) turns wet biomass into solid fuel — so-called biocoal — which can then be gasified. The XGaTe project will develop ways to combine these processes. The project aims at the gasification of all kinds of fuels. A new HTC technology will be tailored to the requirements of gasification. Market potential for these new processes and products will be assessed and then realised.

CONTACT

Hans Hubschneider

+49 721 961 3668

hans.hubschneider@

ava-co2.com

Partners

- European Institute for Energy Research (EIFER), Germany
- Karlsruhe Institute of Technology (KIT), Germany
- Steinbeis-Europa-Zentrum, Germany
- University of Stuttgart, Germany
- Boson Energy, Luxembourg
- EQTEC, Spain
- KTH Royal Institute of Technology, Sweden
- AVA-CO2, Switzerland

6 Fuel Flexible Combustion Systems for Liquid and Gaseous Biofuels — Fuel-Flex

With current technologies, many fuels derived from biomass cannot be utilised for energy production. Glycerin, for example, a by-product of chemical processes such as biodiesel production, has high potential for direct thermal use in the process chain, but there is no suitable combustion system. The Fuel-Flex project will deliver combustion technologies that enable the use of existing and future gaseous and liquid fuels for cost-effective energy production. It will deliver components for novel combustion systems for biomass-derived fuels. Experimental and theoretical investigations of combustion characteristics for future biofuels will be carried out. The project enhances three different combustion concepts: flameless combustion for liquid fuels; plasma assisted combustion; and novel fuels (Aurora, Cyclohex).

Partners

- eflox GmbH, Germany
- University of Stuttgart, Germany
- Eindhoven University of Technology (TU/e), The Netherlands
- Progression Industry, The Netherlands
- Uppsala University, Sweden

CONTACT

Heiko Dieter

+49 711 685 68921

heiko.dieter@

ifk.uni-stuttgart.de

7 Novel Synthesis Process Concepts for Efficient Chemicals and Fuel Production from Biomass — SYNCON

Fluctuating generation technologies (e.g. wind, solar) lead to increasing demand for storage facilities. The efficient conversion of biomass into usable fuels is an optimal way to produce climate-friendly energy that is easy to store. But trying to establish common tools for this process is not yet economically feasible. Large-scale plants can be optimised in terms of heat recovery, but biomass cannot be provided in sufficient quantities due to its low energy density, which is a problem in terms of transport. Compact reactor systems based on micro-process technology can help scale down the fuel synthesis while maintaining high process efficiency. The SYNCON project aims at the efficient mass production of synthetic diesel, kerosene and other fuels from biomass. The focus is on improving energy efficiency through modifications to reactor and plant design. SYNCON will also test improved catalysts and processes, process integration and process intensification. Existing fuel distribution systems for bioenergy will be used for project products.

Partners

- Grenoble Institute of Technology (Grenoble INP), France
- Karlsruhe Institute of Technology (KIT), Germany
- Eindhoven University of Technology (TU/e), The Netherlands
- Statoil ASA, Norway
- Central Mining Institute (GIG), Poland
- KTH Royal Institute of Technology, Sweden
- Uppsala University, Sweden

CONTACT

Peter Pfeifer

+49 721 608 24767

peter.pfeifer@kit.edu





Renewable Energies

This thematic field focuses on the utilisation of energy from wind and oceans, and of solar photovoltaic and solar thermal electricity. All activities revolve around products, companies and educational programmes that produce substantial improvements in the production and profitability of renewable energy.

This reduces the levelised cost of energy (LCoE) — the energy price that must be set in order for a project to break even over its lifetime. It also increases the penetration of renewables and decreases dependency on fossil fuels.

Ambitions in this thematic field are listed below by subtopic.

SOLAR PHOTOVOLTAIC

- Performance enhancement and energy cost reduction, mainly focused on solar technologies such as crystalline silicon cells, thin film and concentrated photovoltaics (CPV).
- The development of materials that are abundant and non-toxic, easy to recycle, and with a lifespan of over 40 years.
- Quality assurance, long-term reliability and sustainability, and grid integration, including very small grids, storage, ancillary services and forecasting.
- Building integration.

SOLAR THERMAL ELECTRICITY

- Higher plant efficiency through the improvement of all main components.
- Lower investments and lower operation and maintenance costs in order to reduce the LCoE.
- Improved dispatch and grid integration to allow market penetration.
- Lower water consumption and fewer environmental hazards.

WIND ENERGY

- Reduction in the LCoE by improving reliability and lifetime and cutting inspection costs and risks.
- Greater accuracy in energy prediction.
- Reduction in installation costs, especially offshore.
- Innovative concepts, systems and materials for the components of onshore and offshore wind turbines, including design tools.
- Improved power transmission and grid integration to increase wind farm deployment, including energy storage.

OCEAN ENERGY

- Innovation aimed at lowering costs and improving the performance and lifespan of specific device components.
- Reduction of operational and maintenance costs.
- Development and building of prototypes of ocean energy converters and components, as well as innovative and safe mooring systems.
- Scalability of devices and farms.

PROJECTS

1 Alternative Floating Platform Designs for Offshore Wind Towers Using Low-Cost Materials — AFOSP

The AFOSP project aims to develop a full-scale prototype floating platform for deep-sea offshore wind turbines using low-cost materials. It would offer an affordable technical solution for the exploitation of the best wind resources in the world due to its use of concrete as the main material. Due to the different water depths across the European coast, two testing solutions will be developed: one for intermediate waters (between 60 and 150 metres deep) and one for deep waters (over 150 metres deep). The project's initial focus would be on an economically viable platform that would work in waters over 60 metres deep.

Partners

- University of Stuttgart, Germany
- gasNatural fenosa, Spain
- Polytechnic University of Catalonia (BarcelonaTECH), Spain

CONTACT

Roberto Cerrato

+34 93 402 9141
rcerrato@
gasnatural.com

2 Current and Vibration Analysis for Preventive and Predictive Condition-Based Maintenance in Offshore Wind Farms — Kastrion

Kastrion is a condition monitoring system for wind turbines that prevents breakdowns and thus the associated costs of shutdowns. The system monitors the electric generator and all rotating parts inside the housing (gears, bearings and shafts). The innovative system addresses all the main customer needs, offering:

- a highly reliable data acquisition and data processing monitoring system based on embedded technology;
- a higher level of automation of mechanical fault detection and identification;
- a user-friendly and flexible tool for the configuration of complex drive trains;
- early fault detection due to sophisticated data analysis algorithms; and
- auxiliary tools for threshold definition and operational state definition.

Partners

- Grenoble Institute of Technology (Grenoble INP), France
- Institut National Polytechnique de Toulouse (INP), France
- Technical Center for the Mechanical Industry (CETIM), France
- Valemo, France
- MECAL, The Netherlands
- EC Systems, Poland

CONTACT

Nadine Martin

+33 476 82 62 69
nadine.martin@gipsa-
lab.grenoble-inp.fr

3

EFFIC

Possible ways to make the manufacturing of thin-film copper indium gallium selenide (CIGS) solar cells for photovoltaics more competitive are to:

- increase the module's output through the more efficient conversion of light energy to electricity;
- reduce manufacturing costs through higher production yield;
- reduce other system costs (racking and mechanical and electrical installation); and
- address market segments that are less accessible for wafer-based technology.

A back-end interconnection system will be developed for the CIGS thin-film PV technology that will result in 10 percent higher product quality at 20 percent lower costs. Added value will be achieved through product customisation.

The product will be improved by reducing the cells' dead zone by overcoming misalignment. In addition, printed fingers will help enhance charge collection combined with higher transparent conductive oxide transmission. Cost reductions will be made possible through increased production yield.

Partners

- NEXCIS Photovoltaic Technology, France
- Centre for Concepts in Mechatronics (CCM), The Netherlands
- The Energy Research Centre of the Netherlands (ECN)
- Roth & Rau BV, The Netherlands
- Smit Ovens Thermal Solutions, The Netherlands
- The Netherlands Organisation for Applied Scientific Research (TNO)

CONTACT

Jan Wemmenhove

j.wemmenhove@
smitovens.nl

4

Encapsulation of Flexible Thin-Film PV Devices — EnThiPV

Thin-film technologies (such as CIGS and CdTe), organic photovoltaic (OPV) and dye-sensitised solar cells (DSSC) can easily be manufactured at a low cost by printing on flexible backing materials (i.e. substrates). However, one drawback of thin-film flexible PV technologies is their relatively short lifetimes. To slow degradation, they need to be covered with a film barrier that will protect them from oxygen and moisture.

Unfortunately, the better plastic film barriers that are proposed are not good enough, and very good gas barrier film is too expensive for PV applications. The market potential of most flexible PV technologies therefore depends on the availability of low-cost high gas barrier films. The main objectives of EnThiPV are to:

- prolong the lifetimes of flexible CIGS and OPV solar panels;
- develop a high gas barrier film at low cost;
- develop a barrier solution that withstands prolonged exposure to light; and
- develop an advanced, industrial-grade measurement instrument that is protected with a very good gas barrier.

Partners

- Amcor, Belgium
- Commissariat à l'Energie Atomique et aux Energies Alternatives (CEA), France

- Disatech, France
- Vinci Technologies, France
- Karlsruhe Institute of Technology (KIT), Germany
- Catalonia Institute for Energy Research (IREC), Spain
- ESADE Ramon Llull University, Spain
- Polytechnic University of Catalonia (BarcelonaTECH), Spain
- Tecnalia Research & Innovation, Spain

CONTACT**Stéphane Cros**

+33 479 44 45 80
stephane.cros@cea.fr

5 Energy Efficiency in Industry — LHI-EE

Improved energy efficiency will help meet the European target of reducing energy consumption by 20 percent by 2020. Industry accounts for about one-third of total EU energy consumption and the sector has charted more gains in energy efficiency than any other over the last two decades — 30 percent. But further improvement is still possible. Manufacturers have already implemented specific improvements to reduce energy costs. The LHI-EE project explores how such improvements can be adapted from one industry to the next and how to open channels for the flow of knowledge. The project will integrate several new solutions in a variety of areas:

- intelligent energy management system software;
- a control system for air heaters for industrial boilers;
- software for steel furnace optimisation and design;
- software for energy service companies that can assist in energy audits;
- the production of electrical energy from waste heat;
- a solar thermal flat plate collector; and
- a solar thermal collector using a Fresnel lens.

Partners

- Silesian University of Technology, Poland
- Catalonia Institute for Energy Research (IREC), Spain
- E4 Experts (Energia Exergia Economia Ecologia) SL, Spain
- gasNatural fenosa, Spain
- Polytechnic University of Catalonia (BarcelonaTECH), Spain
- Tecnalia Research & Innovation, Spain
- KTH Royal Institute of Technology, Sweden

CONTACT**Antoni Julia**

+34 93 402 914
ajulia@gasnatural.com

Marc Vives

+34 93 356 2615
mvives@irec.cat

6 Microlubgear

Microlubgear is a new concept for a lubrication system for pitch and yaw gears (used in wind turbines) that cuts maintenance, increases energy generation and prevents excessive wear. It takes advantage of the volume of a gear's dedendum to embed a micro-fabricated element that continuously supplies fresh grease at the contact region. The system uses micro-technology and micro-tribology to create a tiny nozzle that forms the basis of a new generation of high-efficiency automatic lubrication systems.

CONTACT**Jasmina Casals**

+34 937 398 022

jasmina.casals@upc.edu

The technology reduces losses in energy generation caused by inefficiency and downtime resulting from mechanical failures and the corrective or preventive maintenance of wind turbine gears. It would be marketed to wind turbine manufacturers, gear manufacturers, manufacturers of automatic lubrication systems, and wind farm owners.

The product developed during the project offers the following unique sales propositions (USPs):

- direct workspace lubrication;
- no energy production losses;
- low cost; and
- possible integration into any wind turbine.

Partners

- Grupo Técnico RVI SL, Spain
- Klüber Lubrication, Spain
- Laulagun Bearings SA, Spain
- Polytechnic University of Catalonia (BarcelonaTECH), Spain

7 Offshore Metocean Data Measuring Equipment and Wind, Wave and Current Analysis and Forecasting Software — Neptune

Neptune consists of two products. The first is EOLOS, a type of buoy using light-radar (LiDAR) distance measurement. It can measure wind speeds at heights of more than 200 metres above the sea surface, giving it a competitive advantage over masts. The other is NEPTool, a highly accurate forecasting programme that can simulate wind, wave and sea currents. This is an improvement over existing commercial systems for measuring winds, sea waves and sea currents. Neptune solves the problem of installing expensive masts in offshore wind farms.

CONTACT**Frieder Schuon**

+34 933 56 26 15

frieder.schuon@

kic-innoenergy.com

Partners

- Catalonia Institute for Energy Research (IREC), Spain
- Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas (Ciemat), Spain
- gasNatural fenosa, Spain
- Polytechnic University of Catalonia (BarcelonaTECH), Spain
- Soluciones de Ingenieria Maritima Operacional SL (SIMO), Spain

8 Offshore Test Station — OTS

This project focuses on two products. The first, an environmental monitoring system, is an integrated acoustic tool that offers safe, reliable, high-quality, cost-efficient, environmentally friendly monitoring in near real time in virtually any coastal environment. It is the only product on the market that couples a powerful modelling tool with monitoring equipment — a complete, integrated approach. This enables a

continuous recalibration of the parameters of the model via monitoring data. It also has the capacity to incorporate the parameters in subsequent analysis, enabling sustained improvement. It can be coupled with other sensors to monitor other parameters according to the client's needs.

The second product is software for the operation and maintenance of offshore plants. It assists utilities/park operators in the daily management of offshore farms through the creation of maintenance plans and the estimation of power production. This product will offer a unique capability to undertake both operation management and maintenance management and planning.

Partners

- Ahlers Lindley Lda., Portugal
- Energias de Portugal (EDP) Inovação SA, Portugal
- Instituto Superior Tecnico, Portugal
- UAVision, Portugal
- WavEC Offshore Renewables, Portugal
- Polytechnic University of Catalonia (BarcelonaTECH), Spain

CONTACT

António Sarmento

+351 21 841 7405

antonio.sarmiento@

ist.utl.pt

9 Thermal Storage for Concentrating Solar Power Plants — Tesconsol

The main objective of the Tesconsol project is to reduce the high capital and maintenance costs of existing thermal energy storage (TES) systems. The project would accomplish this by using concentrating solar power (CSP) plants and identifying viable, innovative solutions for TES. Apart from the services Tesconsol would offer to customers, the project is developing:

- detailed codes for the designing of sensible and latent TES systems in CSP plants;
- a software called DYESOPT for designing, decision making and optimisation of CSP plants and a module library called SOLCONTROL for CSP control strategies; and
- a new single-tank storage design.

The main objectives are to reduce costs and achieve greater reliability in TES systems for CSP plants. These aims are addressed at the component level (detailed analysis of TES systems followed by a proposal for optimised and innovative solutions). The system level is also addressed through optimisation that takes into account the dynamics of the whole plant.

Partners

- TOTAL, France
- gasNatural fenosa, Spain
- Polytechnic University of Catalonia (BarcelonaTECH), Spain
- Tecnalia Research & Innovation, Spain
- KTH Royal Institute of Technology, Sweden

CONTACT

Carlos David Pérez Segarra

+34 93 739 8192

segarra@cttc.upc.edu



Smart and Efficient Buildings and Cities

As 40 percent of the world's energy and 40 percent of the world's materials are consumed in the built environment, making buildings and cities smart and energy efficient is key to sustainable development. The ultimate goal of this thematic area is the creation of energy-neutral cities with minimal CO₂ emissions. In smart cities, environmental sustainability plays a central role.

Projects in this field seek to develop smart, energy-efficient buildings, a greener environment and cleaner air without compromising comfort. The thematic field is based on the following concepts:

- Modern technology means that the age of energy-positive buildings for both domestic and office use is at hand. Thermal storage technology can be optimised to make this happen.
- Aside from the technological challenges, society and lifestyles must also change and energy-saving attitudes must be adopted.
- The development of smart and sustainable transport systems is essential to making such attitudes possible.
- Electricity will be the sustainable energy carrier of the future. The development of smart grids at distribution level is crucial to making energy-efficient cities a reality.

PROJECTS

1

Active Substations — KIC-ASS

To cope with new technical and regulatory challenges, distribution substations should take an active role in energy management and fault recovery of smart grids. With active substations, managers can obtain more information on the operational state of the grid, allowing for faster diagnostics, the more rapid resolution of faults and greater control of the grid. Active substations also make it possible to integrate distributed renewable power sources and electric vehicles. KIC-ASS is developing a concept for new and active distribution. It seeks to design compact, accurate and cost-effective devices that make full-scale roll-out of smart technologies in the distribution network economically feasible.

The aim is to develop three products with the following estimated annual market value:

- A contactless MV voltage measurement device — EUR 443 million.
- An intelligent protection relay and substation controller (RTU) — EUR 886 million.
- A direction-sensitive short-circuit detector — EUR 266 million.

Partners

- CG Holdings, Belgium
- Eandis, Belgium
- EnergyVille (with VITO and KU Leuven), Belgium
- Eindhoven University of Technology (TU/e), The Netherlands
- AGH University of Science and Technology, Poland
- Instituto Superior Tecnico, Portugal
- Catalonia Institute for Energy Research (IREC), Spain
- gasNatural fenosa, Spain
- Polytechnic University of Catalonia (BarcelonaTECH), Spain
- KTH Royal Institute of Technology, Sweden
- STRI AB High Voltage Testing and Consulting, Sweden
- Vattenfall AB, Sweden

CONTACT

André Haverkort

+31 65 16 11 763
Andre.haverkort@
kic-innoenergy.com

Hilde Verachtert

+32 495 35 58 18
hilde.verachtert@
vito.be

2 Business and Service Models to Support the Roll-Out of Electric Vehicles in Cities — EVCITY

The electrification of road transport is an important element in reducing local emissions. For cities, the challenge is to find the most appropriate path towards electrified transport and to identify the necessary investments, including charging infrastructure. EVCITY establishes guidelines for cities and stakeholders involved in the roll-out of electric vehicles and supporting infrastructure. The guidelines describe the market roles and business opportunities for new products and services in the mobility and partly regulated energy market. They also supply information on the practical aspects of installing charging infrastructure and on some related regulations.

EVCITY outputs include:

- optimised solutions for charging electric vehicles in cities through a smart charging adaptor that drivers of electric vehicles can use via a standard wall socket, thus lowering the investment costs for deploying charging points in a city;
- the design of a smart-charging adaptor;
- the design of a smart energy payment service that will enable fleet operators to offer a replacement for the fuelling cards of lease cars;
- a proposal for a service that enables the reduction of peak loads caused by the simultaneous charging of multiple electric vehicles; and
- a proposal for an intelligent data logger and data mining service that will generate important data at chosen points in the charging infrastructure and that will be used to reduce peak loads.

Partners

- Eandis, Belgium
- EnergyVille (with VITO and KU Leuven), Belgium
- Triphase NV, Belgium
- Karlsruhe Institute of Technology (KIT), Germany
- Eindhoven University of Technology (TU/e), The Netherlands
- The Netherlands Organisation for Applied Scientific Research (TNO)
- NXP Semiconductors Netherlands BV
- Catalonia Institute for Energy Research (IREC), Spain
- Tecnalia Research & Innovation, Spain

CONTACT

Raf Ponnette

+32 478 47 03 55
raf.ponnette@vito.be

3 Electrical Energy Storage Device for Cold Stores — EStore

The EStore project seeks to develop an automated switch for refrigeration systems that will enable them to adjust their electricity uptake based on system needs as well as the price of electricity. The EStore device with its embedded software controls electricity demand based on electricity market inputs while ensuring that the temperature of the refrigeration unit stays within an acceptable range. In this way, a surplus of renewable electricity can be used to lower the temperature of the warehouse, leading to lower energy costs for the warehouse owner and the useful exploitation of excess electricity.

CONTACT**Aart de Geus**Aart.degeus@
kic-innoenergy.com

The target markets are refrigerated storage facilities in Europe. In recent years, this industry has undergone major changes due to EU restrictions on synthetic refrigerants, including the banning of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) by 2015. In the Netherlands, for example, roughly 75 percent of refrigerated warehouses used R22, an HCFC refrigerant. Converting or rebuilding a refrigerating system is often combined with an upgrade of the control system, creating an enormous opportunity for EStore.

Partners

- Eandis, Belgium
- EnergyVille (with VITO and KU Leuven), Belgium
- Cofely (GDF SUEZ Energy Services), The Netherlands
- The Netherlands Organisation for Applied Scientific Research (TNO)
- KTH Royal Institute of Technology, Sweden

4

Energy Supply Cooperative — ESC

The ESC project aims to develop energy-efficient, environmentally friendly living quarters. Much of the required energy will come from photovoltaic (PV) systems within the building, with energy consumption cut to a minimum by modern passive house technology. The PV energy will be supplemented with heat pumps, and hot water storage and intelligent load shifting will also be incorporated. The project also studies the socioeconomic effects of energy consumption and opportunities for load reduction and shifting. Electricity that cannot be produced in the home will be available from an external supplier. In the micro-grid, an intelligent energy management system using PowerMatcher will ensure optimal interaction between local energy supply and demand. The developed innovations will be affordable for households with average incomes.

CONTACT**Frank Diedrich**+49 172 752 44 87
Frank.diedrich
@kic-innoenergy.com**Partners**

- evohaus GmbH, Germany
- Karlsruhe Institute of Technology (KIT), Germany
- The Netherlands Organisation for Applied Scientific Research (TNO)

5

Micro Turbine Technology for Micro Combined Heat and Power Plants — MTT Micro CHP

The MTT turbine has some important advantages over competing technologies: very small size (and highest power density of all combustion engines); low weight; very low costs due to the use of off-the-shelf components; durability due to having just a few moving components; and flexibility in operation. The MTT micro CHP system combines innovations in several fields, including combustion technology for natural gas, power electronics and recuperators (system components that recover heat from combustion). In addition, MTT uses components in its micro turbine that are already mass produced in the automotive industry, resulting in extremely low costs for the engine.

The micro CHP system can lead to a reduction in customers' energy bills by up to 25 percent and reduce their CO₂ emissions by 3 to 6 tonnes per unit per year. Current estimates of market potential are based on the assumption that micro CHP units will replace gas-fired boilers in central heating systems. This would mean more than 30 million micro CHP systems in the 3 kW electrical range.

Partners

- Eandis, Belgium
- Électricité de France (EDF)
- Eindhoven University of Technology (TU/e), The Netherlands
- Micro Turbine Technology (MTT) BV, The Netherlands
- The Netherlands Organisation for Applied Scientific Research (TNO)
- Catalonia Institute for Energy Research (IREC), Spain

CONTACT

Luc Hamilton

+31 886 88 00 10
luc@mtt-eu.com

6 Products and Services of a Living Smart City Lab — Alive & KICing

Within Alive & KICing, researchers evaluate and improve three essential components of a living lab that tests out a smart city energy system.

- Intelligent street lighting systems for public spaces: Can they cut energy use and reduce the lighting costs of local governments and grid operators, taking into account the specific comfort requirements of end users?
- An energy service company concept for the retrofitting of buildings: This idea offers a solution for the fast and targeted retrofitting of residential buildings by setting up an innovative business concept with the participation of local communities (citizens) while putting a minimum burden on end users. There are no direct investments and some of the profits go back into the local community. The concept would rely on low-cost and reliable technology/energy suppliers.
- Self-learning process: More and more cities are aiming at CO₂ neutrality. The large district investments required need to fit into medium- and long-term city plans. Priority setting, sustainable design, urban planning and impacts on the urban environment are key considerations. The project provides a learning platform, helping stakeholders to make investment decisions efficiently and inclusively, and PhD students are actively involved.

Partners

- Eandis, Belgium
- EnergyVille (with VITO and KU Leuven), Belgium
- Électricité de France (EDF)
- Eindhoven University of Technology (TU/e), The Netherlands
- The Netherlands Organisation for Applied Scientific Research (TNO)
- Waifer Nederland BV, The Netherlands
- AGH University of Science and Technology, Poland
- KTH Royal Institute of Technology, Sweden
- Harvard Engineering Ltd., UK





Smart Electric Grids

In the smart grids and storage technology area, a contribution can be made towards meeting the EU's 20-20-20 targets by the development of smart energy systems centred on smart cities and energy efficiency.

The deployment of smart grids requires the adoption of regulatory regimes and new standards, as well as the use of traditional technologies. The energy system needs solutions for the production and storage of energy in both local and remote locations, as well as the development of flexible transmission and distribution systems with integrated information and communication technologies. New market models that help both traditional and new actors in the energy market are also required.

The concept is based on encouraging active consumers who can lower their own costs when given greater choice between energy sources.

Electricity storage helps to integrate fluctuating renewable energy sources into grids. There is an additional focus on ensuring fast and reliable access to a large output reserve, which will reinforce the grid's stability. The ultimate aim is for electricity storage in the future to be able to ensure power supply regardless of the source of energy production.

PROJECTS

1

High Power Converter Auxiliary Power Supply — HICAPS

Voltage source converters (VSC) for high-voltage direct current (HVDC) and static synchronous compensator (STATCOM) installations currently utilise insulated gate bipolar transistors (IGBTs) as main switches. A recent project at the KTH Royal Institute of Technology in Stockholm has established that another main semiconductor switch, the integrated gate commutated thyristor (IGCT), is superior from the power loss perspective. This translates into significant lifecycle cost (LCC) reductions for the end customer (usually a transmission system operator), as power losses represent a significant proportion of the LCC for a VSC or STATCOM.

The product to be developed is a small but critical part of a much larger system (HVDC station). There are at present no IGCT-based VSC HVDC installations, and according to public information the currently known solutions have inferior characteristics or cannot be directly applied to such systems. The project aims to provide a cost-effective auxiliary power supply for high-power converter cells. The benefits to the end customer lie mainly in:

- lower LCC thanks to reduced power losses during operation; and
- longer planned maintenance intervals, due to the lower probability of unplanned outages.

CONTACT

Andrei Blinov

andrei.blinov@kic-in-
noenergy.com

Partners

- Eindhoven University of Technology (TU/e), The Netherlands
- KTH Royal Institute of Technology, Sweden
- ABB Power and Automation Technologies, Switzerland

2 IncoTrans

Because of the huge electricity market, high market competition, and the increasing density of the electric power network, there is a tendency to produce and sell low-quality insulators in order to create higher market demand. On the other hand, the quality factor is now extremely important in terms of competition due to higher requirements in relation to the performance and reliability of high-voltage power lines. This all leads to increasing environmental impacts.

The IncoTrans project offers innovative deposition devices and technologies based on reactive processes in the gas discharge plasma for very thin coatings on insulator surfaces. This makes the surface more resistant to high-voltage arcing and prolongs its lifetime. In some cases, the application of such protective coating can also allow for a lower-quality substrate material while preserving the high-voltage insulation and chemical/mechanical resistance to the harsh environments of the coated components.

Partners

- Karlsruhe Institute of Technology (KIT), Germany
- FLUBETECH, SL, Spain
- Tecnia Research & Innovation, Spain
- Primateria AB, Sweden
- Uppsala University, Sweden

CONTACT

Hana Barankova

Hana.Barankova
@angstrom.uu.se

3 Intelligent Power Conditioning and Monitoring Interfaces for Smart Grid Prosumers — ProInterface

The reliability of electricity supply has recently become a major concern, along with power distribution sources and loads. Modern factories with highly automated production lines require a reliable power supply with precisely defined power quality parameters. The challenge will become greater as power generation becomes more decentralised. On the one hand, distributed energy sources are prone to episodes of poor power quality at the connection point, and this has a major impact on supply parameters. There is thus a market for solutions that can quickly identify sources of power disturbance and protect energy customers from power quality disruptions. There is also a need for an intelligent interface for smart grid prosumers.

The aim of ProInterface is to develop three products intended to improve conditions for the supply of electricity and the integration of distributed energy sources into the supply network. The project integrates prosumers with a low-voltage electric power grid so as to ensure effective two-way power transmission. Operating with energy storage units, ProInterface is designed to optimise energy costs and maximise profits for the user. It also seeks to improve the quality of the electricity transmitted to consumers through the grid and to ensure the fulfilment of power quality requirements for power supplied by active consumers who provide power to the grid. The interface will also provide for the generation of reactive power and the filtration of higher harmonic current at a given point of the grid.

CONTACT**Krzysztof Chmielowiec**

kchmielo@agh.edu.pl

Partners

- AGH University of Science and Technology, Poland
- Elsta Elektronika, Poland
- JES Energia, Poland
- Tauron Dystrybucja, Poland
- Polytechnic University of Catalonia (BarcelonaTECH), Spain

4

Load Current Commutation and Interruption by Electromechanical Switches and Power Electronics — ESPE

With the drive for renewable energy and lower GHG emissions, solar and wind power installations are proliferating. Since these energy sources generate energy only sporadically, they produce instabilities in the grid and imbalances between power production and consumption. This gives rise to the need for faster and more controllable mechanical switches and other components in the grid.

The ESPE project is developing a faster and more controllable mechanical switch for the energy grid that can provide higher opening speeds and lower opening times than existing technologies.

Partners

- Polytechnic University of Catalonia (BarcelonaTECH), Spain
- KTH Royal Institute of Technology, Sweden
- ABB Power and Automation Technologies, Switzerland

CONTACT**Göran Engdahl**

goran.engdahl@ets.kth.se

5

Smart Grid Materials — Materials

Improved electrical breakdown strength is a key material property in electrical insulation systems. It contributes to increased insulation and a more reliable electrical feed during over-voltage load in electrical apparatus and distribution/transmission systems. Advanced insulation materials are needed to decrease power losses in power systems, which cost millions of euros every year. Improved insulation materials will enable more reliable HVDC cable systems, windings and bushings. This will result in improved electrical design and lower maintenance requirements.

Three new products are being developed within the Materials project:

- An innovative electric field grading material with a higher performance, which increases the efficiency of HVDC cable systems.
- An advanced cellulose-based press board with improved electrical insulation properties for transformers.
- A wear-resistant contact material with low friction, which enables the longer lifetime of sliding contacts in heavy-duty voltage regulation equipment.

Partners

- AGH University of Science and Technology, Poland
- Catalonia Institute for Energy Research (IREC), Spain
- Tecnia Research & Innovation, Spain
- Impact Coatings, Sweden
- KTH Royal Institute of Technology, Sweden
- Uppsala University, Sweden
- ABB Power and Automation Technologies, Switzerland

CONTACT

Malin Nilsson

malin.nilsson@
kic-innoenergy.com

6 Solid State Transformer — SST

As pressure increases on electric service providers to deliver a higher-quality and more reliable product, there is a need to increase the utilisation of the existing grid and its equipment. According to a market investigation, customers require:

- increased voltage control;
- improved power quality;
- reactive power compensation;
- reduced size and weight;
- reduced environmental concerns;
- advanced distribution automation functions;
- energy storage; and
- flexible power supply.

This project seeks to identify the potential business case for the solid state transformer (SST) and to quantify additional benefits gained by using an SST in grid service. An SST can provide better control over the shape and amplitude of output voltage waveform. This results in a more effective utilisation of the grid. With decreased size and reduced weight, the SST will simplify site preparations before installation and also reduce the customer's need for heavy transportation. The SST will also make it easier to connect energy storage to the grid by using the converters within the SST.

Partners

- gasNatural fenosa, Spain
- Polytechnic University of Catalonia (BarcelonaTECH), Spain
- Vattenfall AB, Sweden
- ABB Power and Automation Technologies, Switzerland

CONTACT

Anders Nutti

anders.nutti@poyry.com



Sustainable Nuclear and Renewable Convergence

This is a wide, multipolar thematic field in which the primary goal is to investigate synergies between nuclear energy and renewable energy. By so doing, KIC InnoEnergy aims to decrease energy costs, increase the operational reliability of the future energy system, and reduce GHG emissions.

Synergies can be found, for example, in the application of key enabling technologies (KETs) and in transversal issues of the future energy mix, such as the seamless integration of RES in a centralised production mix via energy storage and efficiency. The strategy is to focus on convergence projects with the greatest impact, including:

- advanced materials and processes for European energy challenges;
- energy storage for the integration of renewable energy production;
- energy efficiency in industry; and
- instrumentation, measurement and control systems for nuclear power.

In the medium term, the goal is to build a balanced and robust innovation project portfolio that complies with the general objectives of KIC InnoEnergy. Longer term, the projects are expected to lead to technology transfers that will create new businesses for KIC InnoEnergy partners.

PROJECTS

1

Advanced Combustion Unit for Biomass — AdCUB

Bioenergy will play a key role in renewable heat and power production, contributing up to 14 percent of the European energy mix by 2020. More than 4,000 MWe are planned to be installed in Europe between 2010 and 2015. At present, however, most biomass technologies are not economically competitive with fossil fuels for a number of reasons, mainly related to the level of maturity of the technologies and the cost of the raw materials (i.e. biomass feedstock). In the “small-scale” range of power (i.e. 2.5 to 6 MWe), the main technical challenges are to find an efficient solution addressing biomass fuel specificities and to cover the capital costs needed to compete in the market.

The AdCUB project aims to develop an advanced combustion unit for a small-scale bioenergy power production plant in order to:

- lower delivery times;
- reduce capital expenses;
- increase the autonomy and operability of the energy system by developing an efficient solution using local resources (locally grown feedstock and local operators); and
- ensure a reduction in GHG emissions.

The power plant’s innovative design will feature a multipurpose modular core to:

- adapt to diverse biomass feedstock; and
- target the worldwide market within two to three years.

The market has been estimated at EUR 220 to 250 million per year between 2015 and 2020, and eventually at EUR 400 to 500 per year.

CONTACT

Florian Castagno

+33 4 42 37 22 10

florian.castagno@areva.com

Partners

- AREVA SA, France
- Commissariat à l’Énergie Atomique et aux Énergies Alternatives (CEA), France
- Karlsruhe Institute of Technology (KIT), Germany

2 High-Temperature Thermoelectric Generator — HITTEG

In the EU27, the industrial sector consumes up to a third of total final energy. Together, the manufacturing industry and energy industry are responsible for about two-thirds of CO₂ emissions. Energy efficiency is the most cost-effective way to cut emissions, improve security and increase the competitiveness of European industry.

Waste heat is a major source of lost energy in industry, and thus a key target for efficiency development. Thermoelectric generators, which convert thermal energy directly to electrical energy, are a promising solution for waste heat recovery. However, some important challenges remain in the spread of this technology, including its high production costs; low conversion efficiency (3 to 5 percent); and the low durability of material at temperatures above 500°C.

The HITTEG project seeks to develop a prototype thermoelectric generator that works at temperatures above 300°C, with high efficiency and with the cost of ownership at below EUR 1 per watt. The generator would be able to convert high-temperature waste industrial heat into electricity. The innovative product would utilise ceramic tapes and powder injection moulding.

Partners

- Commissariat à l’Énergie Atomique et aux Énergies Alternatives (CEA), France
- GDF Suez, France
- Catalonia Institute for Energy Research (IREC), Spain
- CIDETE Ingenieros SL, Spain

CONTACT

Luc Federzoni

+33 4 38 78 57 26
luc.federzoni@cea.fr

3 Hydrogen Storage Solutions — HyCUBE

Energy storage technologies are crucial for achieving European climate energy objectives and the transition to a low-carbon energy mix. Hydrogen is a key vector for energy storage. It makes the integration of renewable energies easier by converting the excess of electricity production into chemical energy. It also offers a promising solution to CO₂-free transportation. However, the development of hydrogen storage faces two challenges: cost and safety. The HyCUBE project aims to bring to the market three innovative solutions for hydrogen storage that address both cost and safety issues:

- a commercial high-pressure tank for vehicles;
- a storage system for stationary applications (based on the conversion of hydrogen to metal hydrides) connected with renewable energy production; and
- a hybrid hydride storage and pressure vessel with a prototype for heavy machines such as airport ground services equipment and lifting machines.

Partners

- Commissariat à l’Énergie Atomique et aux Énergies Alternatives (CEA), France
- McPhy Energy SA, France
- RAIGI SAS, France
- University of Corsica, France
- Federal Institute for Materials Research and Testing (BAM), Germany
- Wrocław University of Technology, Poland

4 Innovative Sensor for Material Ageing and Radiation Testing — I-SMART

More efficient and more precise instrumentation for radiation measurement is needed in many sectors, among them nuclear safety, oil and gas prospecting, medical applications, and national security. In the nuclear industry, there is a need for the selective and simultaneous detection of both fast and thermal neutron flux as well as gamma radiation operating at elevated temperatures. Today, this constitutes a real instrumentation challenge for nuclear safety. The main limitation of existing technologies is their low capacity to withstand harsh temperatures and intense radiation.

In the oil and gas prospecting industry, neutron measurement helps in the mapping of oil and gas reserves and also in gauging the porosity of formations. In most cases, He3 is used for its high sensitivity and its resistance to high temperatures. Due to the shortage of He3, players are seeking an alternative.

The I-SMART project aims to:

- replace current neutron detection based on He3;
- demonstrate a new type of integrated intelligent system for the selective monitoring of high radiation levels in harsh conditions using silicon carbide technology;
- improve the accuracy and predictive knowledge of nuclear reactor core behaviour (safety improvement); and
- easily implement the detector into existing detection systems.

Partners

- Nuclear Research Centre (SCK-CEN), Belgium
- Aix Marseille University, France
- AREVA SA, France
- Commissariat à l'Energie Atomique et aux Energies Alternatives (CEA), France
- Grenoble Institute of Technology (Grenoble INP), France
- Institut des Sciences Appliqués (INSA) Lyon, France
- Schlumberger Ltd., France
- Karlsruhe Institute of Technology (KIT), Germany
- University of Oslo, Norway
- AGH University of Science and Technology, Poland
- KTH Royal Institute of Technology, Sweden

CONTACT

Abdallah Lyoussi

+33 4 42 25 75 88

abdallah.lyoussi@cea.fr

5 Management of Intermittent and Nuclear Electricity with a High-Efficiency Electrochemical Reactor for the Valorisation of CO₂ in Flexible Energies — MINERVE

Europe and other major economies have set ambitious goals to increase the level of renewable energies in the energy mix and reduce CO₂ emissions. Improved flexibility is a key challenge for the integration of renewable energies and the transition towards a sustainable, low-carbon energy system in Europe. The energy system should be able to

absorb excess electricity from wind and solar farms, and there needs to be a way to use and market CO₂ emissions rather than just burying them underground.

One way to improve system flexibility is to convert excess electricity from renewables into hydrogen or other fuels. This conversion (power to gas) and the injection of hydrogen or other gases into the gas network decreases the stress on the electricity grid. The MINERVE project aims to go one step further and develop a solution that not only converts excess renewable electricity but also uses and valorises CO₂ from industries such as cement production, energy generation, chemicals and steel manufacturing. The CO₂ is valorised in the form of high-value products such as methane and synthetic liquid fuels. To do so, MINERVE develops an innovative process based on coupling a modular electrochemical reactor (co-electrolyser of steam and CO₂) with an intensive methanation reactor.

Estimates for the annual potential market are as follows:

- Complete solutions for electrochemical conversion: EUR 1,450 million.
- CO₂ emissions recycling services: EUR 500 million.
- High-added-value products such as synthetic natural gas (SNG): EUR 500 million.
- Oxygen production for oxy-combustion purposes: EUR 240 million.

Partners

- Solvay, Belgium
- Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA), France
- GDF Suez, France
- Karlsruhe Institute of Technology (KIT), Germany
- AGH University of Science and Technology, Poland

CONTACT

Sandra Capela

+33 1 49 22 52 56
sandra.capela@
gdfsuez.com

6 Novel Cost-Effective Energy Storage Solution for Renewable Integration and Infrastructure Deferral — FLOWBOX

At the beginning of 2012, AREVA SA noted the high potential and innovativeness of flow batteries and launched a detailed assessment of a concept proposed by the start-up EnStorage. AREVA SA and EnStorage signed a collaboration agreement to develop, based on EnStorage's core stack, a competitive storage product that can address the market with better performance and lower capital expenditure compared to current solutions.

The objective of FLOWBOX is to evaluate a new "flow battery" technology and to prove its ability to reach the target market. The validation focuses on technical feasibility (both power scale-up and safety) as well as economic feasibility

Partners

- AREVA SA, France
- Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA),
Laboratoire d'Innovation pour les Technologies des Énergies Nouvelles (LITEN), France
- Électricité de France, Énergies Nouvelles (EDF EN), France
- Schneider Electric, France
- TÜV SÜD, Germany
- EnStorage, Israel

CONTACT

Lucile Voiron

+33 4 42 90 47 60
lucile.voiron@areva.com

CONTACT

Xavier Pain

+33 4 76 60 62 23

xavier.pain@

schneider-electric.com

7 Plant Low-Energy Sleep Modes — PLESMO

Energy efficiency measures in factories generally focus on reducing and optimising energy consumption during production. This normally requires in-depth audits, new investments and equipment updates. However, little attention is paid to non-production modes, although electricity consumption during downtime can easily account for 10 to 25 percent of consumption during regular operations.

PLESMO seeks to curb idle-time energy use. This project offers a range of services and products to manage energy consumption that are non-invasive, non-intrusive, easy to use and easy to set up. By combining energy efficiency and renewable energy production, the project will help to ensure that “zero production equals zero energy consumption”. In a nutshell, PLESMO brings an innovative approach to reducing energy consumption by putting in stand-by or stopping processes and machines and auxiliaries as soon as possible.

Partners

- Fenwick Linde Material Handling, France
- Grenoble Business School (GEM), France
- Institut des Sciences Appliqués (INSA) Lyon, France
- Qualistéo, France
- Schneider Electric, France

8 Polymer Electrolyte Nanocomposite for Advanced Lithium Batteries — PENLiB

As electric cars become more popular, car manufacturers are keen to see the development of batteries with higher performance. Lithium batteries have a much higher energy and power density and lower self-discharge than nickel–metal hydride (NiMH) batteries. However, the safety of lithium batteries must be addressed in the electric transportation mass market. The unsafe nature of existing lithium batteries is partly due to the electrolyte. An improvement in the mechanical strength of the polymer electrolyte will avoid short circuits, but this improvement must not increase its resistivity.

The PENLiB project aims to launch a new generation of lithium–ion polymer batteries by developing new battery components. These new components are bio-sourced materials and nanocomposite-reinforced polymer electrolytes. By using these components to improve and reinforce separator materials, PENLiB addresses the safety issue of lithium batteries.

This solution will also decrease the cost of the battery: nanocomposites allow the separator to be thinner, thus reducing the amount of material required. The reduction in material also improves battery energy density while ensuring good mechanical properties.

In a nutshell, the project will lead to safer, cheaper and better-performing batteries than the current lithium–ion batteries.

The new battery would mainly be targeted at the automotive market and would be worth an estimated EUR 12.5 billion annually. The battery could also be used in stationary applications on the 4C market (computers, cellular phones, camcorders and cordless tools). Expected secondary markets are:

- Nanocomposite reinforced polymer electrolytes: EUR 900 million per year.
- The extrusion process of reinforced polymers: EUR 250 million per year.

Partners

- Blue Solutions, France
- Grenoble Institute of Technology (Grenoble INP), France
- Institut des Sciences Appliqués (INSA) Lyon, France
- Uppsala University, Sweden

CONTACT

Yannick Molméret

+33 4 76 82 65 76
Yannick.Molmeret
@lepmi.grenoble-inp.fr

9

Powder Substrate–Based Photovoltaic Cell — POWCELL

The production costs of photovoltaic (PV) cells still need to decrease to allow their massive deployment in electricity production. In the PV industry, high costs are due to the capital expenditure in two manufacturing steps: the production of pure silicon, and the cutting of cast silicon (ingots) into wafers. Wafering costs represent around half the cost of a PV module. These processes require lots of energy and cause big environmental impacts due to:

- the high consumption of chloride acid and solvent; and
- the typical 60 percent loss of silicon material during the process.

Innovative technologies for PV cell manufacturing are expected to decrease the price of PV electricity. European PV manufacturers need to become more competitive through innovative, low-cost production techniques.

The POWCELL project focuses on the low-cost production of the crystalline silicon thin-film solar cell and will develop a new pilot line of 15 MW. This innovative technology combines the strengths of both wafer and thin-film technologies. The aim is to reach:

- energy conversion efficiencies beyond 16 percent;
- wafer costs under EUR 0.2 per W; and
- watt-peak costs of EUR 0.5 per Wp.

The project also aims to:

- decrease the energy consumption of PV cell fabrication by a factor of two; and
- mitigate environmental impacts and minimise chemical consumption.

The objective is to satisfy 1 percent of the European market demand (annual turnover of EUR 30 million) by 2016.

Partners


- Commissariat à l’Énergie Atomique et aux Énergies Alternatives (CEA), France
- Institut des Sciences Appliqués (INSA) Lyon, France
- S’Tile, France
- Karlsruhe Institute of Technology (KIT), Germany

CONTACT

Maximilien Petitgenet

+33 5 79 79 60 10
maximilien.petitgenet@
silicontile.fr





About KIC InnoEnergy

KIC InnoEnergy is a European company dedicated to promoting innovation, entrepreneurship and education in the sustainable energy field. Its goal is to make a positive impact on sustainable energy in Europe. It does so by creating future game changers with a different mind-set, and bringing innovative products, services and successful companies to life.

Becoming a KIC InnoEnergy Innovation Project Partner

The innovator:

- has excellent ideas for innovation with a high potential for commercialisation;
- has developed a prototype (readiness level ≥ 5) with successful proof of concept;
- wants to enter the market while limiting the risk of failure; and
- seeks opportunities to enter European energy markets.

The innovator is looking for:

- partners to promote successful commercialisation;
- financing to finalise a prototype for commercialisation;
- intellectual property protection for ideas;
- first customers for the innovation;
- marketing and sales knowledge for commercialisation; and
- a platform for knowledge exchange.

KIC InnoEnergy can help by:

- transforming innovations into products or services for the market;
- supporting innovation projects by monitoring, conducting reviews and ensuring investment;
- providing a secure environment for innovations (intellectual property protection);
- offering a pan-European partner network; and
- risk sharing, as KIC InnoEnergy only gets a return on investment when market entries are successful.

KIC InnoEnergy:

- is a reliable partner with a strong interest in the commercial success of its innovators' businesses;
- offers support on technological and commercial topics;
- works as a catalyst to promote projects for further funding; and
- collaborates with top companies and research institutes in the field of energy.

KIC InnoEnergy is looking for:

- researchers, innovators and innovative prototypes with successful proofs of concept;
- entrepreneurs who have created their own businesses or have managed small companies; and
- industry partners with specific knowledge and market access in the sustainable energy field.

KIC InnoEnergy's Offer

Do you want to turn your idea into a successful business?

The KIC InnoEnergy Highway® offers all the services an energy entrepreneur needs to transform an idea or venture into a successful business.

Our unique selling proposition

Compared to any other accelerator in the European landscape, the KIC InnoEnergy Highway® offers four unique assets:

European coverage: The KIC InnoEnergy Highway® is a single European accelerator with six entry points. We give innovators access to office space in all our European centres. They also benefit from our European network of 150 key players in the energy field, made up of our industry partners, universities and research centres. These are our experts, our service providers and the early adopters of the innovative solutions that our ventures are launching.

Specialised in sustainable energy: This allows us to propose energy-related technology due diligence, technical expertise and access to laboratories and technical platforms to enhance proof of concepts or prototypes.

Committed to find our innovators' first customers: We all know that it is the customer who legitimises an invention, a product or a service. That's why the KIC InnoEnergy Highway® is actively involved in finding its innovators' first launching customer.

Global services: The KIC InnoEnergy Highway® supports ventures with an integral approach covering four dimensions that are vital to a successful business:

- **Technology:** Due diligence, mapping vs. competing products/services, IP protection, technology enhancement or development, piloting and industrialisation.
- **Market:** Opportunity assessment, market positioning, business case, customer discovery and validation, business modelling, business plan and commercialisation.
- **People:** Team assessment, training, team completion and legal constitution.
- **Finance:** Access to seed money and to the KIC InnoEnergy venture capital community and business angel networks.

In return for these services, we provide equity participation

KIC InnoEnergy is not just another accelerator. We do not ask for a fee. We invest through equity participation in the start-ups that we believe can make a difference.

Our innovators' success is our success!





Annex

KIC InnoEnergy works with formal and associate partners who are engaged in the implementation of projects. The following table lists all KIC InnoEnergy partners involved in active projects — that is, projects that had passed the feasibility study stage and that were under way as of January 2015.

PARTNER	PROJECT		CATEGORY	PAGE
BELGIUM				
Amcor	Encapsulation of Flexible Thin-Film PV Devices	EnThiPV	Renewable Energies	22
CG Holdings	Active Substations	KIC-ASS	Smart and Efficient Buildings and Cities	28
Eandis	Active Substations	KIC-ASS	Smart and Efficient Buildings and Cities	28
	Business and Service Models to Support the Roll-Out of Electric Vehicles in Cities	EVCITY	Smart and Efficient Buildings and Cities	29
	Electrical Energy Storage Device for Cold Stores	EStore	Smart and Efficient Buildings and Cities	29
	Micro Turbine Technology for Micro Combined Heat and Power Plants	MTT Micro CHP	Smart and Efficient Buildings and Cities	30
	Products and Services of a Living Smart City Lab	Alive & KICing	Smart and Efficient Buildings and Cities	31
KU Leuven	Active Substations	KIC-ASS	Smart and Efficient Buildings and Cities	28
	Business and Service Models to Support the Roll-Out of Electric Vehicles in Cities	EVCITY	Smart and Efficient Buildings and Cities	29
	Electrical Energy Storage Device for Cold Stores	EStore	Smart and Efficient Buildings and Cities	29
	Products and Services of a Living Smart City Lab	Alive & KICing	Smart and Efficient Buildings and Cities	31
Nuclear Research Centre (SCK-CEN)	Innovative Sensor for Material Ageing and Radiation Testing	I-SMART	Sustainable Nuclear and Renewable Convergence	42
Solvay	Management of Intermittent and Nuclear Electricity with a High-Efficiency Electrochemical Reactor for the Valorisation of CO ₂ in Flexible Energies	MINERVE	Sustainable Nuclear and Renewable Convergence	42
Triphase N.V.	Business and Service Models to Support the Roll-Out of Electric Vehicles in Cities	EVCITY	Smart and Efficient Buildings and Cities	29
VITO	Active Substations	KIC-ASS	Smart and Efficient Buildings and Cities	28
	Business and Service Models to Support the Roll-Out of Electric Vehicles in Cities	EVCITY	Smart and Efficient Buildings and Cities	29
	Electrical Energy Storage Device for Cold Stores	EStore	Smart and Efficient Buildings and Cities	29
	Products and Services of a Living Smart City Lab	Alive & KICing	Smart and Efficient Buildings and Cities	31

PARTNER	PROJECT		CATEGORY	PAGE
FINLAND				
Agragen LLC	Breeding Programme for the Development of a New Improved Camelina Variety	Nicava	Energy from Chemical Fuels	14
Outotec	Demonstration of Efficient Biomass Use for the Generation of Green Energy and Recovery of Nutrients	DeBugger	Energy from Chemical Fuels	15
FRANCE				
Aix-Marseille University	Innovative Sensor for Material Ageing and Radiation Testing	I-SMART	Sustainable Nuclear and Renewable Convergence	42
AREVA SA	Advanced Combustion Unit for Biomass	AdCUB	Sustainable Nuclear and Renewable Convergence	40
	Innovative Sensor for Material Ageing and Radiation Testing	I-SMART	Sustainable Nuclear and Renewable Convergence	42
	Novel Cost-Effective Energy Storage Solution for Renewable Integration and Infrastructure Deferral	FLOWBOX	Sustainable Nuclear and Renewable Convergence	43
Blue Solutions	Polymer Electrolyte Nanocomposite for Advanced Lithium Batteries	PENLiB	Sustainable Nuclear and Renewable Convergence	44
Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA)	Advanced Combustion Unit for Biomass	AdCUB	Sustainable Nuclear and Renewable Convergence	40
	Encapsulation of Flexible Thin-Film PV Devices	EnThiPV	Renewable Energies	22
	High-Temperature Thermoelectric Generator	HITTEG	Sustainable Nuclear and Renewable Convergence	41
	Hydrogen Storage Solutions	HyCUBE	Sustainable Nuclear and Renewable Convergence	41
	Innovative Sensor for Material Ageing and Radiation Testing	I-SMART	Sustainable Nuclear and Renewable Convergence	42
	Management of Intermittent and Nuclear Electricity with a High-Efficiency Electrochemical Reactor for the Valorisation of CO ₂ in Flexible Energies	MINERVE	Sustainable Nuclear and Renewable Convergence	42
	Powder Substrate-Based Photovoltaic Cell	POWCELL	Sustainable Nuclear and Renewable Convergence	45
Disatech	Encapsulation of Flexible Thin-Film PV Devices	EnThiPV	Renewable Energies	22
Electricité de France (EDF)	Micro Turbine Technology for Micro Combined Heat and Power Plants	MTT Micro CHP	Smart and Efficient Buildings and Cities	30
	Multi-fuel Energy Generation for Sustainable and Efficient Use of Coal	SECoal	Clean Coal Technologies	10
	New Materials for Energy Systems	NewMat	Clean Coal Technologies	11

PARTNER	PROJECT		CATEGORY	PAGE
	Novel Cost-Effective Energy Storage Solution for Renewable Integration and Infrastructure Deferral	FLOWBOX	Sustainable Nuclear and Renewable Convergence	43
	Products and Services of a Living Smart City Lab	Alive & KICing	Smart and Efficient Buildings and Cities	31
Fenwick Linde Material Handling	Plant Low-Energy Sleep Modes	PLESMO	Sustainable Nuclear and Renewable Convergence	44
GDF Suez	High-Temperature Thermoelectric Generator	HITTEG	Sustainable Nuclear and Renewable Convergence	41
	Management of Intermittent and Nuclear Electricity with a High-Efficiency Electrochemical Reactor for the Valorisation of CO ₂ in Flexible Energies	MINERVE	Sustainable Nuclear and Renewable Convergence	42
	Electrical Energy Storage Device for Cold Stores	EStore	Smart and Efficient Buildings and Cities	29
Grenoble Business School (GEM)	Plant Low-Energy Sleep Modes	PLESMO	Sustainable Nuclear and Renewable Convergence	44
Grenoble Institute of Technology (Grenoble INP)	Innovative Sensor for Material Ageing and Radiation Testing	I-SMART	Sustainable Nuclear and Renewable Convergence	42
	Current and Vibration Analysis for Preventive and Predictive Condition-Based Maintenance in Offshore Wind Farms	Kastrion	Renewable Energies	21
	New Materials for Energy Systems	NewMat	Clean Coal Technologies	11
	Polymer Electrolyte Nanocomposite for Advanced Lithium Batteries	PENLiB	Sustainable Nuclear and Renewable Convergence	44
	Novel Synthesis Process Concepts for Efficient Chemicals and Fuel Production from Biomass	SYNCON	Energy from Chemical Fuels	17
Institut des Sciences Appliqués (INSA) Lyon	Innovative Sensor for Material Ageing and Radiation Testing	I-SMART	Sustainable Nuclear and Renewable Convergence	42
	Plant Low-Energy Sleep Modes	PLESMO	Sustainable Nuclear and Renewable Convergence	44
	Polymer Electrolyte Nanocomposite for Advanced Lithium Batteries	PENLiB	Sustainable Nuclear and Renewable Convergence	44
	Powder Substrate-Based Photovoltaic Cell	POWCELL	Sustainable Nuclear and Renewable Convergence	45
Institut National Polytechnique de Toulouse (INP)	Current and Vibration Analysis for Preventive and Predictive Condition-Based Maintenance in Offshore Wind Farms	Kastrion	Renewable Energies	21
Laboratoire d'Innovation pour les Technologies des Energies Nouvelles et les Nanomatériaux (CEA/LITEN)	Novel Cost-Effective Energy Storage Solution for Renewable Integration and Infrastructure Deferral	FLOWBOX	Sustainable Nuclear and Renewable Convergence	43
McPhy Energy SA	Hydrogen Storage Solutions	HyCUBE	Sustainable Nuclear and Renewable Convergence	41

PARTNER	PROJECT		CATEGORY	PAGE
NEXCIS PV Technology	EFFIC	EFFIC	Renewable Energies	22
Qualistéo	Plant Low-Energy Sleep Modes	PLESMO	Sustainable Nuclear and Renewable Convergence	44
RAIGI SAS	Hydrogen Storage Solutions	HyCUBE	Sustainable Nuclear and Renewable Convergence	41
Schlumberger	Innovative Sensor for Material Ageing and Radiation Testing	I-SMART	Sustainable Nuclear and Renewable Convergence	42
Schneider Electric	Novel Cost-Effective Energy Storage Solution for Renewable Integration and Infrastructure Deferral	FLOWBOX	Sustainable Nuclear and Renewable Convergence	43
	Plant Low-Energy Sleep Modes	PLESMO	Sustainable Nuclear and Renewable Convergence	44
S'Tile	Powder Substrate-Based Photovoltaic Cell	POWCELL	Sustainable Nuclear and Renewable Convergence	45
Technical Center for the Mechanical Industry (CETIM)	Current and Vibration Analysis for Preventive and Predictive Condition-Based Maintenance in Offshore Wind Farms	Kastrion	Renewable Energies	21
TOTAL	Thermal Storage for Concentrating Solar Power Plants	Tesconsol	Renewable Energies	25
University of Corsica	Hydrogen Storage Solutions	HyCUBE	Sustainable Nuclear and Renewable Convergence	41
Valemo	Current and Vibration Analysis for Preventive and Predictive Condition-Based Maintenance in Offshore Wind Farms	Kastrion	Renewable Energies	21
Vinci Technologies	Encapsulation of Flexible Thin-Film PV Devices	EnThiPV	Renewable Energies	22
GERMANY				
Deutsches Biomasseforschungszentrum gemeinnuetzige GmbH (DBFZ)	Construction of Small-to-Medium-Capacity Boilers for the Clean and Efficient Combustion of Biomass for Heating	BioEcoMatic	Clean Coal Technologies	09
Deutscher Verein des Gas- und Wasserfaches eV (DVGW)	Development of Concepts for SNG Synthesis to Store Volatile Electric Energy Produced from Renewable Resources	DemoSNG	Energy from Chemical Fuels	16
Efloxx GmbH	Fuel Flexible Combustion Systems for Liquid and Gaseous Biofuels	Fuel-Flex	Energy from Chemical Fuels	17
European Institute for Energy Research (EIFER)	Extended Gasifier Technologies for a Wide Range of Biomass	XGaTe	Energy from Chemical Fuels	16
Evohaus GmbH	Energy Supply Cooperative	ESC	Smart and Efficient Buildings and Cities	30
Federal Institute for Materials Research and Testing (BAM)	Hydrogen Storage Solutions	HyCUBE	Sustainable Nuclear and Renewable Convergence	41
Karlsruhe Institute of Technology (KIT)	Advanced Combustion Unit for Biomass	AdCUB	Sustainable Nuclear and Renewable Convergence	40

PARTNER	PROJECT		CATEGORY	PAGE
	Business and Service Models to Support the Roll-Out of Electric Vehicles in Cities	EVCITY	Smart and Efficient Buildings and Cities	29
	Demonstration of Efficient Biomass Use for the Generation of Green Energy and Recovery of Nutrients	DeBugger	Energy from Chemical Fuels	15
	Development of Concepts for SNG Synthesis to Store Volatile Electric Energy Produced from Renewable Resources	DemoSNG	Energy from Chemical Fuels	16
	Encapsulation of Flexible Thin-Film PV Devices	EnThiPV	Renewable Energies	22
	Energy Supply Cooperative	ESC	Smart and Efficient Buildings and Cities	30
	Extended Gasifier Technologies for a Wide Range of Biomass	XGaTe	Energy from Chemical Fuels	16
	IncoTrans	IncoTrans	Smart Electric Grids	35
	Innovative Sensor for Material Ageing and Radiation Testing	I-SMART	Sustainable Nuclear and Renewable Convergence	42
	Management of Intermittent and Nuclear Electricity with a High-Efficiency Electrochemical Reactor for the Valorisation of CO ₂ in Flexible Energies	MINERVE	Sustainable Nuclear and Renewable Convergence	42
	Novel Synthesis Process Concepts for Efficient Chemicals and Fuel Production from Biomass	SYNCON	Energy from Chemical Fuels	17
	Powder Substrate-Based Photovoltaic Cell	POWCELL	Sustainable Nuclear and Renewable Convergence	45
Ratfisch Analysensysteme GmbH	Development and Market Implementation of PID and FID Tar Analysers	DeMiTar	Energy from Chemical Fuels	15
Steinbeis-Europa-Zentrum	Development and Market Implementation of PID and FID Tar Analysers	DeMiTar	Energy from Chemical Fuels	15
	Extended Gasifier Technologies for a Wide Range of Biomass	XGaTe	Energy from Chemical Fuels	16
TÜV SÜD	Novel Cost-Effective Energy Storage Solution for Renewable Integration and Infrastructure Deferral	FLOWBOX	Sustainable Nuclear and Renewable Convergence	43
University of Stuttgart	Advanced Near-Zero-Emission Coal-Fired Power Plant	ACoPP	Clean Coal Technologies	08
	Alternative Floating Platform Designs for Offshore Wind Towers Using Low-Cost Materials	AFOSP	Renewable Energies	21
	Demonstration of Efficient Biomass Use for the Generation of Green Energy and Recovery of Nutrients	DeBugger	Energy from Chemical Fuels	15
	Development and Market Implementation of PID and FID Tar Analysers	DeMiTar	Energy from Chemical Fuels	15
	Extended Gasifier Technologies for a Wide Range of Biomass	XGaTe	Energy from Chemical Fuels	16

PARTNER	PROJECT		CATEGORY	PAGE
	Fuel Flexible Combustion Systems for Liquid and Gaseous Biofuels	Fuel-Flex	Energy from Chemical Fuels	17
	Multi-fuel Energy Generation for the Sustainable and Efficient Use of Coal	SECoal	Clean Coal Technologies	10
	New Materials for Energy Systems	NewMat	Clean Coal Technologies	11
HUNGARY				
Bay Zoltán Foundation for Applied Research	Advanced Near Zero-Emission Coal-Fired Power Plant	ACoPP	Clean Coal Technologies	08
	Multi-fuel Energy Generation for Sustainable and Efficient Use of Coal	SECoal	Clean Coal Technologies	11
	New Materials for Energy Systems	NewMat	Clean Coal Technologies	11
ISRAEL				
EnStorage	Novel Cost-Effective Energy Storage Solution for Renewable Integration and Infrastructure Deferral	FLOWBOX	Sustainable Nuclear and Renewable Convergence	13
LUXEMBOURG				
Boson Energy	Extended Gasifier Technologies for a Wide Range of Biomass	XGaTe	Energy from Chemical Fuels	16
THE NETHERLANDS				
Biomass Technology Group (BTG)	Development and Market Implementation of PID and FID Tar Analysers	DeMiTar	Energy from Chemical Fuels	15
Centre for Concepts in Mechatronics (CCM)	EFFIC	EFFIC	Renewable Energies	22
Eindhoven University of Technology (TU/e)	Active Substations	KIC-ASS	Smart and Efficient Buildings and Cities	28
	Business and Service Models to Support the Roll-Out of Electric Vehicles in Cities	EVCITY	Smart and Efficient Buildings and Cities	29
	High Power Converter Auxiliary Power Supply	HICAPS	Smart Electric Grids	34
	Fuel Flexible Combustion Systems for Liquid and Gaseous Biofuels	Fuel-Flex	Energy from Chemical Fuels	17
	Micro Turbine Technology for Micro Combined Heat and Power Plants	MTT Micro CHP	Smart and Efficient Buildings and Cities	30
	Novel Synthesis Process Concepts for Efficient Chemicals and Fuel Production from Biomass	SYNCON	Energy from Chemical Fuels	17

PARTNER	PROJECT		CATEGORY	PAGE
Energy Research Centre of the Netherlands (ECN)	EFFIC	EFFIC	Renewable Energies	22
MECAL	Current and Vibration Analysis for Preventive and Predictive Condition-Based Maintenance in Offshore Wind Farms	Kastrion	Renewable Energies	21
Micro Turbine Technology (MTT) BV	Micro Turbine Technology for Micro Combined Heat and Power Plants	MTT Micro CHP	Smart and Efficient Buildings and Cities	30
NXP Semiconductors Netherlands BV	Business and Service Models to Support the Roll-Out of Electric Vehicles in Cities	EVCITY	Smart and Efficient Buildings and Cities	29
Progression Industry	Fuel Flexible Combustion Systems for Liquid and Gaseous Biofuels	Fuel-Flex	Energy from Chemical Fuels	17
Roth & Rau BV	EFFIC	EFFIC	Renewable Energies	22
Smit Ovens Thermal Solutions	EFFIC	EFFIC	Renewable Energies	22
The Netherlands Organisation for Applied Scientific Research (TNO)	Business and Service Models to Support the Roll-Out of Electric Vehicles in Cities	EVCITY	Smart and Efficient Buildings and Cities	29
	EFFIC	EFFIC	Renewable Energies	22
	Electrical Energy Storage Device for Cold Stores	EStore	Smart and Efficient Buildings and Cities	29
	Energy Supply Cooperative	ESC	Smart and Efficient Buildings and Cities	30
	Micro Turbine Technology for Micro Combined Heat and Power Plants	MTT Micro CHP	Smart and Efficient Buildings and Cities	30
	Products and Services of a Living Smart City Lab	Alive & KICing	Smart and Efficient Buildings and Cities	31
Waifer Nederland BV	Products and Services of a Living Smart City Lab	Alive & KICing	Smart and Efficient Buildings and Cities	31
NORWAY				
Statoil ASA	Novel Synthesis Process Concepts for Efficient Chemicals and Fuel Production from Biomass	SYNCON	Energy from Chemical Fuels	17
University of Oslo	Innovative Sensor for Material Ageing and Radiation Testing	I-SMART	Sustainable Nuclear and Renewable Convergence	42
POLAND				
AGH University of Science and Technology	Active Substations	KIC-ASS	Smart and Efficient Buildings and Cities	28
	Advanced Near-Zero-Emission Coal-Fired Power Plant	ACoPP	Clean Coal Technologies	08

PARTNER	PROJECT		CATEGORY	PAGE
	Construction of Small-to-Medium-Capacity Boilers for the Clean and Efficient Combustion of Biomass for Heating	BioEcoMatic	Clean Coal Technologies	09
	Development of a Coal Gasification Technology for High-Efficiency Fuel and Power Production	CoalGas	Clean Coal Technologies	09
	Innovative Sensor for Material Ageing and Radiation Testing	I-SMART	Sustainable Nuclear and Renewable Convergence	42
	Intelligent Power Conditioning and Monitoring Interfaces for Smart Grid Prosumers	ProInterface	Smart Electric Grids	35
	Management of Intermittent and Nuclear Electricity with a High-Efficiency Electrochemical Reactor for the Valorisation of CO ₂ in Flexible Energies	MINERVE	Sustainable Nuclear and Renewable Convergence	42
	New Materials for Energy Systems	NewMat	Clean Coal Technologies	11
	Products and Services of a Living Smart City Lab	Alive & KICing	Smart and Efficient Buildings and Cities	31
	Smart Grid Materials	Materials	Smart Electric Grids	36
Central Mining Institute (GIG)	Advanced Near-Zero-Emission Coal-Fired Power Plant	ACoPP	Clean Coal Technologies	08
	Development of a Coal Gasification Technology for High-Efficiency Fuel and Power Production	CoalGas	Clean Coal Technologies	09
	Novel Synthesis Process Concepts for Efficient Chemicals and Fuel Production from Biomass	SYNCON	Energy from Chemical Fuels	17
Częstochowa University of Technology	Advanced Near-Zero-Emission Coal-Fired Power Plant	ACoPP	Clean Coal Technologies	08
	Multi-fuel Energy Generation for Sustainable and Efficient Use of Coal	SECoal	Clean Coal Technologies	10
EC Systems	Current and Vibration Analysis for Preventive and Predictive Condition-Based Maintenance in Offshore Wind Farms	Kastrion	Renewable Energies	21
Elsta Elektronika	Intelligent Power Conditioning and Monitoring Interfaces for Smart Grid Prosumers	ProInterface	Smart Electric Grids	35
ICHPW Institute for Chemical Processing of Coal	Development of a Coal Gasification Technology for High-Efficiency Fuel and Power Production	CoalGas	Clean Coal Technologies	09
Innowacyjne Przedsiębiorstwo Wielobranżowe Polin Sp. z o.o.	Multi-fuel Energy Generation for the Sustainable and Efficient Use of Coal	SECoal	Clean Coal Technologies	10
Institute of Chemical Engineering, Polish Academy of Sciences	Multi-fuel Energy Generation for the Sustainable and Efficient Use of Coal	SECoal	Clean Coal Technologies	10
Jagiellonian University	Multi-fuel Energy Generation for the Sustainable and Efficient Use of Coal	SECoal	Clean Coal Technologies	10
	New Materials for Energy Systems	NewMat	Clean Coal Technologies	11

PARTNER	PROJECT		CATEGORY	PAGE
JES Energia	Intelligent Power Conditioning and Monitoring Interfaces for Smart Grid Prosumers	ProInterface	Smart Electric Grids	35
Katowicki Holding Węglowy SA	Development of a Coal Gasification Technology for High-Efficiency Fuel and Power Production	CoalGas	Clean Coal Technologies	09
Metalerg Sp. z o.o. SKA	Construction of Small-to-Medium-Capacity Boilers for the Clean and Efficient Combustion of Biomass for Heating	BioEcoMatic	Clean Coal Technologies	09
PROMONT Sp. z o.o.	Development of a Coal Gasification Technology for High-Efficiency Fuel and Power Production	CoalGas	Clean Coal Technologies	09
Rafako SA	Advanced Near-Zero-Emission Coal-Fired Power Plant	ACoPP	Clean Coal Technologies	08
	New Materials for Energy Systems	NewMat	Clean Coal Technologies	11
SEFAKO Fabryka Kotłów SA	Efficient Coal-Fired Stoker Boiler	EcoStoker	Clean Coal Technologies	10
Silesian University of Technology	Advanced Near-Zero-Emission Coal-Fired Power Plant	ACoPP	Clean Coal Technologies	08
	Efficient Coal-Fired Stoker Boiler	EcoStoker	Clean Coal Technologies	10
	Energy Efficiency in Industry	LHI-EE	Renewable Energies	23
	Multi-fuel Energy Generation for the Sustainable and Efficient Use of Coal	SECoal	Clean Coal Technologies	10
Syngaz Sp. z o.o.	Development of a Coal Gasification Technology for High-Efficiency Fuel and Power Production	CoalGas	Clean Coal Technologies	09
Tauron Group	Development of a Coal Gasification Technology for High-Efficiency Fuel and Power Production	CoalGas	Clean Coal Technologies	09
	Intelligent Power Conditioning and Monitoring Interfaces for Smart Grid Prosumers	ProInterface	Smart Electric Grids	35
	Efficient Coal-Fired Stoker Boiler	EcoStoker	Clean Coal Technologies	10
Wrocław University of Technology	Advanced Near-Zero-Emission Coal-Fired Power Plant	ACoPP	Clean Coal Technologies	08
	Hydrogen Storage Solutions	HyCUBE	Sustainable Nuclear and Renewable Convergence	41
	Multi-fuel Energy Generation for the Sustainable and Efficient Use of Coal	SECoal	Clean Coal Technologies	10
Zakład Aparatury Pomiarowej KWANT Sp. z o.o.	Development of a Coal Gasification Technology for High-Efficiency Fuel and Power Production	CoalGas	Clean Coal Technologies	09
PORTUGAL				
Ahlers Lindley, Lda.	Offshore Test Station	OTS	Renewable Energies	24
Energias de Portugal (EDP) Inovação SA	New Materials for Energy Systems	NewMat	Clean Coal Technologies	11
	Offshore Test Station	OTS	Renewable Energies	24

PARTNER	PROJECT		CATEGORY	PAGE
Instituto Superior Tecnico	Active Substations	KIC-ASS	Smart and Efficient Buildings and Cities	28
	Advanced Near-Zero-Emission Coal-Fired Power Plant	ACoPP	Clean Coal Technologies	08
	New Materials for Energy Systems	NewMat	Clean Coal Technologies	11
	Offshore Test Station	OTS	Renewable Energies	24
UAVision	Offshore Test Station	OTS	Renewable Energies	24
WavEC Offshore Renewables	Offshore Test Station	OTS	Renewable Energies	24
ROMANIA				
BIOTEHGEN	Breeding Programme for the Development of a New Improved Camelina Variety	Nicava	Energy from Chemical Fuels	14
SPAIN				
BarcelonaTECH: Polytechnic University of Catalonia	Active Substations	KIC-ASS	Smart and Efficient Buildings and Cities	28
	Alternative Floating Platform Designs for Offshore Wind Towers Using Low-Cost Materials	AFOSP	Renewable Energies	21
	Encapsulation of Flexible Thin-Film PV Devices	EnThiPV	Renewable Energies	22
	Energy Efficiency in Industry	LHI-EE	Renewable Energies	23
	Intelligent Power Conditioning and Monitoring Interfaces for Smart Grid Prosumers	ProInterface	Smart Electric Grids	35
	Load Current Commutation and Interruption by Electromechanical Switches and Power Electronics	ESPE	Smart Electric Grids	36
	Offshore Metocean Data Measuring Equipment and Wind, Wave and Current Analysis and Forecasting Software	Neptune	Renewable Energies	24
	Offshore Test Station	OTS	Renewable Energies	24
	Solid State Transformer	SST	Smart Electric Grids	37
	Thermal Storage for Concentrating Solar Power Plants	Tesconsol	Renewable Energies	25
Catalonia Institute for Energy Research (IREC)	Active Substations	KIC-ASS	Smart and Efficient Buildings and Cities	28
	Business and Service Models to Support the Roll-Out of Electric Vehicles in Cities	EVCIITY	Smart and Efficient Buildings and Cities	29
	Encapsulation of Flexible Thin-Film PV Devices	EnThiPV	Renewable Energies	22
	High-Temperature Thermoelectric Generator	HITTEG	Sustainable Nuclear and Renewable Convergence	41

PARTNER	PROJECT		CATEGORY	PAGE
	Energy Efficiency in Industry	LHI-EE	Renewable Energies	23
	Micro Turbine Technology for Micro Combined Heat and Power Plants	MTT Micro CHP	Smart and Efficient Buildings and Cities	30
	Offshore Metocean Data Measuring Equipment and Wind, Wave and Current Analysis and Forecasting Software	Neptune	Renewable Energies	24
	Smart Grid Materials	Materials	Smart Electric Grids	36
Camelina Company Espana (CCE)	Breeding Programme for the Development of a New Improved Camelina Variety	Nicava	Energy from Chemical Fuels	14
Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas (Ciemat)	Offshore Metocean Data Measuring Equipment and Wind, Wave and Current Analysis and Forecasting Software	Neptune	Renewable Energies	24
CIDETE Ingenieros SL	High-Temperature Thermoelectric Generator	HITTEG	Sustainable Nuclear and Renewable Convergence	41
E4 Experts SL	Energy Efficiency in Industry	LHI-EE	Renewable Energies	23
EQTEC	Extended Gasifier Technologies for a Wide Range of Biomass	XGaTe	Energy from Chemical Fuels	16
ESADE Ramon Llull University	Encapsulation of Flexible Thin-Film PV Devices	EnThiPV	Renewable Energies	22
FLUBETECH, SL	IncoTrans	IncoTrans	Smart Electric Grids	35
gasNatural fenosa	Active Substations	KIC-ASS	Smart and Efficient Buildings and Cities	28
	Alternative Floating Platform Designs for Offshore Wind Towers Using Low-Cost Materials	AFOSP	Renewable Energies	21
	Development of Concepts for SNG Synthesis to Store Volatile Electric Energy Produced from Renewable Resources	DemoSNG	Energy from Chemical Fuels	16
	Energy Efficiency in Industry	LHI-EE	Renewable Energies	23
	Offshore Metocean Data Measuring Equipment and Wind, Wave and Current Analysis and Forecasting Software	Neptune	Renewable Energies	24
	Solid State Transformer	SST	Smart Electric Grids	37
	Thermal Storage for Concentrating Solar Power Plants	Tesconsol	Renewable Energies	25
Grupo Técnico RVI SL	Microlubgear	Microlubgear	Renewable Energies	23
Instituto Técnico Agronómico Provincial SA (ITAP)	Breeding Programme for the Development of a New Improved Camelina Variety	Nicava	Energy from Chemical Fuels	14
Klüber Lubrication	Microlubgear	Microlubgear	Renewable Energies	23
Laulagun Bearings SA	Microlubgear	Microlubgear	Renewable Energies	23
Soluciones de Ingeniería Marítima Operacional SL (SIMO)	Offshore Metocean Data Measuring Equipment and Wind, Wave and Current Analysis and Forecasting Software	Neptune	Renewable Energies	24

PARTNER	PROJECT		CATEGORY	PAGE
Tecnalia Research & Innovation	Business and Service Models to Support the Roll-Out of Electric Vehicles in Cities	EVCITY	Smart and Efficient Buildings and Cities	29
	Encapsulation of Flexible Thin-Film PV Devices	EnThiPV	Renewable Energies	22
	Energy Efficiency in Industry	LHI-EE	Renewable Energies	23
	IncoTrans	IncoTrans	Smart Electric Grids	35
	Thermal Storage for Concentrating Solar Power Plants	Tesconsol	Renewable Energies	25
	Smart Grid Materials	Materials	Smart Electric Grids	36
SWEDEN				
Cortus Energy	Development of Concepts for SNG Synthesis to Store Volatile Electric Energy Produced from Renewable Resources	DemoSNG	Energy from Chemical Fuels	16
Impact Coatings	Smart Grid Materials	Materials	Smart Electric Grids	36
KTH Royal Institute of Technology	Active Substations	KIC-ASS	Smart and Efficient Buildings and Cities	28
	Advanced Near Zero-Emission Coal-Fired Power Plant	ACoPP	Clean Coal Technologies	08
	Development and Market Implementation of PID and FID Tar Analysers	DeMiTar	Energy from Chemical Fuels	15
	Development of Concepts for SNG Synthesis to Store Volatile Electric Energy Produced from Renewable Resources	DemoSNG	Energy from Chemical Fuels	16
	Electrical Energy Storage Device for Cold Stores	EStore	Smart and Efficient Buildings and Cities	29
	Energy Efficiency in Industry	LHI-EE	Renewable Energies	23
	Extended Gasifier Technologies for a Wide Range of Biomass	XGaTe	Energy from Chemical Fuels	16
	High Power Converter Auxiliary Power Supply	HICAPS	Smart Electric Grids	34
	Innovative Sensor for Material Ageing and Radiation Testing	I-SMART	Sustainable Nuclear and Renewable Convergence	42
	Load Current Commutation and Interruption by Electromechanical Switches and Power Electronics	ESPE	Smart Electric Grids	36
	Multi-fuel Energy Generation for the Sustainable and Efficient Use of Coal	SECoal	Clean Coal Technologies	10
	New Materials for Energy Systems	NewMat	Clean Coal Technologies	11
	Novel Synthesis Process Concepts for Efficient Chemicals and Fuel Production from Biomass	SYNCON	Energy from Chemical Fuels	17

PARTNER	PROJECT		CATEGORY	PAGE
	Products and Services of a Living Smart City Lab	Alive & KICing	Smart and Efficient Buildings and Cities	31
	Smart Grid Materials	Materials	Smart Electric Grids	36
	Thermal Storage for Concentrating Solar Power Plants	Tesconsol	Renewable Energies	25
Primateria AB	IncoTrans	IncoTrans	Smart Electric Grids	35
STRI AB High Voltage Testing and Consulting	Active Substations	KIC-ASS	Smart and Efficient Buildings and Cities	28
Uppsala University	Fuel Flexible Combustion Systems for Liquid and Gaseous Biofuels	Fuel-Flex	Energy from Chemical Fuels	17
	IncoTrans	IncoTrans	Smart Electric Grids	35
	New Materials for Energy Systems	NewMat	Clean Coal Technologies	11
	Novel Synthesis Process Concepts for Efficient Chemicals and Fuel Production from Biomass	SYNCON	Energy from Chemical Fuels	17
	Smart Grid Materials	Materials	Smart Electric Grids	36
Vattenfall AB	Active Substations	KIC-ASS	Smart and Efficient Buildings and Cities	28
	Solid State Transformer	SST	Smart Electric Grids	37

SWITZERLAND

ABB Power and Automation Technologies	High Power Converter Auxiliary Power Supply	HICAPS	Smart Electric Grids	34
	Load Current Commutation and Interruption by Electromechanical Switches and Power Electronics	ESPE	Smart Electric Grids	36
	New Materials for Energy Systems	NewMat	Clean Coal Technologies	11
	Smart Grid Materials	Materials	Smart Electric Grids	36
	Solid State Transformer	SST	Smart Electric Grids	37
AVA-CO2	Extended Gasifier Technologies for a Wide Range of Biomass	XGaTe	Energy from Chemical Fuels	16

UK

Harvard Engineering Ltd.	Products and Services of a Living Smart City Lab	Alive & KICing	Smart and Efficient Buildings and Cities	31
--------------------------	--	----------------	--	----

KIC InnoEnergy Offices

KIC InnoEnergy SE

High Tech Campus 69
5656 AG Eindhoven
The Netherlands
info@kic-innoenergy.com
www.kic-innoenergy.com

KIC InnoEnergy Benelux

Eindhoven University of Technology (TU/e)
Connector 1.08
5612 AS Eindhoven
The Netherlands
benelux@kic-innoenergy.com

KIC InnoEnergy France

Immeuble L'Alizee
32, rue des Berges
38000 Grenoble
France
france@kic-innoenergy.com

KIC InnoEnergy Germany

Albert-Nestler-Straße 26
76131 Karlsruhe
Germany
germany@kic-innoenergy.com

KIC InnoEnergy Iberia

Edifici Nexus II Oficina 0A
c/ Jordi Girona, 29
08034 Barcelona
Spain
iberia@kic-innoenergy.com

KIC InnoEnergy Sweden

Lindstedtsvägen 1
SE-114 28 Stockholm
Sweden
sweden@kic-innoenergy.com

KIC InnoEnergy Poland Plus

Czerwone Maki 84, Bldg C
30-392 Krakow
Poland
polandplus@kic-innoenergy.com



About KIC InnoEnergy

KIC InnoEnergy is a European company dedicated to promoting innovation, entrepreneurship and education in the sustainable energy field by bringing together academics, businesses and research institutes. It is one of the first Knowledge and Innovation Communities (KICs) fostered by the European Institute of Innovation and Technology (EIT), an independent body of the European Union. It is a commercial company with 27 shareholders that include top-ranking industries, research centres and universities, all of which are key players in the energy field. Shareholders have committed to a seven-year industrial plan in which they pledge to mobilise EUR 700 million in resources during the period 2011-2015 alone.

Supported by the EIT

KIC InnoEnergy is funded by the European Institute of Innovation and Technology (EIT). The EIT is an independent body of the European Union that was established in March 2008. Its mission is to increase European sustainable growth and competitiveness by reinforcing the innovation capacity within the European Union.

Published by:

KIC InnoEnergy Secretariat

c/o The Regional Environmental Center
Ady Endre út 9-11 • 2000 Szentendre • Hungary

For further information, please contact:

Jerome Simpson • Email: JSimpson@rec.org • Tel: +36 26 504 039



European Institute of
Innovation & Technology



This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation