

DRAFT – NOT FOR PUBLICATION

ANNUAL WORK PROGRAMME

2007

(to be updated annually)

COOPERATION THEME 5: ENERGY

**DRAFT ONLY FOR INFORMAL
CONSULTATION WITH THE ENERGY
COMMITTEE TO BE ESTABLISHED
UNDER FP7**

NOT FOR PUBLICATION

12 October 2006

DRAFT – NOT FOR PUBLICATION

ANNUAL WORK PROGRAMME

2007

COOPERATION THEME 5: ENERGY

CONTENTS

5.1. CONTEXT	3
5.1.1. POLICY CONTEXT	3
5.1.2. APPROACH	3
5.1.3. OTHER ACTIVITIES	10
5.2. CONTENT OF CALLS IN 2007	14
5.3. IMPLEMENTATION OF CALLS	75
5.4. INDICATIVE PRIORITIES FOR FUTURE CALLS	77

Note: This work programme describes only the topics for which proposals will be called for in 2007. It will be updated on an annual basis.

ANNUAL WORK PROGRAMME

2007

COOPERATION THEME 5: ENERGY

Overall objective for FP7:

Adapting the current energy system into a more sustainable one, less dependent on imported fuels and based on a diverse mix of energy sources, in particular renewables, energy carriers and non polluting sources; enhancing energy efficiency, including by rationalising use and storage of energy; addressing the pressing challenges of security of supply and climate change, whilst increasing the competitiveness of Europe's industries.

5.1. CONTEXT

5.1.1. POLICY CONTEXT

As described in the Commission's Green Paper on a European strategy for sustainable, competitive and secure energy¹, Europe has entered into a new energy era. The new energy landscape of the 21st century is one in which the world's economic regions are dependent on each other for ensuring energy security and stable economic conditions, and for ensuring effective action against climate change.

Europe's energy economy, and that of the World, is currently on a pathway that is not sustainable. This must change. Set against the backdrop of a growing global demand for energy to power economic development and growth, we are faced with a huge challenge. Sustainable, competitive and secure energy has to become one of the basic pillars of our daily life.

5.1.2. APPROACH

Europe and the rest of the World share the common objectives of providing abundant, clean, secure and affordable energy, whilst simultaneously achieving substantial reductions in greenhouse gas emissions to mitigate the potentially serious consequences of climate change.

The focus of the research and demonstration actions in this Work Programme will be on accelerating the development of cost-effective technologies for a more sustainable energy economy for Europe (and world-wide) and ensuring that European industry can compete successfully on the global stage.

Recognising that none of the technologies being developed can make a sufficient difference on their own and that their commercialisation will take place over differing time horizons, a broad technology portfolio approach is adopted, thus greatly reducing the risk and potentially the costs, if one or more technologies fail to make the expected progress.

The research, development and demonstration carried out under this Work Programme is expected to:

- Improve energy efficiency throughout the energy system;

¹ COM(2006)105 of 08 March 2006

DRAFT – NOT FOR PUBLICATION

- Accelerate the penetration of renewable energy sources;
- Decarbonise power generation and, in the longer term, substantially decarbonise transport;
- Reduce greenhouse gas emissions;
- Diversify Europe's energy mix;
- Enhance the competitiveness of European industry.

• *Structure and focus of calls in 2007*

Calls for Proposals will be selective. There will be competition, based on quality and excellence, between proposals both across and within research topic areas in each call, which may result in some topics not being supported in a given call.

A common call with two parts will be published in 2007. One part (COOP-ENERGY-2007-1-RTD) will focus on research with a longer term perspective, with a view to accelerating technology development, and will cover the major part of the available budget for such activities for 2007 and 2008.

The other part (COOP-ENERGY-2007-2-TREN) will focus on research with a shorter term perspective and particularly demonstration actions (with a research element included), with the main objective of shortening the time to market for promising technologies and systems, and will cover the available budget for such activities for 2007.

The calls will be implemented using Collaborative Projects and Coordination and Support Actions. The funding scheme applicable to each topic is indicated in this Work Programme, along with guidance as to the expected level of ambition and other relevant information.

• *Cross-cutting and cross-thematic approaches*

Due attention will be paid to ensuring there is effective coordination between the priority themes and to scientific areas which cut across themes. In particular, special consideration will be devoted to coordination of aspects linked to rational and efficient use of energy within the Framework Programme and with other Community policies and programmes.

Energy efficiency in its wider sense is fundamental to economic stability and development. In the Energy Theme itself, the concept of energy efficiency underpins the whole RTD programme and not just the activity that is labelled “energy efficiency and savings”. It is also a prime example of a cross-thematic subject, which will be appropriately coordinated.

Within the theme, the activity "Energy efficiency and savings" (ENERGY.8) includes a number of cross-cutting issues related to different energy efficiency technologies (in buildings, communities, industry sectors and processes, SMEs etc) in combination with "Renewable electricity generation" (ENERGY.2) and "Renewables for heating and cooling" (ENERGY.4). Further, energy efficiency aspects in transport will be developed and implemented in liaison with activity ENERGY.3 (Renewable fuel production) and with the Transport theme (Theme 7).

In addition, the goal of increased energy efficiency throughout the energy system is supported by most of the other themes, in which energy efficiency is explicitly or implicitly

DRAFT – NOT FOR PUBLICATION

recognised as a key area for research. The contributions to energy efficiency can be summarised as follows:

- **Theme 2: Food, Agriculture and Biotechnology:** research will help to increase the overall “well to wheel” efficiency of biomass and biofuels.
- **Theme 3: Information and Communication Technologies:** ICT can improve the end-use efficiency of energy in buildings, industry and transport (e.g. smart buildings, electricity and gas networks, more efficient processes, intelligent transport systems).
- **Theme 4: Nanosciences, Nanotechnologies, Materials and new Production Technologies:** new materials to improve energy conversion efficiency and more energy efficient industrial processes.
- **Theme 6: Environment (including Climate Change):** environmental technologies contribute to the goal of improving the sustainability of the energy system and thus overall energy system efficiency.
- **Theme 7: Transport (including Aeronautics):** improving energy efficiency (e.g. of vehicle propulsion systems) is the key the greening of air and surface transport; encouraging modal shift can also lead to more energy efficient means of transport.

Integrated actions that cut across or exploit the synergies between different research activities of the Cooperation Programme and other Specific Programmes will be implemented in cooperation with the relevant themes, including through joint or coordinated calls, as appropriate.

[TBC: Certain topics in the "hydrogen and fuel cells" activity should preferably be implemented through a Joint Call with Theme 4 "Nanosciences, Nanotechnologies, Materials and new Production Technologies".]

The area "Ocean Energy" (ENERGY.2.6) contributes to the cross-thematic subject of marine sciences and technologies.

The activities "CO₂ capture and storage technologies for zero emission power generation" ENERGY.5 and "Clean coal technologies" ENERGY.6 are strongly linked and cross-cutting actions between the two are addressed in a separate section (Activity ENERGY.5&6).

Horizontal actions within the Energy theme (i.e. not linked to specific technologies) are addressed in the separate section (Activity ENERGY.10).

• **Consultation**

In drafting this Work Programme, the Commission has taken account of input from a wide variety of sources, including:

- European Technology Platforms (see below)
- Conferences and workshops on specific technologies;
- Requested input from Thematic Networks, Coordination Actions and project clusters;
- Consultations on policy documents, such as Actions Plans and Green Papers;
- Spontaneous inputs received from stakeholder groups or organisations;

- FP6 and FP7 Advisory Groups on Energy;
- Member States (Programme Committee).

- ***European technology platforms***

The key deliverables of European Technology Platforms, such as vision documents, strategic research agendas, deployment strategies and implementation plans, are an important input for the research priorities in the Theme, as demonstrated in the relevant sections of this work programme. Such platforms have been established on hydrogen and fuel cells, photovoltaics, biofuels, zero emission fossil fuel power generation and electricity networks of the future. A platform on solar thermal energy has also recently been created and one on wind energy is about to start.

- ***SME relevant research***

Strengthening the competitiveness of the European energy sector, in the face of severe global competition, is an important objective of this Theme, providing the capability for European industry to attain or maintain world leadership in key energy technologies. In particular, SMEs, the lifeblood of the EU industry, play a vital role in the energy chain and are crucial to promoting innovation.

Strong SME participation in research and demonstration activities has been instrumental in the creation of new industrial sectors, in particular in the area of renewable energy systems, and in placing European industries at the forefront of industrial innovation. Their effective participation in FP7 will continue to be actively encouraged and promoted.

The strategy in the Energy Theme is to encourage further SME participation through the continuation of on-going activities. Dissemination events and the identification of topics particularly suitable for SMEs will continue. Topics open for proposals will indicate whether there is a particular relevance or encouragement for the participation of SMEs. In addition, Specific Actions aimed at bringing together SMEs in the energy sector will follow on from the work of the FP6 Economic and Technological Intelligence (ETI) projects. New actions will be implemented once the current ETI activities have been completed. Two topics in 2007 to support SMEs can be highlighted:

- **Topic ENERGY.2007.8.1.2: Manufacturing industry: SMEs energy innovation**
- **Topic ENERGY.2007.10.0.7: The role and impact of SMEs in Energy Research Framework Programme projects**

- ***International cooperation***

All activities carried out in the Energy Theme are open to researchers and research institutions from third countries and strong efforts will be made to encourage them to seize this opportunity, in particular, countries from the International Cooperation Partner Countries (ICPC, see list of countries in Annex) and countries with whom the EU has a Scientific and Technological cooperation agreement.

Funding will be provided to participants from the ICPC countries. Funding for organisations from other third countries may be provided on a case-by-case basis if considered necessary for carrying out the project.

DRAFT – NOT FOR PUBLICATION

More specifically, international cooperation will be implemented via two mechanisms:

- (1) Opening of all activities of the Theme to international cooperation. The topics open for proposals will indicate whether there is a particular relevance or encouragement for the participation of third countries, providing guidance as to the targeted countries or regions.
- (2) A series of “Specific International Cooperation Actions” (SICA) will be dedicated to international co-operation with partners from International Cooperation Partner Countries (ICPC). They will address, on the basis of mutual benefit, problems of shared interest and importance such as the environmental consequences of energy policies, energy supply inter-dependency, technology transfer and capacity building and will engage emerging economies with significant energy needs. These activities will have specific rules for participation and have criteria for evaluation which take into account the concept of SICA. See below.

Where relevant, a particular attention will be paid to support strategically important bilateral agreements and dialogues, as well as multi-lateral co-operation initiatives, such as the International Partnership for the Hydrogen Economy (IPHE), the Carbon Sequestration Leadership Forum (CSLF) and others.

- ***Specific International Cooperation Actions (SICA)***

Topics for proposals for Specific International Cooperation Actions (SICA) are incorporated into the activities and areas described in Chapter 5.2. Such opportunities, described in detail in the relevant sections, include:

- **Topic ENERGY.2007.2.5.2: Using CSP for water desalination (*Mediterranean Partner Countries*)**
- **Topic ENERGY.2007.3.2.7: Identifying research needs and technological opportunities for biofuels production in Latin America (*Latin American Countries*)**
- **Topic ENERGY.2007.5&6.2.6: Support to international collaboration in zero emission power generation (*China*)**
- **Topic ENERGY.2007.9.1.4: Energy technology transfer (*EU Neighbouring and Developing Countries*)**

The total indicative budget for these actions in 2007 is expected to be of the order of **4 M€**. However, proposals will be in competition with the other proposals submitted to the relevant call and funding for any given topic is not guaranteed.

Note that special participation rules apply to Specific International Cooperation Actions – these are explained in the topic description only when they are different from the normal participation rules. Only Coordination and Support Actions are called for in 2007.

- ***Future and Emerging Technologies (FET)***

The objective is to support research aiming at identifying or further exploring new scientific and technological opportunities in a given field and/or in combination with other relevant areas and disciplines, as well as to nurture novel ideas and radically new uses and

to explore new options in research roadmaps, in particular those with a potential for significant breakthroughs.

Where appropriate, opportunities for proposals for “Future and Emerging Technologies” are incorporated into the activities and areas described in Chapter 5.2, through the open nature of certain research topics. Such opportunities, described in detail in the relevant sections, include:

- **Topic ENERGY.2007.1.1.3: Innovative concepts for fuel cells**
- **Topic ENERGY.2007.3.5.1: Fuel production using solar radiation**

- ***Coordination of Non-Community Research Programmes***

The objective of the ERA-NET scheme is to step up the cooperation and coordination of research programmes carried out at national or regional level in the Member or Associated States through the networking of research programmes, towards their mutual opening and the development and implementation of joint activities.

ERA-NET projects can network four type of activities: (1) Information exchange; (2) Definition and preparation of joint activities; (3) Implementation of joint activities; (4) Funding of joint trans-national research actions. New ERA-NETs, which address new topics and without any experience from FP6, should address at least the first three steps, but are encouraged to aim at the “four step approach”.

Opportunities for proposals for new ERA-Nets are incorporated into the activities and areas described in Chapter 5.2. Such opportunities, described in detail in the relevant sections, include:

- **Topic ENERGY.2007.7.3.3: Stepping up the cooperation of national and regional research activities on Smart Power Grids**
- **Topic ENERGY.2007.10.0.3: Optimise EU action through a better coordination of the international cooperation initiatives of the EU and Member States**
- **Topic ENERGY.2007.10.0.4: Fostering coordination between national and European energy RTD strategies and programmes**

See Annex 4 of the Work Programme for more details of the ERA-Net scheme.

- ***Dissemination actions***

In order to strengthen the diffusion and use of the output of research, the dissemination of knowledge and transfer of results, including to policy makers, will be supported. This will complement actions in the Intelligent Energy-Europe (IEE) Programme component of the Competitiveness and Innovation Programme (CIP) to support innovation and remove non-technological barriers to the widespread market deployment of demonstrated energy technologies.

Where appropriate, communication and dissemination strategies will address the wider audience of policy-makers, the media and the general public (including young people), in order to promote increased understanding between the scientific world and society at large.

Opportunities for proposals for specific dissemination actions are incorporated into the activities and areas described in Chapter 5.2. Such opportunities, described in detail in the relevant sections, include:

- **Topic ENERGY.2007.3.7.4: Promotion and dissemination (biofuels)**
 - **Topic ENERGY.2007.8.7.1: Promotion and dissemination (energy efficiency)**
 - **Topic ENERGY.2007.8.7.2: Support action for coordination and dissemination CIVITAS-Plus**
 - **Topic ENERGY.2007.10.0.6: Identification, promotion and dissemination of energy research results**
- ***Integration of the socio-economic dimension and societal concerns***

To become the most advanced knowledge-based society in the world, Europe must create a social and cultural environment conducive to successful and exploitable research. Therefore, legitimate societal concerns and needs have to be taken on board, entailing an enhanced democratic debate with a more engaged and informed public and better conditions for collective choices on scientific issues. This is particularly the case in the energy field which has an impact on the everyday life of all citizens.

Wherever possible, actors in the energy field will be encouraged to develop science in society perspectives from the very beginning of the conception of their activities. Where appropriate, cross-thematic partnerships, particularly with the "Science in Society" activity in the Capacities Programme, will be established which will focus on actions and measures of mutual benefit, highlight synergies, and help bridge the gap between topical areas in science and technology and society's interests.

Many of the activities to be funded under this programme will also make positive contributions to education and training and to raising general levels of awareness of the nature of the research undertaken and the benefits likely to accrue.

Opportunities for the integration of the socio-economic dimension and societal concerns occur throughout this work programme and are incorporated into the activities and areas described in Chapter 5.2. Specific opportunities of particular interest, described in detail in the relevant sections, include:

- **Topic ENERGY.2007.5&6.2.3: Socio-economic assessment of pathways for the deployment of CCS in Europe**
- **Topic ENERGY.2007.9.1.2: Energy behavioural changes** (*N.B. this topic should be carried out in cooperation with Area 5.1.2, SiS.2007.Cta, "Framing deliberative processes fostering sustainable consumption and production" of the Capacities Programme - Science in Society*)
- **Topic ENERGY.2007.9.2.2: Analysis and assessment of sustainable energy potential and impact of technology development in the society and the economy**
- **Topic ENERGY.2007.10.0.5: Development of a methodology for monitoring the expected impacts of FP7 Energy projects**

- ***Gender and ethical issues***

Activities in the work programme will be carried out according to fundamental ethical principles.

The pursuit of scientific knowledge and its technical application towards society requires the talent, perspectives and insight that an increasing diversity in the research workforce will ensure. Therefore, a balanced representation of women and men at all levels in research projects is encouraged. When human beings are involved as users, gender differences may exist. These should be addressed as an integral part of the research to ensure the highest level of scientific quality.

5.1.3. OTHER ACTIVITIES

The activities described in this section fall outside of the mainstream “calls for proposals” means of implementation of the Work Programme. Funds will be made available to support activities for which:

- a specific initiative on the basis of Art 171 or 169 of the Treaty is foreseen;
- a direct beneficiary is identified to receive financial support without a call for proposals²;
- a call for tender is planned in place of a call for proposals.

a) Joint Technology Initiative on hydrogen and fuel cells

The Commission will make a specific proposal for a Joint Technology Initiative (JTI) on hydrogen and fuel cells, on the basis of Article 171 of the Treaty (proposal for a Council Regulation setting up the European Partnership for Hydrogen and Fuel Cell Technology Development).

Subject to formal approval of the Council Regulation, an amount of **75 M€** (indicative) will be made available to the JTI from the 2008 budget allocated to the Energy Theme.

In order to facilitate the start-up of the JTI and ensure a rapid transition to full operational readiness, the Commission will enter into a Support Action (SA) grant agreement² (subject to satisfactory negotiation) with 'The European Industry Grouping for a Hydrogen and Fuel Cell Joint Technology Initiative'³, the partner that will become a member of the JTI along with the European Community. The maximum EC grant will be **1-2 M€**, on the basis of a 50:50 sharing of the costs of the action. The principle activities of the Support Action will be:

- to carry out, in collaboration with the EC, all the preparatory activities necessary to ensure an immediate launch of the JTI as soon as possible after the Council Regulation is adopted;
- to start the build-up of the necessary resources and support structures to ensure the operational readiness of the JTI Programme Office.

² In accordance with Article 14(a) of the FP7 Rules for Participation.

³ Provisional name for an international not-for-profit association to be established under Belgian Law.

b) Risk-Sharing Finance Facility (RSFF)

In addition to direct financial support to participants in RTD actions, the Community will improve their access to private sector finance by contributing financially to the 'Risk-Sharing Finance Facility' (RSFF) established by the European Investment Bank (EIB).

The Community contribution to RSFF will be used, by the Bank, in accordance with eligibility criteria set out in the Work Programme 'Co-operation' (horizontal issues)⁴. RSFF support is not conditional on promoters securing grants resulting from calls for proposals described herein, although the combination of grants and RSFF-supported financing from EIB is possible.

In accordance with the Specific Programme 'Cooperation' [ref], which stipulates that the Community contribution to RSFF be funded by *proportional contributions of all Themes, except Socio-economic Sciences and the Humanities*, the Commitment Appropriations for this Theme to RSFF in 2007 will be EUR [xxx million]. This amount will be committed entirely in 2007.

The use of the Community Contribution from the Specific Programme 'Cooperation' will be on a 'first come, first served' basis and will not be constrained by the proportional contribution of Themes.

c) National Contact Points (NCP)

An action to reinforce the network of National Contact Points (NCP) for the Seventh Framework Programme under the Energy Theme, by promoting trans-national co-operation, is open for proposals in 2007. See **Topic ENERGY.2007.10.0.2** in Chapter 5.2.

d) Calls for Tender

Where appropriate, the Commission will issue Calls for Tender for public procurements, such as specific studies or services required to achieve the programme objectives, particularly with regard to the monitoring and assessment of the programme and to the promotion and dissemination of results. A list of Calls for Tender planned for 2007 is shown in the table below:

Subject (Indicative title)	Status	Indicative Budget	Expected duration
Development and implementation of methodology for evaluation and impact assessment of the EU RTD energy programme within the FP: - FP5 (The aim of this pilot action is to perform the ex-post evaluation including, when appropriate, the impact assessment of the European energy programme of FP5.)	Call for Support Action expected to be published in	150 000 €	12 months

⁴ Exact reference to be verified

DRAFT – NOT FOR PUBLICATION

<p><i>[- FP6 (based on lessons learned from the FP5 pilot exercise, a major evaluation and ex-post impact assessment of FP6 will be launched in 2008)]</i></p>	<p>2Q 2007 [2008]</p>	<p>[300 000 €]</p>	<p>[18 months]</p>
<p>Support to the promotion of International Cooperation (The aim of this action is to organise and conduct a dynamic dialogue between Europe and targeted ICPC namely China, India, Russia, LA and the MPC around specific areas to jointly set up research topics, projects and/or programme(s) of common interest and identify cooperation mechanisms – one Lot per targeted region).</p>	<p>Call for Support Action expected to be published in 2Q 2007</p>	<p>1.500.000 €</p>	<p>30 months</p>

e) International Energy Agency

The Commission represents the European Community in the Implementing Agreements (hereinafter “IAs”) concluded under the framework of the International Energy Agency where it participates in activities in certain areas of energy research.

The Commission will make annual financial contributions required by its participation, up to a total amount of 440,000 €. The annual financial contributions will be paid to the entities responsible for managing the respective agreements. The table below shows only those IAs for which the financial contribution will be paid from the budget of this part of the Cooperation Work Programme. It is not an exhaustive list of all of the IAs to which the Commission participates.

The Commission may participate in additional activities agreed under the IAs mentioned above or in any other existing or future IA and in any other activities of the IEA where such participation is in the interest of the Community, in line with the objectives and priorities of the present Work Programme, and within the limits of the budgetary provisions. The table below will be updated in any future modifications of the Work Programme.

DRAFT – NOT FOR PUBLICATION

IEA Implementing Agreements financed under the Energy WP:

Implementing Agreement	Date IA signed by the European Commission	Estimated Annual EC Contribution in nominal currency	Estimated Annual EC Contribution in euro
IEA Implementing Agreement for Co-operation in the Research and Development of Wind Turbine Systems (Task XI)	Commission signature in 1996. Expires in 2008	\$ 15,793	€ 12,205
IEA Implementing Agreement for the Establishment of a Project on Solar Power and Chemical Energy Systems (SolarPaces)	Commission signature in 1998. Expires in 2006 <i>(to be extended)</i>	€ 5,250	€ 5,250
IEA Implementing Agreement for a Programme of Energy Technology Systems Analysis (ETSAP)	Commission signature in 1980. Expires in 2009	€ 24,000	€ 24,000
Programme to Develop and Test Solar Heating & Cooling Systems	Commission signature in 1979. Expires in 2009	\$ 6,000	€ 4,636
IEA Implementing Agreement for a Programme of Research, Development and Demonstration on Bioenergy (Tasks 32, 33, 34, 36, 37, 39 and 41)	Commission signature in 1995. Expires in 2009	\$ 125,400	€ 100,000
IEA Geothermal Implementing Agreement (GIA)	Commission signature in 1997. Expires in 2007	\$ 14,000	€ 10,816
IEA Implementing Agreement on Photovoltaic Power System Programme (PVPS) (Task 1)	Commission signature in 1992. Expires in 2007	€ 7,500	€ 7,500
IEA Implementing Agreement for the establishment of IEA Coal Research	Commission signature in 1989. Expires in 2008	GBP 57,000	€ 82,885
IEA Implementing Agreement for a Co-operative Programme on Technologies Relating to Greenhouse Gases derived from Fossil Fuel Use	Commission signature in 1991. Expires in 2006 <i>(to be extended)</i>	GPB 52,500	€ 76,341
IEA Implementing Agreement for a Co-operative Programme on Ocean Energy Systems	Commission signature in 2002. Expires in 2006 <i>(to be extended to 2011)</i>	€ 7,000	€ 7,000
IEA Implementing Agreement for Demand Side Management (DSM)	Expires in 2008	€ 35,000	€ 35,000

5.2. CONTENT OF CALLS IN 2007

This section describes only the topics for which proposals will be called for in 2007. It will be updated on an annual basis in successive Annual Work Programmes.

Proposals may only be submitted to topics specifically identified in this Work Programme (i.e. explicitly labelled Topic ENERGY.2007.x.x.x). Proposals addressing other subjects will be considered to be ineligible (out-of-scope).

The description of each topic includes the technical content and scope, the applicable funding scheme and expected impact, as well as any other relevant information regarding participation requirements, relevance for SMEs or cooperation with third countries etc.

Funding schemes in the Energy Theme:

Regarding the Funding Schemes, the following information is provided to help applicants understand the expectations concerning project size.

(1) Collaborative Projects:

Collaborative projects can range from small or medium-scale focused research/demonstration actions to large-scale integrating projects for achieving a defined objective.

[Where an indication of the expected size of a project is provided in the description of a topic, the following definitions apply:

- *'small-medium' collaborative projects have an EC contribution of up to 4M€. For topics where this size is indicated, unless otherwise specified, it would normally be expected to finance more than one project.*
- *'large' collaborative projects have an EC contribution of more than 4M€. For topics where this size is indicated, unless otherwise specified, it would normally be expected to finance only one project.]*

(2) Coordination and support actions:

Where appropriate, a distinction is made between two types of actions, with the corresponding indications as regards the expected size of the project as follows:

- *'Coordination (or networking) Actions'* are expected to be in the range 1-2 M€ (EC contribution), depending on the scale of the activity to be coordinated. For topics where this scheme is indicated, unless otherwise specified, it would normally be expected to finance only one project.
- *'Support Actions'* are expected to be up to 1 M€ (EC contribution). For topics where this scheme is indicated, unless otherwise specified, it would normally be expected to finance only one project.

Forms of grant:

The forms of grant to be used in the energy theme are specified in Annex 3 of the Work Programme.

Evaluation criteria:

The evaluation criteria to be applied to proposals submitted to the energy theme are specified in Annex 2 of the Work Programme.

ACTIVITY ENERGY.1: HYDROGEN AND FUEL CELLS

NOTE: This Section is drafted on the assumption that the Commission will propose a Joint Technology Initiative (JTI) on hydrogen and fuel cells, on the basis of Article 171 of the Treaty, to become fully operational by 2008 (i.e. making use of the 2008 budget). An indicative amount of **75 M€** is foreseen from the 2008 budget to finance the JTI.

The JTI, a strategically managed, goal oriented programme, will cover industrial applied research, demonstration activities and relevant cross-cutting activities. As the detailed work programme of the JTI will be decided by its Governing Board, such activities are not dealt with by this draft of the work programme.

This draft of the WP therefore covers only more upstream collaborative research effort aimed at achieving breakthrough on critical materials, processes and emerging technologies.

A delay in the timing of the JTI will necessitate a substantial re-drafting of this Section, to include industrial applied research topics as well.

The integrated research and deployment strategy developed by the European Hydrogen and Fuel Cell Technology Platform (HFP) provides the basis for a strategic, integrated programme for transport, stationary and portable applications, aimed at providing a strong technological foundation for building a competitive EU fuel cell and hydrogen supply and equipment industry. The programme will comprise: fundamental and applied research and technological development; demonstration projects at an appropriate scale to validate research results and provide feedback for further research; cross-cutting and socio-economic research activities including infrastructure issues to underpin sound transition strategies and provide a rational basis for policy decisions and market framework development. The industrial applied research, demonstration and cross-cutting activities of the programme will preferably be implemented through the Joint Technology Initiative (JTI). This strategically managed, goal oriented action will be complemented and closely co-ordinated with more upstream collaborative research effort aimed at achieving breakthrough on critical materials, processes and emerging technologies.

This activity will address topics for research that will not be addressed by the JTI, taking into consideration the input received from the HFP strategic documents, in particular the Implementation Plan. It will cover basic oriented research on novel materials, process engineering, components and sub-systems, as well as cross-cutting issues, aimed at achieving significant performance and durability improvements and cost reductions in order to meet the relevant targets specified in the HFP Implementation Plan.

Performance targets listed below represent the current state of the art; applicants should also consult the strategic documents (Implementation Plan) of the Hydrogen and Fuel Cell technology platform for updates and more detailed definition of targets and applications

Results of this basic oriented research should have a realistic prospect of being integrated at a later stage into applied research and development, validation and demonstration action areas defined within the context of the JTI.

[NOTE: the topics marked with an asterisk below should preferably be implemented through a Joint Call with Theme 4 "Nanosciences, Nanotechnologies, Materials and new Production Technologies" – to be confirmed.]

AREA ENERGY.1.1: FUEL CELLS

Basic research should contribute to achieving significant, fundamental breakthroughs in the understanding of the physical and chemical aspects of the different materials included in fuel cells stacks.

Expected impact: the discovery of novel high-performance, low-cost materials, and their synthesis/manufacturing processes, as well as enabling new concepts for stacks, which can be used in the next generation of fuel cells by 2015. Technology specific targets are mentioned at the topic level.

Topic ENERGY.2007.1.1.1: Basic research for materials and processes for Polymer Electrolyte Membrane Fuel Cells (PEMFC)*

Content/scope: Basic research on multifunctional materials and processes with the aim of reducing fuel cell stack and system cost, and improving performance and durability of existing PEMFC technologies. The effort should focus on gas diffusion layers, non-noble metal based catalysts, novel polymer and ionomers for high temperature membranes and cost reduction of Membrane Electrode Assemblies (MEAs) and processes. Research should be dedicated to novel materials, including nano-structured materials and integrated nano-scale architectures for catalysts. Activities should also include modelling and simulation of membranes and fuel cell stacks, recyclability aspects and scaling-up of materials to mass production. Proposals for novel, alternative PEM technologies including direct fuel cells will also be fully considered, providing they demonstrate convincing arguments regarding potential competitiveness.

Funding scheme: Collaborative project (expected to be small-medium size), with a predominant R&D component.

Expected impact: Breakthrough in materials leading to a stack cost target of 45 Euro/kW, a power density $> 1\text{W}/\text{cm}^2$, and durability $> 5000\text{hrs}$ for transport and $> 40000\text{ hrs}$ for stationary applications.

Other information: Consortia will typically comprise research institutes, universities, and stack manufacturers/assemblers; opportunity for innovative SMEs. International cooperation involving particularly the participation of IPHE countries is welcomed.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.1.1.2: Basic research on materials and processes for High Temperature Fuel Cells (SOFC & MCFC)*

Content/scope: Basic research on multi-functional novel materials and processes, including nano-structured materials and recyclability with the aim of reducing fuel cell stack cost, improving performance (for maximum efficiency under practical operating conditions) and durability, compared with existing High Temperature Fuel Cells technologies. For Solid Oxide Fuel Cells (SOFC), research should focus on cycling (thermal & redox stability), fuel impurity and sulphur tolerance, dry methane operation for internal reforming or direct utilisation, load transients, high fuel utilisation, rapid start-up and cold-start. For Molten Carbonate Fuel Cells (MCFC), research focus should be directed at increasing power density and reducing degradation and corrosion of materials. Activities may also include: developing theory for modelling and simulation of cells/ stacks; recyclability aspects and scaling-up of materials to mass production.

Funding scheme: Collaborative project (expected to be small-medium size), with a predominant R&D component.

DRAFT – NOT FOR PUBLICATION

Expected impact: Breakthrough in materials leading to a stack with the following performance: sulphur tolerant to 30 ppm, 2500 redox cycles to 25% anode re-oxidation for SOFC, 10 000 load cycles 10 to 90 %, stack lifetime > 40,000 hours for stationary and >5000 hrs for transport applications , > 2500 stack thermo-cycles.

Other information: Consortia will typically comprise research institutes, universities, private companies, test facility providers, sub-suppliers (cell and stack components), cell and stack manufacturers; opportunity for innovative SMEs. International cooperation involving particularly the participation of IPHE countries is welcomed.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.1.1.3: Innovative concepts for fuel cells*

Content/scope: Research effort on innovative designs for fuel cells stacks, including development of related new materials and processes, which can lead to breakthrough concepts with potential for substantial improvement in fuel cell performance, durability and cost reduction. Activities should include theory, modelling and simulation of the new component/ stack concepts. The research activities should focus on cutting-edge research on multifunctional materials and should also include scaling-up to mass manufacture issues. New concepts are not limited to hydrogen as a fuel, but must demonstrate competitive potential for GHG and pollution reduction over the fuel production and use chain – compared to current fuel cell technologies.

Funding scheme: Collaborative project (expected to be small-medium size), with a predominant R&D component.

Expected impact: New competitive concepts for fuel cells. Main interest is in new fuel cell technologies that have potential for scale up to energy intensive applications

Other information: This is a "Future and Emerging Technologies" topic. SMEs are strongly encouraged to participate for the successful implementation of this technology. Typical consortia could comprise predominantly SMEs and research organisations, including universities.

Open in call: COOP-ENERGY-2007-1-RTD

AREA ENERGY.1.2: HYDROGEN SUPPLY

Research should contribute to the achievement of fundamental breakthroughs in materials and processes for hydrogen production routes using different primary energy sources. It should also contribute to the understanding of the physical and chemical aspects of processes governing the storage of hydrogen, in particular the interface of hydrogen with materials.

Expected impact:

The discovery of novel, efficient and cost-competitive materials, the development of new chemical processes and synthesis techniques, and the manufacture of critical components with potential for breakthrough performance and durability at system level. Technology specific targets are mentioned at the topic level.

Topic ENERGY.2007.1.2.1: New materials and processes for advanced electrolyzers*

Content/scope: Research should focus on the development of novel multifunctional, low-cost materials (and the associated manufacturing processes) for their integration in efficient and durable components and sub-systems for the next generation of electrolyzers based on both Proton Exchange Membranes (PEM) and Solid Oxide Electrolysis Cells (SOEC). The following (non-exclusive) components may be addressed: electrodes, electrolytes, catalysts,

separators, interconnect and membranes. The final outcome should be the design, construction and testing of an innovative laboratory prototype electrolyser with potential for increased efficiency and lifetime and lower capital cost compared with the present state of the art. Assessment of the potential integration of the prototype electrolyser with intermittent renewable energy sources should also be addressed.

Funding scheme: Collaborative project (expected to be small-medium size), with a predominant R&D component.

Expected impact: high efficiency, cost competitive electrolysis processes for distributed and/or centralised hydrogen production with minimal environmental impact, and potential to achieve efficiencies >70% (LHV basis) at a system level, “non-energy production cost” down to 1 €/kg of hydrogen produced, and system availability >99%.

Other information: Consortia will typically include research institutes, universities and, preferably, electrolyser (or fuel cell stack) manufacturers; opportunity for innovative SMEs. International cooperation involving particularly IPHE countries in particular is welcomed

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.1.2.2: New materials and processes for advanced multi-fuel processors*

Content/scope: The main emphasis should be on development of novel, efficient and cost-effective functional materials for critical components (e.g. catalysts, catalyst supports, membranes) for new, efficient and low cost advanced multi-fuel (liquid and gaseous) processors for distributed production of hydrogen. Effort should take advantage of recent advances in nano-scale synthesis and architectures, analytical tools and screening methods, and modelling/simulation of complex chemical systems including catalyst / chemical interfaces. Research could also include the design of innovative concepts for the fuel reformer, the water gas shift and the hydrogen purification steps as well as their integrated engineering. Cost reduction and scale-up potential of the investigated critical components must also be addressed.

Funding scheme: Collaborative project (expected to be small-medium size), with a predominant R&D component.

Expected impact: cost competitive processes for small scale hydrogen production with minimal environmental impact and potential to achieve overall efficiencies of 70%-80% (LHV basis) at system level and non energy costs <1.5 €/kg of hydrogen produced.

Other information: Consortia will typically comprise research institutes, universities, component manufacturers and with support from chemical companies and process technologists; opportunity for innovative SMEs. International cooperation involving IPHE countries in particular is welcomed.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.1.2.3: Advanced Materials for High Temperature thermo-chemical processes*

Content/scope: Research will focus on materials, components and sub-systems necessary for safe and efficient production of hydrogen through thermo-chemical decomposition of water. In particular, advanced, cost-effective materials should be identified and investigated for their use in critical components (e.g. alloys, membranes, refractories) and sub-systems (e.g. heat exchangers/decomposers/separators). These should relate to the most promising thermochemical cycles particularly the sulphur-iodine and the hybrid-sulphur families, which normally operate at high temperatures and under corrosive environments. Activities could include corrosion testing, thermal-hydraulics analysis, thermodynamic and

mechanical stress modelling, empirical validation and safety assessment. Research should constitute a significant advancement beyond the present state of the art and build upon current European and worldwide research projects.

Funding scheme: Collaborative project (expected to be small-medium size), with a predominant R&D component. Only one is expected to be funded.

Expected impact: Improve the durability and efficiency of critical components and subsystems, and in general, to prove the technical viability of promising thermo-chemical cycles for water splitting., in order to achieve hydrogen production cost of 2 €/kg.

Other information: Consortia will typically comprise leading Research Centres, universities and engineering firms. Cooperation (or complementarities) with on-going initiatives in the US and Japan is strongly recommended.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.1.2.4: Novel nanostructured materials for hydrogen storage*

Content/scope: Research should focus on novel nanostructured materials for hydrogen-storage which are not currently under investigation in EU funded projects and/or existing independent initiatives in Member States. Emphasis should be on the fundamental understanding of the chemical and structural interactions governing the energetics, thermodynamics and kinetics of the hydrogen uptake and release characteristics of these novel materials. The nanostructures could be based on novel light metal hydrides, porous materials or other ‘non-traditional’ approaches and also on potential hybrids of these classes. Activities should include synthesis, characterisation, modelling and investigation of the associated production processes and consequences for scale up. A laboratory prototype tank for on-board vehicle storage applications should be also an expected outcome of this research.

Funding scheme: Collaborative project (expected to be small-medium size), with a predominant R&D component.

Expected impact: Cost-effective breakthrough materials with demonstrable potential for incorporation into safe, conformable systems having in the order of 8wt% storage capacity. Opportunity for innovative SMEs.

Other information: Consortia will typically comprise universities, research centres and, specialised chemical companies with expertise in relevant process technology. Participation of qualified partners from IPHE countries is strongly encouraged.

Open in call: COOP-ENERGY-2007-1-RTD

AREA ENERGY.1.3: CROSS-CUTTING ISSUES AND HORIZONTAL ACTIVITIES

Topic ENERGY.2007.1.3.1: Pre-normative research to support EU and international regulatory activities

Content/scope: The main objective is to fill gaps in the knowledge base necessary for assuring safety, inter-operability, and maintainability of hydrogen supply, storage and delivery for transport and stationary applications. The work should concentrate on the validation of technical requirements to support the definition of technical specifications for safe handling and use of hydrogen (and fuel cell systems) to be further integrated into relevant EU and international regulations. Research should include theoretical and/or experimental work, and it may include development and validation of safety testing procedures (component and system level), mitigation techniques, sensors, environmental tests, risk analysis, general assessment of safety aspects. Work should constitute an advance

DRAFT – NOT FOR PUBLICATION

comparable to the state of the art, including current EU research and demonstration projects.

Funding scheme: Collaborative project (expected to be small-medium size), with a predominant R&D component. Only one is expected to be funded.

Expected impact: a significant contribution to the development of EU-wide and international best practice providing a sound knowledge base for regulatory and standards bodies concerning safety, compatibility and interoperability of hydrogen (and fuel cell) systems and components supporting harmonisation at EU and international level. The applicants should clearly demonstrate how the results and output of the envisaged research would impact on the (development or update of) EU/international legislation necessary for the implementation of hydrogen systems.

Other information: Consortia will typically comprise industry partners as well as research organisations, regulatory bodies and accreditation bodies. Participation of organisations of IPHE countries, that are actively involved in the development of hydrogen-related regulations should be included in order to co-ordinate and harmonise research effort at international level.

Open in call: COOP-ENERGY-2007-1-RTD

Draft

ACTIVITY ENERGY.2: RENEWABLE ELECTRICITY GENERATION

Research, development and demonstration of integrated technologies for electricity production from renewables, suited to different regional conditions, in order to provide the means to raise substantially the share of renewable electricity production in the EU. Research should increase overall conversion efficiency, significantly drive down the cost of electricity, enhance process reliability and further reduce the environmental impact. Emphasis will be on photovoltaics, wind and biomass (including biodegradable fraction of waste). Furthermore, research will aim at realising the full potential of other renewable energy sources: geothermal, thermal solar, ocean and small hydropower.

Policy context: this activity would facilitate the actual implementation of the “Directive on the promotion of electricity produced from renewable energy sources in the internal electricity market (2001/77/EC, O.J. L283, 27/10/2001)” as well as its revision and medium-term application.

AREA ENERGY.2.1: PHOTOVOLTAICS

Photovoltaics is the most capital-intensive renewable source of electricity. Currently, the generation costs of grid-connected PV electricity in Europe range from 0.25 €/kWh to 0.65 €/kWh, depending on both local solar irradiation and market conditions. The work will include the development and demonstration of new processes for photovoltaic equipment manufacturing, standardized and tested building components and the demonstration of the multiple additional benefits of photovoltaic electricity. Longer term strategies for next-generation photovoltaics (both high-efficiency and low-cost routes) will also be supported.

The content of this Area takes into consideration the Strategic Research Agenda (SRA) developed within the European Photovoltaic Technology Platform.

Expected impact:

Through technological improvements and economies of scale, the cost of grid-connected PV electricity in Europe is expected to be lowered to a figure in the range of 0.10-0.25 €/kWh by 2020. Research and development should lead to reduced material consumption, higher efficiencies and improved manufacturing processes based on environmentally sound processes and cycles.

Topic ENERGY.2007.2.1.1: Intermediate band (IB) materials and cells for PV

Content/scope: The research should cover basic studies of the IB cell, development of bulk IB materials and possible low-cost growth methods in order to reach enhanced performance (especially under concentrated sunlight).

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component. Only one is expected to be funded.

Expected impact: The results should lay the foundation for a breakthrough in high-efficiency intermediate bandgap cells.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.1.2: Dye-sensitised PV solar cells

Content/scope: The aim is to increase the efficiency and stability of dye-sensitised solar cells and to improve their potential for upscaling and fabrication. The activities should cover basic research, e.g. long-term stability, reduction of interfacial recombination and device simulation, as well as applied technology aspects, e.g. interface engineering, optimisation of sensitizer and module design.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component.

Expected impact: The project should increase technical expertise and accelerate the exploitation of this technology.

Other information: The participation of SMEs is especially encouraged.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.1.3: Concentrating photovoltaics: cells, optics, modules

Content/scope: The project should address the following aspects: (i) improvement of existing cell materials and develop new materials, in order to increase the cell efficiency, stability and life-time of multi-junction, high-concentration solar cells; (ii) development of high-efficiency optics with long-term stability and wide acceptance angles, for high concentration and suitable for cost-effective mass production; (iii) development of dedicated, cost-effective, high-throughput module assembly techniques, with due consideration of durability and temperature issues. Environmental and economical aspects should be fully addressed.

Funding scheme: Collaborative project (expected to be larger size) with a predominant R&D component.

Expected impact: The results should lead to economically-attractive concentrating photovoltaics, based on higher efficiencies, stable optics and optimised assembly techniques.

Other information: The participation of SMEs is especially encouraged.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.1.4: Research for binary thin-film photovoltaics

Content/scope: The aim is to develop cadmium telluride photovoltaic technology by i) advancing the understanding of physical parameters and processes (e.g. material interfaces, influence of impurities and grain boundaries) and ii) improving production technology (e.g. improved ohmic back contact, advanced TCOs, improved nucleation, film morphology and doping). Environmental and health aspects should be given due consideration.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component.

Expected impact: The results should lead to more cost-effective and more efficient thin-film modules based on environmentally sound processes and cycles.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.1.5: Environmental aspects of photovoltaics

Content/scope: The objective is to deliver up-to-date environmental data and information, in order to benchmark and optimise the environmental profile of photovoltaic technologies. The project should provide indicators (e.g. LCA/LCE, energy payback) for all main technologies. The project should also publish analyses and recommendations on, for example, reduction or avoidance of the use of critical materials (i.e. scarce or hazardous), more environmentally friendly processing steps, and recycling issues, with reference to environmental legislation where appropriate. The project consortium must take full account of past and ongoing work, and the conclusions of the project widely disseminated.

Funding scheme: Support Action.

Expected impact: The project will increase awareness and enable benchmarking of the environmental aspects of photovoltaic technologies.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.1.6: Innovative silicon technologies for PV

Content/scope: The aim is to develop technologies to reduce silicon consumption in crystalline silicon cells and modules. The research may cover techniques using wafer equivalents or silicon ribbon. Priority will be given to innovative, ambitious and clearly-focussed ideas, with due consideration of cost, efficiency and environmental aspects.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component.

Expected impact: The results should improve the competitiveness of crystalline silicon photovoltaics by significantly reducing the consumption of silicon material.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.1.7: Secure, reliable and affordable supply of feedstock for the PV industry

Content/scope: The objective of this topic is to ensure a secure, reliable and affordable supply of feedstock for the PV industry. Here the problem is more related to the need to facilitate the demand from the PV industry to meet the supply side by setting-up actions to properly kick-start new and efficient routes for the Si-feedstock production of at lower cost.

Funding scheme: Coordination and support action.

Expected impact: Actions aimed at kick start routes for Si-feedstock production.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.2.1.8: Improved production equipment and cost reduction

Content/scope: The objective of this topic is to reflect on the crucial role of cost reduction played by the production equipment used by the PV manufacturing industry and identifies the need for development and demonstration of new equipment (for instance: systems for high handling yield/high throughput of thin wafers; equipment for novel manufacturing technologies of solar cells) to be put on the market.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Higher performances and innovative equipment for the PV industry.

Other information: Equipment manufacturers should have a leading role.

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.2.1.9: Innovative/improved PV manufacturing processes

Content/scope: This topic has the objective to develop and demonstrate innovative processes in the PV manufacturing industry to increase yield and reduce costs.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Innovative and/or improved processes in the PV industry.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.2.1.10: Development and demonstration of standardized building components

Content/scope: The objective of this topic is the development and demonstration of standardized and tested building components based on photovoltaics which comply with existing standards and building codes. The building industry should have the lead of the initiative, with involvement of architects and testing laboratories. Test results should be communicated together with the products (educational material and tools for professionals and students).

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Enhanced use of PV building component by architects and builders.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.2.1.11: Multiple benefits of PV systems

Content/scope: The objective of this topic is the demonstration of the multiple benefits of PV systems for: i) Power quality improvement in industrial and residential environment; ii) Security of supply in residential and urban environments as well as for autonomous power supply systems in new member states and in developing countries. The demonstration of these additional benefits aims at increasing the value of PV electricity. Production of educational material should be included.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Enhanced deployment of PV technologies.

Other information: Participants should include utilities, system industry, research institutes, universities, industrial, communal and individual (private) users.

Open in call: COOP-ENERGY-2007-2-TREN

AREA ENERGY.2.2: BIOMASS

Current costs of electricity generation from biomass are in the range of 0.05-0.08 €/kWh. Development should aim at extending applications to a wider range of biomass materials by (1) solving specific problems hindering the use of biomass in direct co-firing and (2) addressing technical challenges for advanced biomass gasification systems for efficient power production.

Demonstration should aim at medium to large scale bio-electricity systems, covering the whole process chain from sustainable feedstock supply over energy conversion to the recovery of by-products. Preference will be given to the ambitious use of biofuels with still high exploitation potentials such as forest residues, energy crops, agricultural residues incl. straw, refuse derived fuels etc. Medium- to large scale power generation from organic waste also comprises mass burning of solid municipal waste as well as the separate use of pre-treated and pre-separated municipal waste fractions. Emphasis is put on innovations with high penetration potential throughout Europe. Stakeholders relevant for the commercialisation of the innovation are expected to participate.

Expected impact:

Increased electricity production from biomass through the development and demonstration of improved biomass power generation and CHP plants which allow power generation costs below 0.04 €/kWh in 2020 whilst operating on a variety of sustainably produced biomass feedstocks.

Topic ENERGY.2007.2.2.1: Advanced gas cleaning technologies for biomass

Content/scope: Development of advanced gas conditioning and gas cleaning technologies (including tar removal or conversion, gas and particulate emissions abatement) to obtain a high purity syngas for the requirements of fuel cells.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component. Only one is expected to be funded.

Expected impact: The resulting technologies should allow the production of a gas with the required specifications for use in fuel cells in a cost-effective way.

Other information: SMEs are important in the innovation process for this topic.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.2.2: Innovative technologies for efficient electricity production in biomass-fired IGCC

Content/scope: Development of innovative technologies dedicated to biomass-fired IGCC systems including (1) pre-treatment and high pressure feeding systems for a variety of biomass feedstock (e.g. solid, slurry form) and/or (2) hot gas cleaning with efficient removal of all contaminants that are harmful for the turbine and other parts of the plant. Research should include testing at pilot scale of the developed technologies.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component.

Expected impact: The objective is to advance the development of high-efficiency entrained-flow based IGCC of biomass.

Other information: SMEs are important in the innovation process for this topic.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.2.3: New and improved slagging and corrosion control technologies for large-scale biomass co-firing processes

Content/scope: Development of slagging and corrosion control technologies for direct co-firing of dedicated biomass (residues, energy crops) in large-scale power plants at high biomass-to-fossil feedstock ratios. Research should include feed optimisation, ash deposition and corrosion control, as well as innovative solutions for the handling of combustion residues.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component.

Expected impact: The research should result in a cost-effective method for using wider varieties of biomass, while reducing fouling and corrosion of the boiler.

Other information: The participation of partners from third countries, in particular Eastern Europe and Central Asia (EECA) countries, is encouraged. For technology development, SMEs are expected to represent the core members of the team.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.2.4: Large-scale co-firing

Content/scope: Demonstration of co-firing of biomass in existing large-scale fossil fuel fired power plants with high net electric efficiency and high biomass shares is addressed. Activities should include long term monitoring of the sustainability and reliability of feedstock supply and of the co-firing impact on power plant performance (e.g. on the flue gas cleaning systems, ash usability, plant availability). This topic is open to all co-firing concepts and biomass feedstocks.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: To substantially increase the highly efficient co-firing of a variety of biomass feedstocks into existing fossil fuel power stations through successful demonstration of technology, sustainable fuel supply, and high long-term power plant performance.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.2.2.5: Novel solid biofuels for electricity generation

Content/scope: Demonstration of the production of new, tradable solid biofuels fully or partially based on unconventional and difficult resources such as straw including their long-term application in existing bio-electricity installations is intended. The new biofuels should be ready-to-use for the plant operators without the necessity of major technical adaptations of the existing conversion plants themselves. Supplementary pre-normative work aiming at a future European-wide standardisation of these new biofuels is welcome.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Increase the range of usable biomass feedstock for existing bio-electricity installations. Reduce the production cost of solid biofuels through the (partial) use of low-cost feedstock.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.2.2.6: High-efficiency medium-to-large scale electricity generation from biomass

Content/scope: Demonstration of medium- to large scale power generation from biomass with increased net electric efficiency, high process reliability at levels which are competitive with those of fossil fuel based power generation, and low pollutant emissions is addressed. Depending on local fuel supply conditions such installations may have to be able to run on biomass feedstock of varying origin and quality. This call is open to all conversion technologies (combustion, gasification etc.) and all biomass feedstocks.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: The objective is to offer to the market new and improved conversion technologies for the medium to large scale power generation from biomass.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

AREA ENERGY.2.3: WIND

Innovative large scale on and off-shore wind power plants based on improved technologies, more robust, reliable and low-maintenance multi-MW turbines, combined with dependable output forecasting tools as well as with standards and certification schemes should bring wind power to higher levels of market penetration. Current costs for wind-generated electricity are in the range of 0.04-0.09 €/kWh.

Expected impact:

Cost reductions through improvements in technology, up-scaling of turbines, large-scale deployment (including offshore) and grid connection should lead to a cost below 0.04 €/kWh in 2020.

Topic ENERGY.2007.2.3.1: Development of components and systems for turbines and wind farms

Content/scope: The objective is to develop robust, reliable, cost effective and low-maintenance onshore and offshore wind energy systems which are easy to transport and to install. Issues to be addressed include the development of individual components and aggregate sub-systems (e.g. rotors, drive trains, controls) using advanced design tools and validation models.

Funding scheme: Collaborative project (expected to be larger size) with a predominant R&D component.

Expected impact: Reduction of manufacturing, logistics and maintenance costs combined with increased power-to-weight ratio, reliability and robustness should lead to lower production costs for wind generated electricity.

Other information: The participation of SMEs is especially encouraged.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.3.2: External conditions, resource assessment and forecasting for wind energy

Content/scope: The objective is to develop cost-effective measuring devices and methods, including sensing, communication and processing of data to improve system design and short-term forecasting, in particular for extreme conditions.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component. Only one is expected to be funded.

Expected impact: Minimising risk of project failure due to inaccurate interpretation of system parameters. Increased value of variable wind electricity and reduced cost of integration through improved predictability.

Other information: The participation of partners from third countries, in particular India and China, is encouraged.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.3.3: Testing, standards and certification for wind energy systems

Content/scope: The objective is to carry out pre-normative research, including development of measurement and testing methods for advancing standards in design, safety and performance of wind energy systems.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component. Only one is expected to be funded.

Expected impact: Improved compatibility between systems will lead to easier access to global markets.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.3.4: Demonstration of large scale systems for on-and off-shore wind farms

Content/scope: The objective is to demonstrate large scale wind energy systems: MW-turbine, tower and foundation, electrical conversion system and wind farm, including interface with grid, and storage systems integrated in the wind power plant. Issues to be addressed include logistics, manufacturing and maintenance strategies.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Cost reduction, increased reliability and reduced maintenance costs of wind parks.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.2.3.5: Integration of wind power into the European power system

Content/scope: Develop and demonstrate design and operating principles for cost effective large-scale grid integration of wind energy systems. Issues to be addressed include the demonstration of electric/electronic components and technologies for grid connection and operation.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Large scale deployment of wind energy through integration of large onshore and offshore wind farms.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.2.3.6: Wind mapping for offshore applications

Content/scope: The objective is to demonstrate and validate tools and methods which aim at offering maximum availability of comprehensive offshore wind data. Issues to be addressed include demonstration of advanced support tools, databases and services related to mapping for offshore applications.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Accurate and reliable wind data to assist operators and utility companies in the management of wind-generated electricity and to contribute to increasing penetration of offshore wind power.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

AREA ENERGY.2.4: GEOTHERMAL

Research and development should aim to develop enabling technologies for the exploitation of high-temperature ($\geq 150^\circ$) resources, and to prove the feasibility and sustainability of EGS technology in representative EU sites. The estimated current cost of electricity generation from the first-generation prototype plants is of the order of € 0.08-0.15/kWh. Demonstration projects should aim at improving geothermal reservoir detection technology, increasing the performance of fluid production systems (corrosion and scaling), and increasing the efficiency of electricity generating systems.

Expected impact: a continued reduction in cost through innovative developments, learning curve effects and co-generation of heat and power should lead to an electricity cost from enhanced geothermal systems of around 0.05 €/kWh in 2020.

Topic ENERGY.2007.2.4.1: Understanding and Mitigation of Induced Seismicity Associated with Geothermal Field Development

Content/scope: The objective is to study the mechanisms of induced seismicity related to geothermal field development and operation, in particular enhanced geothermal systems (EGS). The research should (a) analyse the distribution in time and space of the magnitude of seismic events, (b) set requirements for seismic monitoring, (c) recommend management strategies for prolonged field operation, and (d) provide a methodology for the estimation of site-specific seismic hazard prior to development of potential sites for EGS.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component. Only one is expected to be funded.

Expected impact: The results should lead to a better understanding of the mechanisms of seismic events in geothermal reservoirs. This will enable to define strategies for fluid injection, for the extraction of heat over a prolonged period, and/or for the creation of EGS.

Other information:

Open in call: COOP-ENERGY-2007-1-RTD

AREA ENERGY.2.5: CONCENTRATED SOLAR POWER

Concentrated solar power (CSP) has much scope for improvements in the optical and thermal efficiency of the solar components, power generation efficiency (including

hybridisation with other fuel), and operational reliability. Current electricity generation costs for concentrating solar thermal are in the range of 0.16-0.20 €/kWh for areas like Southern Spain.

A large reduction in both capital cost and maintenance cost, together with the improvement of the environmental profile, is necessary to make CSP systems more competitive with conventional electricity sources and other renewables. This includes development and demonstration of new receiver concepts; demonstration of heat transfer cycles with higher performances; development of low-cost high efficient storage systems; demonstration of lower cost, intermediate size power plants for decentralised electricity, heating and cooling generation; improvement of the environmental profile of the CSP installations (e.g. lower water consumption, more efficient land use,...).

Expected impact:

Reductions in cost through the up-scaling of units, volume production and technological innovation should lead to an electricity cost of around 0.05 €/kWh in 2020 for areas with high irradiation levels.

Topic ENERGY.2007.2.5.1: Key components for CSP

Content/scope: Development of CSP technologies by improving the efficiency, durability and reliability of key components such as mirrors, storage systems, driving mechanisms, receivers and heat exchangers. Research may cover new materials, such as innovative coatings, and the use of nanotechnology.

Funding scheme: Collaborative project (expected to be small-medium size).

Expected impact: Improvements in the performance of key components, in particular at the high end of current temperature ranges, should lead to a substantial reduction in the cost of electricity generation from CSP.

Other information: SMEs are important in the innovation process for this topic. See also related topic ENERGY.2007.2.5.5

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.5.2: Using CSP for water desalination

Content/scope: Feasibility study of a CSP MW size hybrid power plant combined with water desalination in the Mediterranean region.

Funding scheme: Support Action.

Expected impact: Assessment of the techno-economic potential of concentrating solar technologies for electricity generation combined with water desalination.

Other information: *This is a Specific International Cooperation Action.* Strong involvement of research institutions and industry from Mediterranean Partner Countries (MPC) is necessary.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.5.3: Low cost, high efficiency daily storage systems

Content/scope: Development and demonstration of cost-effective storage systems to extent electricity production during and between the solar radiation hours and improve the overall economics of the generation facility.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Improve efficiency of CSP generation facilities.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.2.5.4: Improve the environmental profile of the CSP installations

Content/scope: This topic has the objective to improve the environmental profile of the CSP installations to allow their larger exploitation. This includes the reduction of water usage for the thermodynamic cycle by more economic and sustainable solutions and a more efficient land utilization.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Low cost CSP facilities with very low use of water and more efficient land use.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.2.5.5: CSP: Innovative heat transfer concepts

Content/scope: This topic has the objective to improve the performances of the heat transfer cycle in the CSP systems by extending the temperature operating range to achieve better integration and/or more efficient and economic operation conditions with the objective of increasing production during the solar radiation hours and reducing the kWh cost.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: CSP generation cycle and/or facilities using heat transfer cycles with improved performances.

Other information: Eligible costs associated only to innovative parts. See also related topic ENERGY.2007.2.5.1.

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.2.5.6: Intermediate size, lower concentration ratio CSP systems

Content/scope: Demonstration of smaller-size CSP systems (1 MW to 2MW) for electricity, heating and cooling production to assure the coverage of distributed production end-use energy and a cost reduction of installed power in the range from 1000€/kW to 2000 €/kW.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Low cost CSP facilities for distributed tri-generation.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

AREA ENERGY.2.6: OCEAN

Electricity generation from ocean currents, waves, salinity gradients and tidal stream systems will benefit from further cost reductions through technological improvements in new components and system designs, leading to higher efficiencies and lower operator and maintenance requirements. Estimated current cost of electricity generation from the first-generation prototype plants are of the order of € 0.08-0.20/kWh. Demonstration of ocean energy technologies should mainly address their intrinsic technical and financial risks. Among them the proving of the energy conversion potentials and the technical problems associated to the site's harsh environment. The large scale success of ocean energy needs demonstration at full scale of reliable, efficient and cost-effective systems with a view to commercial exploitation.

Expected impact:

A continued reduction in technology costs through innovative developments and learning curve effects should lead to an electricity cost of around 0.05 €/kWh in 2020.

Topic ENERGY.2007.2.6.1: New components and concepts for ocean energy converters

Content/scope: Development of new components and concepts for ocean, wave, tidal stream energy converters and power from salinity gradient systems. The projects should concentrate on the development of more efficient components for, for example, power take-off, control systems, mooring, membranes etc, or address new concepts to be developed and tested at laboratory scale.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component.

Expected impact: The new concepts and components should help to substantially reduce the technical and non-technical risks associated with deployment in the harsh marine environment.

Other information: For technology development, SMEs are expected to represent the core members of the team.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.6.2: A strategy for ocean energy

Content/scope: Coordination of ongoing or planned research activities in the EU and Member/Associate States, to propose research priorities, recommend an approach to implement the technology and provide a communication forum in the field.

Funding scheme: Coordination Action.

Expected impact: The co-ordination action should steer innovation in the field of ocean energy by focusing future RTD activities and by fostering lasting links between public and private partners in the field.

Other information: For technology development, SMEs are expected to represent the core members of the team.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.6.3: Pre-normative research for ocean energy

Content/scope: Pre-normative research aiming at harmonised testing methods and comparative assessment of ocean energy converters in terms of monitoring the performance, cost, and environmental impact.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component. Only one is expected to be funded.

Expected impact: The harmonised testing and assessment of ocean energy converters will facilitate the matching of different system designs to various marine environments, and accelerate their rate of deployment.

Other information: SMEs are important in the innovation process for this topic.

Open in call: COOP-ENERGY-2007-1-RTD

AREA ENERGY.2.7: HYDRO

In spite of the perception that the small hydro energy is a mature technology, it is not yet developed as much as other renewable sources and there are still technological challenges which should be addressed in order to develop further the technology and to exploit the remaining potential, composed mainly of low-head and very-low-head sites.

The main objective is to further improve the energy and cost-efficiency of hydropower plants, in particular smaller systems, while minimising the adverse environmental impact. There is a need for demonstration of innovative systems, equipment and design practices which could be at the same time economically and environmentally efficient. They should

be easily customised for a site-specific use. The systems should improve the reliability and efficiency with guaranteed performance. Innovative solutions which can maximise the energy production of existing plants should also be developed and demonstrated.

Expected impact: A continued increase in efficiency while reducing the environmental impact and the technology costs through innovation and learning curve effects.

Topic ENERGY.2007.2.7.1: New or improved hydro components and concepts

Content/scope: Development and laboratory testing of new or improved turbines and other components, including innovative concepts, aiming at increasing efficiency and/or lowering manufacturing costs, independent of their size. Research may also include the development of new design tools.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component.

Expected impact: to realise the highest possible power output, in both new and existing hydropower installations, while minimising operating cost.

Other information: The participation of SMEs is especially encouraged.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.2.7.2: A strategy for hydropower

Content/scope: European wide stakeholder discussion with the aim to propose research priorities, recommend an approach to implement the technology and provide a communication forum in the field.

Funding scheme: Coordination Action.

Expected impact: The action should steer innovation in the field of hydropower by focusing future RTD activities and by fostering lasting links between equipment providers, hydropower utilities and the public sector.

Other information: The participation of SMEs is especially encouraged.

Open in call: COOP-ENERGY-2007-1-RTD

AREA ENERGY.2.8: CROSS-CUTTING ISSUES

This area will cover issues common to the different renewable energy technologies such as development of combined RES systems and electricity storage system to address RES intermittency.

Topic ENERGY.2007.2.8.1: Solar irradiation resource assessment and forecasting

Content/scope: Assessment of solar irradiation in Southern Europe and Northern Africa including historic data and short-term forecasting.

Funding scheme: Support Action.

Expected impact: The results should facilitate the matching of different concepts to various solar environments, reduce the cost of integration through improved predictability, and accelerate the rate of solar energy deployment in the EU and neighbouring countries.

Other information: The participation of partners from Mediterranean Partnership Countries (MPC) is encouraged.

Open in call: COOP-ENERGY-2007-1-RTD

ACTIVITY ENERGY.3: RENEWABLE FUEL PRODUCTION

Research, development and demonstration of improved conversion technologies for the sustainable production and supply chains of solid, liquid and gaseous fuels from biomass (incl. biodegradable fraction of waste), in particular biofuels for transport. Emphasis should be on new types of biofuels as well as on new production and distribution routes for existing biofuels, including the integrated production of energy and other added-value products through biorefineries. Aiming to deliver ‘source to user’ carbon benefits, research will focus on improving energy efficiency, enhancing technology integration and use of feedstock. Issues such as feedstock logistics, pre-normative research and standardisation for safe and reliable use in transport and stationary applications will be included. To exploit the potential for renewable hydrogen production, biomass, renewable electricity and solar energy driven processes will be supported.

The structure and content of this Activity takes into consideration the Strategic Research Agenda (SRA) of the Biofuels Technology Platform.

Policy context: this research activity would facilitate the actual implementation of the Directive on the promotion of the use of bio-fuels or other renewable fuels for transport (2003/30/EC, O.J. L125, 17/05/2003).

AREA ENERGY.3.1: FIRST GENERATION BIOFUEL FROM BIOMASS

Biodiesel (fatty acid methyl ester), bioethanol from starch and sugar crops and biomethane from anaerobic digestion of dedicated energy crops and waste streams are commercially available, however, their cost is still relative high and in comparison European based production has a higher cost that US and Brazilian based production. Activities will focus on new and innovative technologies that can maximise the energy use of process by-products and residues, increase the overall conversion efficiency to biofuels and improve significantly the energy and green house gas emissions balances. Projects may also comprise elements of demonstration of the biofuels in fleets.

Expected impact:

The results are expected to reduce significantly the overall biofuels production costs and improve the energy balance and environmental performance of the first generation biofuels and make them more competitive. These technology improvements could result in the long term utilisation of these biofuels.

Topic ENERGY.2007.3.1.1: Bioethanol from sugar and starch crops

Content/scope: Demonstration at industrial scale of bioethanol production with improved efficiencies and with particular emphasis in the energetic utilisation of the process (plant to biofuel) by-products in view of significantly reducing the cost of bioethanol to comparable international levels and improving the carbon and energy balances.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Reduced production costs for bioethanol, and improved environmental performance with higher energy and CO₂ balances.

Other information: SMEs are expected to be important contributors to such technology development.

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.3.1.2: Biodiesel from oil crops, animal tallow and used cooking oils

Content/scope: Demonstration at industrial scale of biodiesel production with improved efficiencies and with particular emphasis in the energetic utilisation of the process (plant to biofuel) by-products in view of significantly reducing the cost of biodiesel and improve the carbon and energy balances. The production of Fatty Acid Ethyl Ester and the use of the by-product glycerine as a fuel in stationary applications will also be addressed.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Reduced production costs for biodiesel, and improved environmental performance with higher energy and CO₂ balances.

Other information: Related to topic ENERGY.2007.3.3.2. SMEs are expected to be important contributors to such technology development.

Open in call: COOP-ENERGY-2007-2-TREN

AREA ENERGY.3.2: SECOND GENERATION FUEL FROM BIOMASS

Second generation biofuels comprise a range of alternatives such as lignocellulosic ethanol, syngas gas based fuels, pyrolysis-oil based biofuels and others. Activities will cover process development and system integration focusing on the conversion process, with a view to improve cost-competitiveness of biofuels while minimising the environmental impact of biofuel production. Results are expected to expand the biomass feedstock available for biofuel production, assisting the take-off of a large biofuel industry while helping to avoid food/fuel competition for the land use.

Expected impact: Technology development should bring about substantial cost reduction to pave the way for large scale production of second generation biofuels by 2020, while improving the energy balance and environmental impact of biofuel production.

Topic ENERGY.2007.3.2.1: Pre-treatment of lignocellulosic biomass for ethanol production

Content/scope: Development of new and advanced pre-treatment technologies for lignocellulosic biomasses (agricultural residues, wood, forestry residues and biodegradable fraction of municipal solid waste and perennial annual crops). Research should focus on optimising the exposure of cellulose and hemicellulose for subsequent enzymatic hydrolysis, while minimising the production of inhibitors and reducing the environmental impact of the pre-treatment. The technologies developed should improve the overall process efficiency of the whole lignocellulose to ethanol process, and optimise the pre-treatment for the production of added value bio-products in this phase or the subsequent steps. Research should include testing of the technology from lab-scale to pilot reactors.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component.

Expected impact: The results are expected to substantially reduce the cost of the pre-treatment step and improve its environmental performance.

Other information: For technology development, SMEs are expected to represent the core members of the team.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.3.2.2: New and advanced technologies for hydrolysis and/or fermentation of lignocellulosic biomass

Content/scope: Optimisation of the enzymatic hydrolysis of cellulose and hemicellulose, and/or the fermentation of the produced sugars, either as separate processes or in SSF (simultaneous saccharification and fermentation). Research should focus on one or both of the following steps:

(1) Development of new and improved enzymes (e.g. thermostable enzymes) and enzyme systems, with a view to improving the rate of enzymatic hydrolysis and enzyme recycling in the whole lignocellulose to ethanol process. Research should include both production of the improved enzymes and their testing - at laboratory scale and in a pilot reactor - on pre-treated biomasses ranging from agricultural residues to wood and forest residues, the biodegradable fraction of municipal solid waste and perennial annual crops.

(2) Development of improved yeasts and/or thermophilic bacteria aiming at increasing the ethanol yields of the fermentation of C5 and C6 sugars from hydrolysed lignocellulosic biomass. Research should address the optimisation of fermentation conditions, including the effect of the degradation compounds on fermentation.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component.

Expected impact: The results are expected to substantially reduce the cost of lignocellulosic ethanol production.

Other information: For technology development, SMEs are expected to represent the core members of the team.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.3.2.3: High purity syngas cleaning technologies for biofuels

Content/scope: Development and pilot-scale testing of new and advanced gas cleaning and conditioning technologies to obtain a high purity syngas with the required standards for catalytic conversion processes for the production of biofuels. Research could include the development of analytical methods to measure the concentration of contaminants in relation to the required purity standards. Optimal treatment of the waste streams, including water, should be considered.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component.

Expected impact: The results will minimise the risk of catalyst poisoning and reduce the environmental impact of gas cleaning and conditioning technologies.

Other information: SMEs are important in the innovation process for this topic.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.3.2.4: Biological conversion of syngas into liquid biofuels

Content/scope: Development of new biological methods for conversion of synthesis gas (CO, CO₂ and H₂) into alcohols and other organic compounds by novel biocatalysts and fermentation techniques.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component.

Expected impact: Results are expected to bring about new processes with higher stability, milder reaction conditions and improved energy balance.

Other information: For technology development, SMEs are expected to represent the core members of the team.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.3.2.5: Synthetic biofuels via gasification

Content/scope: Demonstration at industrial scale of synthetic biofuels from lignocellulosic biomass (and its derivatives such as black liquor and flash pyrolysis bio-oil), with emphasis in the production of clean synthesis gas and the final synthetic fuel process steps. The final output of this demonstration should lead alternatively to one of the following final products: DME, methanol, ethanol, Fischer-Tropsch biofuel or biomethane. The methanol could also be used for hydrogen production; the ethanol for both CHP applications and hydrogen production. The final biofuel should also be tested in appropriate engines and/or vehicles and/or fleets in order to check technical standards, commercial possibilities and engine compatibilities.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: New types of biofuels production processes with significantly improved energy and environmental performance.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.3.2.6: Hydrogenation of oils and fats

Content/scope: Demonstration at industrial scale of the production path: oil crops/oil extraction (or used cooking oils, fats)/hydrogenation/ diesel type biofuel, with emphasis in the hydrogenation step. The final liquid diesel type biofuel could also be used for CHP or heating applications. The final diesel type biofuel should also be tested in appropriate engines and/or vehicles and/or fleets in order to check technical standards, commercial possibilities and engine compatibilities.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: New diesel type biofuel production process with significantly improved energy and environmental performance.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.3.2.7: Identifying research needs and technological opportunities for biofuels production in Latin America

Content/scope: Mapping of Latin America (LA) biofuels sector and its research capacities and assessment of the related opportunities and RTD needs. The analysis of research expertise/capacities and innovation potential should focus on biomass conversion technologies taking into consideration sustainability aspects and adaptation to local conditions. Ongoing bilateral cooperation should also be taken into account.

Funding scheme: Support Action.

Expected impact: The results are expected to increase awareness about EU-LA opportunities for collaboration in the area of biofuels and propose suitable areas for cooperation.

Other information: *This is a Specific International Cooperation Action.* Preference will be given to regional approaches including countries having a S&T bilateral agreement with the EU and/or specific arrangements. Relevant LA stakeholders, such as a research centres, universities, biofuel producers, should have a leading role.

Open in call: COOP-ENERGY-2007-1-RTD

AREA ENERGY.3.3: BIOREFINERY

The biorefinery concept aims at maximising the value derived from biomass feedstock by using all of its components. A biorefinery is a processing plant which integrates biomass

fractionation and conversion processes to produce energy (fuels, power, and heat) and bioproducts (chemicals and/or materials). Activities will focus on the development of (i) advanced fractionation and conversion technologies (ii) advanced biorefinery concepts and (iii) stand-alone biorefinery concepts. Demonstration will focus on most promising biorefinery concepts.

Expected impact:

The results are expected to expand the range and volume of bioproducts on the market and to improve the economics of biorefinery plants, while optimising their energy and environmental performance to enhance the cost-competitiveness of biofuels. Deployment of integrated biorefineries is expected beyond 2020.

Topic ENERGY.2007.3.3.1: Forest-based biorefinery

Content/scope: Development of advanced fractionation and conversion technologies to be integrated in a pulp mill for the combined production of new bioproducts and biofuels (solid and/or transport fuels by fermentation or syngas route) from forest-based biomass and mill residues. project should include development from lab scale to pilot plant. The optimised integration of the developed technologies in a pulp mill should be covered. Research could address: extracting hemicelluloses before pulping for the production of fuels and bioproducts, extraction of chemicals from black liquor, syngas route to fuels and chemicals from forest biomass and mill residues.

Funding scheme: Collaborative project (expected to be larger size) with a predominant R&D component.

Expected impact: The results are expected to maximise the renewable energy output from existing pulp mills, thus optimising the economics of the whole process.

Other information: For technology development, SMEs are expected to represent the core members of the team.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.3.3.2: New uses for glycerine in biorefineries

Content/scope: Development of innovative conversion technologies for the conversion of glycerine into new bioproducts. Novel conversion of glycerine into transport biofuels may be included. The optimised integration of the developed technologies in a biodiesel plant should be addressed. The proposal should involve process development and tests from lab-scale to pilot plant.

Funding Scheme: Collaborative project (expected to be small-medium size) with a predominant R&D component.

Expected Impact: The results are expected to maximise the renewable energy output from biodiesel plants, thus optimising the economics of the biodiesel process.

Other information: Related to topic ENERGY.2007.3.1.2. For technology development, SMEs are expected to represent the core members of the team.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.3.3.3: Developing biorefinery concepts

Content/scope: Development of advanced biorefinery schemes to be integrated into existing industrial complexes, such as sugar/starch ethanol plants, oil-seed crushing/trans-esterification plants, pulp and paper mills, oil refineries. Feasibility studies should identify the optimal integrated schemes of production and the best suited “building blocks” in term of processes and bioproducts. The analysis should consider optimal uses of the side-streams, innovative fractionation and conversion technologies, most promising bioproducts

and maximising energy production. Simulation tools will be necessary to support the analysis, which should focus on a particular biomass sector, and should identify the main technological challenges for the realisation of the developed schemes.

Funding scheme: Support Action. More than one may be funded.

Expected impact: The analysis will identify opportunities for various biomass-based sectors to produce fuels while increasing their competitiveness.

Other information: SMEs are important in the innovation process for this topic.

Open in call: COOP-ENERGY-2007-1-RTD

AREA ENERGY.3.4: BIOFUELS FROM ENERGY CROPS

The existing conventional crop schemes are far advanced but the entire process chain including planting, harvesting, logistics, and upgrading to a quality feedstock still requires integrated technological improvements to increase productivity and yields. The same is true for novel crops and cropping schemes such as short rotation coppice, Miscanthus and perennial grasses as well as other innovative energy crop schemes (e.g. for anaerobic digestion). Particular attention has to be paid to sustainable feedstock production, feedstock quality according to customer needs, minimised feedstock cost, and the regional/climatic fit of the entire process chain.

For this Area, no topics are open in calls published in 2007.

AREA ENERGY.3.5: ALTERNATIVE ROUTES TO RENEWABLE FUEL PRODUCTION

The activities will explore alternatives to fuel generation from biomass such as using renewable electricity to produce carbon-neutral hydrogen and solar radiation to fuel generation through thermo-chemical and non-thermal processes.

Expected impact:

Results are expected to (i) provide in-depth fundamental and technological knowledge as a basis for future development and (ii) bring innovative fuel production processes closer to pilot plant demonstration.

Topic ENERGY.2007.3.5.1: Fuel production using solar radiation

Content/scope: Research aiming at a validation at small scale of a photoelectrochemical or a biomimetic conversion concept as a future production mechanism for fuel.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant visionary research component.

Expected impact: The research will bring in-depth fundamental and technological knowledge of importance for future development.

Other information: *This is a 'Future and Emerging Technologies topic'.*

Open in call: COOP-ENERGY-2007-1-RTD

AREA ENERGY.3.6: BIOFUEL USE IN TRANSPORT

The objective is to prove and further improve the technical reliability, energy effectiveness, environmental and societal benefits of biofuels as fuel for vehicles: pure or added to or blended with fossil fuels.

Expected impact: The expected impact is to accelerate market penetration and to reduce cost associated with implementation of new technologies and to provide inputs for EU policy.

Topic ENERGY.2007.3.6.1: Demonstration of liquid and gaseous biofuels use in transport/ vehicles

Content/scope: Medium scale fleets demonstration with particular attention to pure biofuels, high blends and to the introduction of new technologies such as the combination of electric hybrid technologies are intended. Biofuels derived from innovative production processes and innovative ways of use will be considered more valuable.

Funding scheme: Collaborative project. Medium-scale focused project with a predominant demonstration component.

Expected impacts: 1) To widen the range of biofuel use for vehicles 2) Contribution to a more sustainable, less fossil depending fuel distribution for the transport sector. 3) To facilitate the introduction of new car biofuel technologies.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

AREA ENERGY.3.7: CROSS-CUTTING ISSUES

Activities will focus on assessing and optimising the availability of biomass resources and biomass supply chains, feedstock logistics, market uptake, pre-normative research and harmonised methodologies.

Expected impact:

The results are expected to facilitate the expansion of renewable biofuel production in Europe.

Topic ENERGY.2007.3.7.1: Harmonisation of biomass resource assessment

Content/scope: Coordination of research activities in order to develop a common methodology for gathering information on biomass potential using terrestrial and earth observations, and for gathering and disseminating this information.

Funding scheme: Coordination Action.

Expected impact: A harmonised approach is expected to bring a better understanding and classification of the potential of biomass use for bioenergy in the EU. Accessing a reliable and common dataset on biomass potential will offer a more efficient use of the available biomass feedstock and a better monitoring of sustainability as well as competitiveness aspects.

Other information: The participation of partners from Eastern Europe and Central Asia (EECA) and Western Balkan Countries (WBC) is especially encouraged.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.3.7.2: Marine biomass

Content/scope: Biomass feedstock from marine origin is marginally exploited nowadays. The objective is to carry out an evaluation of the current technologies for marine biomass production and conversion to biofuels and to identify the major challenges and opportunities for the exploitation of marine biomass for biofuel production.

Funding scheme: Support Action.

Expected impact: The information gathered in this study will serve as an input for future research activities on marine biomass.

Other information:

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.3.7.3: Standardisation and sustainability issues

Content/scope: Pre-normative research and standardisation of tradable solid, liquid and gaseous biofuels. Projects may also address CEN standardisation of the existing as well as of the new biofuels. Emphasis will be given to the development of standards and certification systems for the sustainable production of biofuels for transport.

Funding scheme: Coordination and support action

Expected impact: Establishment of European commodity markets for standardised, produced solid, liquid, and gaseous biofuels.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.3.7.4: Promotion and dissemination

Content/scope: Promotion and dissemination activities aiming at facilitating the smooth penetration of biofuels in the market and public acceptance by the EU citizen. Activities should include marketing and promotion campaigns; dissemination of experiences and results from successful projects; and educational activities. Each action should set its messages in the context of the relevant associated EU policy and legislation, in coherence with the complementary non-technological programme Intelligent Energy Europe (IEE), and the rest of the Competitiveness and Innovation Programme (CIP).

Funding scheme: Coordination and support action

Expected impact: Accelerated use of innovative RES-fuel-technology.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

ACTIVITY ENERGY.4: RENEWABLES FOR HEATING AND COOLING

Research, development and demonstration of a portfolio of technologies to increase the potential of heating and cooling from renewable energy sources to contribute to sustainable energy. The aim is to achieve substantial cost reductions, increase efficiencies, further reduce environmental impacts and optimise the use of technologies in different regional conditions. Research and demonstration should include new systems and components for industrial applications (incl. thermal seawater desalination), district and/or dedicated space heating and cooling, building integration and energy storage.

Policy context: this research activity will facilitate the implementation of EU policy in this area.

AREA ENERGY.4.1: LOW/MEDIUM TEMPERATURE SOLAR THERMAL ENERGY

Expected impact: the focus of the solar thermal area will be on the following topics: i) to develop higher efficiency, and lower cost solar systems with high performing collectors (e.g. using plastic materials with high thermal and optical performances); ii) to develop small scale, high performing, low price, cooling solar thermal systems to meet the increasing demand from the tertiary and household sectors; iii) to demonstrate large scale solar thermal systems for industrial applications and sea water desalination.

Topic ENERGY.2007.4.1.1: Collector design and components

Content/scope: In order to address the segments in the temperature range of 80°C to 250°C, solar thermal collectors need to be developed to reach those temperatures with an improved absorption efficiency. Current materials used in the collectors could be replaced by new ones as e.g. by substituting glass and metals by new generations of plastics. The use of high performing plastics would decrease total cost of the equipment and would favour a more suitable mass production operation. Future developments need also to be ensured on cost effective optical coatings (reflect, transmit, absorb the light in more effective way), self cleaning and glazing materials.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Considering the potential of new materials described above, it is expected that significant cost reductions could be achieved as well as higher efficiencies and increased flexibility to use the materials to facilitate the industrial mass production.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.4.1.2: Small scale thermal cooling units

Content/scope: With increasing demand for higher comfort levels in offices and houses, the market for cooling is increasing constantly. Currently, medium to large scale thermal cooling systems are commercially available. On the contrary, the small scale devices (up to 5 to 10 kW capacity) have not yet fully entered into the market. It is therefore needed to develop novel high efficiency integrated systems (collectors - low T° cooling systems) to replace traditional electric cooling devices. R&D efforts should be devoted to sorption processes for the low temperatures operating conditions as well as for multi-stage processes.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: The anticipated benefits are mainly: in terms of environmental gains as the new sorption processes and chemicals will induce the replacement of traditional

depleting refrigerants. Another important benefit is that such cooling units are fully autonomous systems that would not need electric compressors. It is also expected that such systems might offer higher conversion performances at reduced costs.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.4.1.3: Small distributed systems for seawater desalination

Content/scope: The focus of technology developments should be on designing and demonstrating small to medium size de-centralised processes. The processes should ensure high level of reliability, and efficiency under variable heat energy supply. The new processes should exploit better the potential of membrane distillation, humidification, dehumidification stills and multi-stage solar stills. To increase the supply of clean water especially in Mediterranean areas suffering of increasing water scarcity.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: The main goal is to supply the market with new cost efficient technologies that would expand market development and ensure the supply of clean water in EU water scarcity affected zones.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.4.1.4: Large scale systems for industrial heat processes

Content/scope: The EU industrial sector requires high energy supply (30 % of total energy consumption). Currently, there is insufficient development and exploitation of large scale heat systems for industrial heat applications. Therefore, demonstration of large scale integrated systems for industrial heat/ cooling applications on the base of high-efficiency collectors (T° 80-250 $^{\circ}$ C) is necessary.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Development of high level efficiency collectors in the range of 80 to 250 $^{\circ}$ C and demonstration of large-scale deployment of solar heat for industrial heat process with substantial cost reduction potential.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

AREA ENERGY.4.2: BIOMASS

The focus of the biomass area (including the biodegradable fraction of waste) will be on the following topics: i) to improve the performances of small scale biomass boilers/stoves and their exhaust systems in order to achieve very low levels of pollutants emissions at highest efficiencies and low cost; ii) to improve the performances of small-to-medium scale combined heat-and-power plants (CHP) or combined cooling-heat-and-power plants (CCHP) on the base of a wide range of biomass and waste feed-stocks with emphasis on maximised total energy exploitation; iii) to cost-effectively convert existing industrial oil and gas boilers into biomass-fired ones; iv) to produce and use novel solid biomass fuels (e.g. energy crops or mixed pellets based on a variety of organic feedstock such as agricultural by-products) in existing biomass heating installations, incl. technical adaptation of the heating installations incl. long term demonstration.

For this Area, no topics are open in calls published in 2007.

AREA ENERGY.4.3: GEOTHERMAL ENERGY

Expected impact: the focus of the geothermal energy area will be on the following topics: i) to improve the performance of geothermal specific heat pumps (increased efficiency and competitiveness); ii) to improve the reliability and ease of maintenance of the underground heat exchanger.

Topic ENERGY.2007.4.3.1: Improved geothermal heat pumps

Content/scope: Optimise the component level design including heat transfer fluids of commercial geothermal heat pumps. The aim is to increase the coefficient of performance of the heat pump in order to reduce the electricity consumption and extend its usage in Europe and particularly to the Mediterranean regions where this technology has not gained ground in a massive manner. The increase of efficiency will reduce operating costs and reduce pay-back time.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Reduce total cost (investment, operation and maintenance costs) of geothermal heat supply.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.4.3.2: Improved underground systems

Content/scope: Development of components which are easy to connect and disconnect from the surface. It is important to further progress with this technology as the geothermal heat pump has important components below the surface. The installation and repair costs which are a sizable part of the installation will be greatly reduced allowing sector to increase market share as well as progress in reliability.

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Robust, reliable and low-maintenance geothermal heat pump systems.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

AREA ENERGY.4.4: CROSS-CUTTING ISSUES

The focus of cross-cutting issues will be as follows: i) to develop testing procedures, standards and labels for components and modular systems; ii) to develop cost-efficient and reliable combined RES/RES hybrid systems; iii) to demonstrate new compact and cost effective advanced heat or cold storage systems with higher energy density than water and water/glycol mixtures. Medium-to-long term thermal storage systems are of particular interest. iv) to pursue comprehensive impact assessments of future developments in the renewables for heating and cooling sector; v) to promote and disseminate innovations in the renewables for heating and cooling sector.

Topic ENERGY.2007.4.4.1: Advanced compact storage systems

Content/scope: For RES heating/cooling applications (especially for solar thermal and biomass CHP/CCHP), it is necessary to demonstrate new compact and cost effective advanced heat storage systems with higher energy density than water/ water glycol mixture. The future technologies of thermal storage might make it possible to use the surplus RES-heat of the summer to cover the high demand in the winter season. Compact thermal storage systems should provide significant reduction of the storage volumes and the related costs. Develop/ demonstrate advanced insulation & storage materials/ processes (thermo-chemical).

DRAFT – NOT FOR PUBLICATION

Funding scheme: Collaborative project with a predominant demonstration component.

Expected impact: Improve storage performances to allow time independent storage cycles and reduce cost of storage.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Draft

ACTIVITY ENERGY.5: CO₂ CAPTURE AND STORAGE TECHNOLOGIES FOR ZERO EMISSION POWER GENERATION

Research, development and demonstration of technologies to drastically reduce the adverse environmental impact of fossil fuel use aiming at highly efficient and cost effective power and/ or steam generation plants with near zero emissions, based on CO₂ capture and storage technologies, in particular underground storage.

Areas and topics in the two partly complementary activities ENERGY.5 and ENERGY.6 are based on previous actions initiated under the 5th and 6th framework programmes and take into account results as well as work under way. Their common aim is to enable the arrival of an integrated technological solution allowing for zero emission power generation from solid fuels. Priorities have also been determined in accordance with those identified by the work of the Technology Platform for zero emission, with a view to getting to the vision established by the ZEP platform of having integrated solutions for zero emission fossil fuel based power available by 2020. This requires large scale demonstration in place by 2015 at the latest.

Besides this common aim, each activity also includes particular priorities of its own merit which can be seen as parallel, although not unrelated, to the aim of an integrated solution for zero-emission power generation.

The activities under the Framework Programme must also be seen in complementarity with those carried out by the Research Fund for Coal and Steel. Following a Protocol annexed to the Treaty of Nice, the RFCS disposes of own budgetary means outside the Framework Programme, part of which are used to fund coal research activities ranging from coal mining to coal conversion and coal combustion/applications.

Expected impact:

The development of more cost effective zero emission fossil fuel based power plants would enable the use of fossil fuel reserves with a substantially reduced environmental impact, in particular in terms of greenhouse gas emissions. The same capture techniques would often also be applicable to other energy intensive industries.

The development of safer storage techniques, monitoring and verification techniques for geological storage would enable the large scale deployment of zero emission fossil fuel power plants with a wide public acceptance. It would also enable the qualification of such plants into the European Emission Trading Schemes or indeed into any other form of incentivising scheme.

The development of clean coal technologies with a view to delivering zero emission would enable the wider use of indigenous coal and lignite resources, as well as widely abundant traded coal, compatible with the environment.

All these actions would put the European industry in these sectors in a better competitive position for markets in the EU and outside, in a carbon-constrained world.

AREA ENERGY.5.1: CO₂ CAPTURE

Projects in this area should optimise and develop capture techniques for both greenfield and retrofit power generation applications.

Expected impact:

Optimisation and redesign work in this area should allow to decrease the cost of capture down to about 15€ per ton of CO₂. Such a drastic decrease of the penalty associated with

capture would allow zero emission fossil fuel plants to better compete with other zero emission technologies.

Topic ENERGY.2007.5.1.1: Advanced pre-combustion capture techniques

Content/scope: Work based on the on-going FP6 projects work, looking specifically at the pre-combustion techniques which are not taken forward by FP6 projects to a pilot plant phase. Developments are required for retrofit and new-built application, using solvents, membranes, to separate CO₂ from gas streams containing mostly but not only CO and H₂. Work is also required on oxygen separation techniques, notably on the ceramic auto-thermal recovery technique and other non-cryogenic techniques. The applicability of these advanced capture techniques to other energy intensive industries should also be envisaged.

Funding scheme: Collaborative project (expected to be larger size), with a predominant research component, leading to one or more pilot plants.

Expected impact: Developments must be pursued to further reduce the cost of CO₂ capture from large power generation plants to less than 15 € per ton captured. It is expected that these developments could contribute and are made in conjunction with large scale plants which are emerging in Europe.

Other information:

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.5.1.2: Fluid bed based capture techniques

Content/scope: research and development of the many schemes where fluid bed reactors are used to capture CO₂ from fossil fuel combustion, notably those based on the principle of chemical looping. The different schemes should be screened and the most promising one(s) taken to pilot plant to test the bed behaviour, the material degradation mechanisms, and detect any feeding, attrition or deactivation problems usually associated with these techniques.

Funding scheme: Collaborative project (expected to be small-medium size), with a predominant research component, with the objective to establish a pilot plant scale activity. Only one is expected to be funded.

Expected impact: Advances in fluid bed combustion techniques would allow CO₂ capture in niche markets for some of the most difficult solid fuels (high ash content, etc) and they would provide a general mechanism for some advanced CO₂ capture techniques like chemical looping.

Other information:

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.5.1.3: Advanced separation techniques

Content/scope: Work is required to develop new separation techniques outside of the main line of thinking, to capture CO₂ from flue gases and from stream containing CO and H₂, and to separate oxygen from the air. This requires work in membranes, permeable and active, transport and reactive membranes, ceramics and other new materials specifically for the purpose of gas separation at large scale. Work is also required on the integration of such new equipment and techniques in power generation or hydrogen generation plants. For post-combustion capture, work is required to develop further the existing solvents, test them, and integrate the capture process with the rest of the power plant in order to improve the overall efficiency, both for new and retrofit applications.

Funding scheme: Collaborative project (expected to be small-medium size), with a predominant research component.

Expected impact: New and highly innovative CO₂ separation techniques must be investigated. Emerging techniques, new ideas, developed outside of the mainstream thinking, assessed and compared to the mainstream techniques would allow to decrease the cost of capture to the order of 15€/ton and compete with more standard post- and pre-combustion capture techniques.

Other information: The participation of SMEs is especially encouraged in this topic.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.5.1.4: Separation techniques in gaseous fuel power generation (RTD)

Content/scope: Work based on the on-going FP6, looking at specifically at the pre-combustion techniques which FP6 projects do not take forward for a pilot plant phase, and building on the work done by CACHET. Developments are required for retrofit and new-built application, using solvents, membranes, to separate CO₂ from gas streams containing mostly but not only CO and H₂. Work is also required on non-cryogenic oxygen separation techniques. The applicability of these advanced capture techniques to other energy intensive industries should also be envisaged.

Funding scheme: Collaborative project (expected to be small-medium size), with a predominant research component. Only one is expected to be funded.

Expected impact: Developments must be pursued to further reduce the cost of CO₂ capture from large power generation plants to less than 15 € per ton captured. These developments can be made in conjunction with the large scale private initiatives which are emerging in Europe and would allow them to better compete with other low greenhouse gas technologies.

Other information:

Open in call: COOP-ENERGY-2007-1-RTD

AREA ENERGY.5.2: CO₂ STORAGE

Projects in this area should address the safety of geological CO₂ storage at all timescales, the liability issues, for different kinds of CO₂ storage underground, e.g. saline aquifers, depleted oil or gas fields, enhanced oil or gas recovery, enhanced coal bed methane.

Expected impact:

It is expected that this will give full confidence in geological CO₂ storage and will form the basis for the legal and regulatory requirements allowing the deployment of large scale near zero emission power generation technology using underground CO₂ storage.

Topic ENERGY.2007.5.2.1: Development of a suitable methodology for the qualification of deep saline aquifers for CO₂ storage

Content/scope: Development of a suitable methodology (seismic testing, exploratory drilling, etc) to assess the quality of a given site for geological storage. The aim will be to develop a common generic methodology to address the various criteria put in place by the regulatory authorities with the ultimate view of satisfying the certification criteria that they will enforce.

Funding scheme: Collaborative project (expected to be larger size), with a predominant research component.

Expected impact: Such a project will deliver site qualification methodologies which will feed into the regulatory process for site qualification. This will ultimately contribute to the use of deep saline aquifers for CO₂ storage in Europe, and therefore ease the penetration of fossil fuel based zero emission power plants.

DRAFT – NOT FOR PUBLICATION

Other information: It is envisaged that such a project could be developed in connection with one or more of the specific sites for CO₂ storage emerging in Europe, where a deep saline aquifer could be used for the storage part. Cooperation is encouraged with organisations from the member countries of the Carbon Sequestration Leadership Forum.

Open in call: COOP-ENERGY-2007-1-RTD

Draft

ACTIVITY ENERGY.6: CLEAN COAL TECHNOLOGIES

Research, development and demonstration of technologies to substantially improve plant efficiency, reliability and cost through research, development and demonstration of coal and other solid fuel conversion technologies producing also secondary energy carriers (including hydrogen) and liquid or gaseous fuels. "Clean coal" in this context really means a sustainable coal value chain with a focus on coal utilization, use, i.e. coal use aiming at zero or significantly reduced emissions by means of enhanced plant efficiency and CO₂ capture and storage.

Areas and topics in the two partly complementary activities ENERGY.5 and ENERGY.6 are based on previous actions initiated under the 5th and 6th framework programmes and take into account results as well as work under way. Their common aim is to enable the arrival of an integrated technological solution allowing for zero emission power generation from solid fuels. Priorities have also been determined in accordance with those identified by the work of the Technology Platform for zero emission, with a view to getting to the vision established by the ZEP platform of having integrated solutions for zero emission fossil fuel based power available by 2020. This requires large scale demonstration in place by 2015 at the latest.

Besides this common aim, each activity also includes particular priorities of its own merit which can be seen as parallel, although not unrelated, to the aim of an integrated solution for zero-emission power generation.

The activities under the Framework Programme must also be seen in complementarity with those carried out by the Research Fund for Coal and Steel. Following a Protocol annexed to the Treaty of Nice, the RFCS disposes of own budgetary means outside the Framework Programme, part of which are used to fund coal research activities ranging from coal mining to coal conversion and coal combustion/applications.

Expected impact:

The development of more cost effective zero emission fossil fuel based power plants would enable the use of fossil fuel reserves with a substantially reduced environmental impact, in particular in terms of greenhouse gas emissions. The same capture techniques would often also be applicable to other energy intensive industries.

The development of safer storage techniques, monitoring and verification techniques for geological storage would enable the large scale deployment of zero emission fossil fuel power plants with a wide public acceptance. It would also enable the qualification of such plants into the European Emission Trading Schemes or indeed into any other form of incentivising scheme.

The development of clean coal technologies with a view to delivering zero emission would enable the wider use of indigenous coal and lignite resources, as well as widely abundant traded coal, compatible with the environment.

All these actions would put the European industry in these sectors in a better competitive position for markets in the EU and outside, in a carbon-constrained world.

AREA ENERGY.6.1: CONVERSION TECHNOLOGIES FOR ZERO EMISSION POWER GENERATION

Projects in this area should address the necessary research, development and demonstration of conversion technologies required for solid fuels, coal and lignite, including co-utilisation of biomass, with a view towards zero emission power generation. Work is required on the

mainstream technologies, pulverised fuel combustion, gasification, as well as on the application of fluidised bed technologies. Work is also required on poly-generation based on coal.

Pulverised coal will remain competitive if the ultra-supercritical steam conditions can be made reliable and affordable. Integrated coal gasification combined cycles need to be made more reliable, affordable, and are an obvious route to zero emission, as are fluid bed schemes. The development of poly-generation based on coal would enable coal to play a greater role in terms of energy security by addressing the transport sector.

Expected impact:

The development of both coal gasification and ultrasupercritical coal combustion will enable coal to play a greater role in the EU power generation sector, thereby helping the EU supply security. Ultrasupercritical coal plants will be deployed more widely because of their efficiency advantage over subcritical plants, and integrated coal gasification plants will be adopted because of an increased efficiency and reliability compared to the present units. This would allow a easier deployment of zero emission plants, since gasification units are natural candidates for CO₂ capture.

Topic ENERGY.2007.6.1.1: Solid fuel gasification development – improvement of gasifier technologies

Content/scope: Comparative study to identify the most promising gasification technologies for subsequent CO₂ separation, and to help develop a variant of this technology to ease separation. The quenching and cooling techniques of the gasifier, as well as the feed ratios (oxygen, steam, fuel) must be adapted in order to provide a synthesis gas suitable for CO₂ capture. The variability of solid fuels (coal, lignite, biomass co-firing, others) must be taken into account in this work, as well as the integration of the gasification technology equipment into the power plant. Biomass co-gasification issues should be addressed. Attention must be given to the reliability and availability issues associated with the gasification technology itself, and with the integration between the gasification and gas treatment and separation plants and the power generation island. In first place, a more robust, efficient and reliable coal gasification technology is needed, therefore gasifier operation (coal, gas and slag handling, heating, quenching and cooling regimes), de-dusting systems (advanced cyclone and filter systems), gas cleaning (wet scrubbing and gas stripping, sulphur removal) must be considered.

Funding scheme: Collaborative project. It is envisaged to fund one small or medium-scale focused research project on a comparative study on gasification systems.

Expected impact: Solid fuel gasification techniques must be developed with a view to fuel flexibility as well as zero emission power generation. All the existing gasification technologies were conceived long ago, some of them are more suitable than other for subsequent separation. Gasification technologies are one of the more promising routes to near zero emissions fossil fuel based power plants.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

AREA ENERGY.6.2: COAL-BASED POLY-GENERATION

Work will cover the efficient conversion of coal into secondary energy carriers including hydrogen as well as gaseous or liquid fuels, possibly coupled with the production of power

and/or heat. Conversion processes based on gasification, liquefaction should be envisaged, coupled with CO₂ capture and storage, as these schemes are only sustainable if the carbon is captured.

Expected impact:

The development of coal-based poly-generation concepts for coal fired power plants will allow coal to play a greater role in the EU energy sector. Coal would provide primary energy to supply other sectors than just pure power generation and also enhance the flexibility of such plants with regard to changing market conditions.

Topic ENERGY.2007.6.2.1: Poly-generation concepts for coal fired power plants

Content/scope: Research, development and demonstration of advanced conversion technologies to transform coal into combinations of electricity, heat, hydrogen or other liquid and gaseous energy carriers; coupled with CO₂ capture and storage. New pathways for secondary fuels from coal should be addressed by coal liquefaction routes apart from power generation.

Funding scheme: Collaborative project. It is envisaged that one up to one small or medium-scale focused research project could be funded, which would be a feasibility study for a subsequent phase.

Expected impact: Efficient and reliable coal conversion technologies into gaseous or liquid energy carriers coupled with CO₂ capture and storage will enable coal to play a vital role as a primary energy source for the transport sector in a carbon constrained environment.

Other information: Collaboration with Chinese organisations is desired in this project within the framework of the Memorandum of Understanding between the EU the People's Republic of China on Zero Emission Power Plants, specifically on coal to liquid technologies. Interested parties are advised to contact the Ministry of Science of the People's Republic of China prior to submitting a proposal.

Open in call: COOP-ENERGY-2007-2-TREN

CROSS-CUTTING ACTIONS BETWEEN ACTIVITIES ENERGY.5 AND ENERGY.6 (Activity ENERGY.5&6)

This Section includes areas and topics that are cross cutting between "CO₂ capture and storage for zero emission power generation" and "clean coal technologies", which in many ways are complementary activities.

AREA ENERGY.5&6.1: POWER GENERATION TECHNOLOGIES FOR INTEGRATED ZERO EMISSION SOLUTIONS

Projects in this area should address complete power plant concepts, using fossil fuels, and aiming at zero emissions through high-efficiency conversion technologies coupled with CO₂ capture and storage. This requires a holistic approach to the issues associated with power plant simulation, design and optimisation. Work is required to improve power plant efficiency, reliability and costs. Fuel flexibility and products flexibility are also important.

Expected impact:

Zero emission plants concepts with overall net efficiencies higher than 55% for gas and higher than 45% for coal should be developed, with reliabilities comparable to current technology, and total costs below 15€ per tonne of CO₂ avoided. This would allow the deployment of fossil fuel based zero emission power plants in Europe in line with the recommendations of the zero emission platform.

Topic ENERGY.2007.5&6.1.1: Feasibility study and development of an integrated solution for a large scale zero emission fossil fuel power plant

Content/scope: Work is required to continue and take further the pre-feasibility study work carried out by the FP6 projects. A feasibility study for a large scale fossil fuel based zero emission plant will comprise technical design, planning, siting, integration, economic appraisal and environmental impact studies and/or development. This will be done for the technology recommended by FP6 projects on one of the sites identified. Work is required to carry out the engineering studies of an integrated fossil fuel zero emission power plant based on the work developed in all the FP6 projects and the parallel FP7 projects. This should cover the CO₂ capture equipment, transport, storage site development, as well as the required engineering work for the power generation island of the plant. The technological solution should combine the results of the "clean coal" research in conversion technologies with the research of CO₂ capture and storage in power generation to deliver an integrated solution allowing for the construction of zero-emission power stations.

Funding scheme: Collaborative project (expected to be larger size), with a predominant research component.

Expected impact: The project is expected to contribute to the first of its kind large scale demonstration plant in Europe able to produce electricity and hydrogen from fossil fuels with near zero CO₂ emissions. The integration of capture, transport and storage techniques must be done with the rest of the power generation plant and equipment. This is required to make sure that the overall plant has the best possible performance in terms of efficiency, cost and reliability. The project will also provide the basis for future large scale demonstration projects.

Other information: International Cooperation depending on the progress of the implementation of the MoU EU-China, the participation of Chinese organisations in this project may be envisaged. Interested Chinese partners are strongly recommended to contact MOST before preparing or submitting proposals.

Open in call: COOP-ENERGY-2007-1-RTD and/or COOP-ENERGY-2007-2-TREN

AREA ENERGY.5&6.2: CROSS CUTTING AND REGULATORY ISSUES

Projects in this area should contribute to address general economic, social, environmental and infrastructural development issues essential to the large scale commercial deployment of CCS technologies. Results should contribute to prepare a regulatory framework for CCS technology in the EU, addressing the relevant issues as identified in the report of the ECCP2 that is planned to be taken forward in the upcoming Commission Communication on CO₂ capture and storage. Research will also identify, assess and recommend ways to overcome non-technical barriers relative to the deployment of CCS.

Projects in this area should also address the pre-regulatory issues associated to the planned Commission Communication on sustainable coal technologies for zero emission power prepared as part of the follow up of the Energy Green Paper of March 2006.

Expected impact:

Projects in these areas will provide support for the international cooperation actions in activities 5 and 6, as well as for non-community research activities, notably those carried out in the Member States. This will deliver a better coordination, of both the European activities (Commission and Member States) and of the European activities with the international ones, avoiding duplication of efforts and aligning priorities.

Topic ENERGY.2007.5&6.2.1: Support to regulatory activities for CO₂ capture and storage

Content/scope: Work is required to support the making of a suitable regulatory framework for the large scale deployment of CO₂ capture and storage technologies in zero emission power plants. This should address safety and liability issues, site qualification and certification, incentivisation mechanisms, including inclusion in the Emission Trading Scheme and Kyoto Flexible Mechanisms (Clean Development Mechanisms, Joint Implementation and International Trading Scheme) as well as other societal and economic aspects.

Funding scheme: Support Action. More than one may be funded.

Expected impact: The safety of storage, at all timescales, must be ascertained. This must be made in view of future regulations, legislation and standards which will allow CO₂ storage to qualify in the emission trading scheme and in other EU and international CO₂ inventory schemes, based on the Kyoto Flexible Mechanisms (Clean Development Mechanisms, Joint Implementation and International Trading Scheme). Many large storage sites in operation or planned are in the immediate vicinity of large oil and gas fields (Sleipner, In Salah, Snohvit), where the geological data required in order to properly qualify the storage site were obtained as a by-product of the oil and gas exploration.

Other information: The involvement of SMEs is particularly encouraged in this topic. All work must be done in the spirit of the ECCP II exercise and the planned follow-up Commission Communication on CO₂ capture and storage. International collaboration is strongly recommended for this topic, especially with member countries of the Carbon Sequestration Leadership Forum, and more specifically with the largest emerging economies, namely China, India, Brazil, South Africa.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.5&6.2.2: Support to regulatory activities for zero emission power generation

Content/scope: work is required to support the making of a suitable regulatory framework for the large scale deployment of zero emission coal power plants. Work will support the

Commission Communication on sustainable coal technologies for zero emission power prepared as part of the planned follow up of the Energy Green Paper of March 2006.

Funding scheme: Support Action. More than one may be funded.

Expected impact: Projects in this topic will support the efficient and environmentally acceptable use of coal based power plants in the context of the policy put forward by the Commission Communication on sustainable coal, thereby enabling coal to play its role in terms of energy security of supply and diversification of the energy sources.

Other information: The involvement of SMEs is particularly encouraged in this topic.

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.5&6.2.3: Socio-economic assessment of pathways for the deployment of CCS in Europe

Content/scope: Work is required to assess the necessary conditions that would allow the deployment of carbon capture and storage technologies in Europe, from a socio-economic, policy and public acceptance perspective. Work is also required on the necessary infrastructures to allow a large scale deployment of these technologies.

Funding scheme: Support Action.

Expected impact: Work in this topic will allow to determine the socio-economic conditions required to allow the large scale deployment of fossil fuel based zero emission technologies in Europe. This will provide useful information to feed into policy formulation further to the Commission Communications on CO₂ capture and storage coming out of the ECCP initiative and out of the Communication on Sustainable Coal.

Other information: The involvement of SMEs is particularly encouraged in this topic.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.5&6.2.4: Initiating a CO₂ value chain in the energy sector using early opportunities

Content/scope: According to current estimates, overall CO₂ volumes captured in power plants can be used as chemical feed stock at a rate of less than 7 %. Within the options of geological storage, however, it can be used initially by serving as so-called tertiary measure for extended exploitation of oil and gas fields. By this way, the overall yield of a hydrocarbon field can be increased by 5 to 15 %. Currently, this option is considered in Europe for extending the lifetime of several fields, but present experience is limited to on-shore installations with a structure of well spacing being different from off-shore installations. In a similar fashion, methane trapped in coal seams which are not mineable, can be recovered by CO₂ injection. Exploratory activities should be complementary to completed or on-going initiatives where they exist (e.g. in the North Sea). R & D efforts in studies, planning and simulation work for facilitating decision making processes for Enhanced Oil Recovery (EOR) and Enhanced Gas Recovery (EGR) schemes via CO₂ injection are envisaged.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant research component. Only one is expected to be funded.

Expected impact: Developing a new value chain for captured CO₂ from large point sources close to injection into operated oil and gas fields could extend their lifespan by ten years and more. This would enable producers to better exploit their resources and European economies to avoid or protract substantial increases in hydrocarbon imports.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.5&6.2.5: Extending the value chain for GHG emissions other than CO₂ associated with coal production and use

Content/scope: Coal production and utilization results in release of significant amounts of GHG, including methane. This comes on top of the CO₂ emissions resulting from coal combustion. Processes can be set up to recover specifically methane from the emissions associated with coal production; this methane can be subsequently utilized as a high-energy fuel or a chemical feedstock. Widespread application of such practices hinges upon further development of cost-efficient technologies and their dissemination across the coal sector worldwide. Methane recovery is similarly important in oil production where it otherwise leads to environmentally harmful practices such as gas-flaring. EU activity in the field requires further reinforcement to complement ongoing and new initiatives, including European participation in the Methane to Markets (M2M) Partnership. Dissemination actions and co-funding of pilot projects shall be supported to advance especially the transfer of European technologies to third countries through international cooperation on the recovery and use of methane as a valuable clean energy source.

Funding scheme: Collaborative project (expected to be small-medium size), aiming at the recovery and utilisation of methane from coal mining (alternatively oil production) is envisaged in support of technology transfer to less developed M2M member countries (incl. China, India, Russia etc).

Expected impact: Policy makers and industry in emerging large coal and oil producing countries will be made familiar with the technologies for methane recovery and utilization in Europe and encouraged to apply them at local coal and oil fields.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.5&6.2.6: Support to international collaboration in zero emission power generation

Content/scope: Work should cover the monitoring, coordination and reporting tasks in support of the Memorandum of Understanding between the EU and the people's Republic of China on Near Zero Emission Coal, aimed at collaboration for the demonstration in China and the EU of near zero emission generation of power and alternative fuels.

Funding scheme: Support Action.

Expected impact: Successful outcome of the exploratory phase of the MoU will pave the way for the construction in China of a demonstration plant with carbon dioxide capture and storage technology. The adoption by China and other emerging economies of CCS technology is essential for the wide use of abundant coal resources compatible with environmental constraints.

Other information: *This is a Specific International Cooperation Action.* The consortium should include in a balanced way both Chinese and European partners with solid experience and competence in the field and strong project management skills. Expertise in the international context and knowledge of China for European partners and vice-versa is important. Chinese partners interested in joining are strongly recommended to contact the Ministry of Science before engaging in proposal preparation or submission.

Open in call: COOP-ENERGY-2007-1-RTD

ACTIVITY ENERGY.7: SMART ENERGY NETWORKS

To facilitate the transition to a more sustainable energy system, a wide-ranging R&D effort is required to increase the efficiency, flexibility, safety, reliability and quality of the European electricity and gas systems and networks notably within the context of a more integrated European energy market. For electricity networks, the goals of transforming the current electricity grids into a resilient and interactive (customers/operators) service network, controlling the real time flows and removing the obstacles to the large-scale deployment and effective integration of renewable energy sources and distributed generation (e.g. fuel cells, microturbines, reciprocating engines), will necessitate the research, development and demonstration of key enabling technologies (e.g. innovative ICT solutions, storage technologies for renewables, power electronics and superconducting devices) including the development of new control and reliability tools for electricity systems. For gas networks, the objective is to demonstrate more intelligent and efficient processes and systems for gas transport and distribution, including the effective integration of renewable energy sources and the use of biogas in the existing networks.

This Activity has been structured into four Research Areas, which have been identified taking into consideration the Vision and recommendations of the Strategic Research Agenda developed within the Technology Platform SmartGrids, as well as the inputs of the existing Coordination Actions active in the area.

AREA ENERGY.7.1: DEVELOPMENT OF INTER-ACTIVE DISTRIBUTION ENERGY NETWORKS

To fully exploit the potential advantages of renewable energies, distributed generation and demand respond techniques it is necessary to re-thing the basic philosophy governing the electricity distribution systems. Distributed generation sources should not only be connected, but must be fully integrated into the distribution system. At the same time, full use must be made of the customers' demand flexibilities, and appropriate economic signals, such as real time pricing, must be developed to exploit these flexibilities. The future active network will efficiently link small and medium scale power sources with consumer demands, allowing both to decide how best to operate in real time. The level of control required to achieve this is much higher than in the present distribution systems. Power flow assessment, voltage control, protection and intelligent metering solutions require cost-competitive technologies and new communication systems with more sensors and actuators than presently seen in the distribution systems.

Expected impact:

To contribute to the penetration of renewable energies and distributed generation into the distribution grids, improving the security of supply of critical loads, increase the load factor of distribution feeders, and enable real-time electricity pricing for all network users.

Topic ENERGY.2007.7.1.1: Develop and validate innovative control strategies and network architectures for active networks with large-scale penetration of renewables sources and distributed generation

Content/scope: Research on new concepts for future active customer-integrated distribution networks and validation of most promising ones. These new concepts should enable the market based optimal exploitation of the multiple benefits of large numbers of renewables and distributed generation coupled with intelligent metering and real-time demand and

response techniques, and at the same time fulfil customer expectations. In addition, research should also cover pre-regulatory issues related to the development of decentralised energy and ancillary services markets, the efficient allocation of network costs, new business models and flexible contract management.

Funding scheme: Collaborative project (expected to be larger size). The proposal should follow an industrial driven approach and should demand a predominant research effort.

Expected impact: In line with the objectives of the EU in the areas of renewable energies, energy efficiency and functioning markets, the results of this project should demonstrate that active distribution networks have the potential to accelerate the large scale deployment of distributed generation and renewables and to significantly increase the network load factor.

Other information: The typical consortium should be a well balanced partnership between industry and research centres.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.7.1.2: Develop new tools to simulate smart distribution networks

Content/scope: Research should be aimed at the development of tools for power system analysis and dynamic simulation capable of handling active distribution networks, large numbers of power converters, flexible loads and the stochastic nature of Distributed Energy Resources (DER).

Funding scheme: Collaborative project (expected to be small-medium size). Research activities are expected to be the dominant approach. Only one is expected to be funded.

Expected impact: The tools developed in this topic will enable the effective assessment of the value of DER and facilitate future studies on the most effective method to properly integrate distributed generators and active loads in LV and MV networks, and maximise their economic value.

Other information: To address this topic, a well balanced partnership of industrial and research establishments is typically expected. International Collaboration with similar software development groups in Canada, Japan and the US is encouraged.

Open in call: COOP-ENERGY-2007-1-RTD

AREA ENERGY.7.2: PAN-EUROPEAN ENERGY NETWORKS

The Energy Green Paper 2006 identifies the need to develop a flexible single European Grid as one of the most important priorities of the EU energy policy for the next few years. A single European Grid is needed to support the proper functioning of the Internal Electricity & Gas Market, to facilitate the large scale deployment of new generation technologies, like wind power and distributed generation, to increase security of supply, to avoid black-outs and to support mechanisms of solidarity between Member States.

Expected impact:

The expected results of this area will be focused on the development of the technical and regulatory solutions necessary for the rapid establishment of a *de facto* single European Grid. This will require the development of technologies to increase the observability, controllability, stability and security of the overall system, to increase the current-carrying capacities of existing and new lines, and to strengthen the cooperation between network operators, both on research and operational issues.

Topic ENERGY.2007.7.2.1: Simulation and state estimation of smart electricity transmission networks

Content/scope: Development and validation of software tools for steady state and transient simulation and/or state estimation of trans-national grids, including the adequate modelling of new and non-linear elements, like control systems, HVDC and FACTS. Activities should also include the identification of the minimum set of data to be exchanged between the key stakeholders to allow the development of such tools.

Funding scheme: Collaborative project (expected to be larger size), with a predominant R&D component.

Expected impact. A reliable simulator and state estimator of the PAN-European electric transmission networks would be a key support tools for the functioning of the electricity market and to the deployment of bulk renewable energy sources. These tools will allow reducing safety operational margin, better understanding of the system stability, improving congestion management, development of coordinated control strategies for wide-area re-dispatch, and training of operators.

Other information: A strong involvement of European TSOs is essential for the success of the project. Furthermore, international cooperation is particularly encouraged, especially with EU neighbouring countries which are physically connected to the European grid.

Open in call: COOP-ENERGY-2007-1-RTD

AREA ENERGY.7.3: CROSS CUTTING ISSUES AND TECHNOLOGIES

This activity will cover enabling and emerging technologies and cross-cutting issues, of a technical and non-technical nature, required to support the development of the Smart Energy Networks. It will also address activities of support to the coordination of non-community research programmes.

Topic ENERGY.2007.7.3.1: Electricity network assets management

Content/scope: Improved knowledge of the natural life cycle of existing networks assets, including aging mechanisms, life-expectancy and long term functional performance, is a prerequisite for the efficient deployment of new technologies into the electricity system. Work should focus on the exchange of data and best practices, as well as on the establishment of a common data warehouse for knowledge on assets monitoring and risk analysis methods and tools.

Funding scheme: Coordination and support action, based on a well spread geographical consortium of network operators and other relevant actors.

Expected impact: Improved cooperation of network operators and the establishment of common best practices in the subject of asset management, so as to facilitate the optimal deployment of efficient and environmental friendly technologies in the perspective of the future electricity networks.

Other information:

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.7.3.2: The value of innovative storage solutions for smart networks

Content/scope: Electricity storage is a strategic enabling technology which will not only reduce costs and increase the efficient use of grid assets, but is key for accelerating the integration of distributed generation and renewable sources of energy. The work should focus on development of methodologies and tools for assessing the economic value and the strategic aspects of storage systems integrated into the electricity grids. Such tool should be

capable to evaluate and analyse energy storage solutions in a variety of applications, such as integration of distributed/renewable energy resources, reduction of peak loading on T&D equipment, improvement of transmission grid stability and reliability.

Funding scheme: Collaborative project (expected to be small-medium size), with a predominant research component. Only one is expected to be funded.

Expected impact: Research in this area will contribute to the assessment and understanding of the role and added value of energy storage solutions within the evolving electricity systems, both from economic and technical perspective.

Other information: The project consortium is expected to include research organisations, market actors, SMEs and end-users. International cooperation is encouraged for this activity.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.7.3.3: Stepping up the cooperation of national and regional research activities on Smart Energy Networks

Content/scope: activities aimed at increasing the cooperation between national and regional programmes dedicated to Smart Energy Networks, in order to promote the convergence of RTD priorities, the development and implementation of joint activities and the mutual opening up of the research programmes and national research infrastructures. For electricity, the Strategic Research Agenda (SRA) issued by the Technology Platform SmartGrids represents useful input to the identification of the potential research activities of common interest.

Funding scheme: ERA-NET Coordination and support action.

Expected Impact: This action should increase the focus, coherence and coordination of RTD activities on Smart Energy Networks in the EU.

Other information: As for other ERA-NET actions, this topic is mainly addressed to bodies managing or financing national research and innovation programmes, and not for research performers.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.7.3.4: Analysis and scenarios of energy infrastructure evolution

Content/scope: Taking into consideration the Vision of the SmartGrids Technology Platform, activities are intended to cover a thorough analysis of the prospective energy technologies and their gradual incorporation into today's transmission and distribution networks. This analysis should comprise the development of a roadmap for the coming 30-40 years outlining technology driven changes of the Europe-wide electricity and gas networks, based on different scenarios. These scenarios should include storage options, new and refitted high-voltage transmission lines, further synchronisation of national networks and should describe measures for the prevention of black-outs and cascade effects. A methodology for transmission investments on multi-national level should be derived, comparing corporate, public, national and multinational benefits and costs.

Funding scheme: Collaborative project.

Expected impact: The results should provide critical input, in terms of tools, criteria, benchmarks, for political, infrastructure and network decision makers, power distributors and should ease PAN-European approaches and harmonisation.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.7.3.5: More efficient integration of renewable energy into future infrastructures

Content/scope: Grid related scenarios of combined electricity/heat generation and electricity from renewable sources should be evaluated, predicted and compared in a time horizon 2030-2050. Advanced quantitative models should be therefore applied and further developed. The studies should address centralised and distributed options; particular emphasis has to be put on options for storage of energy in different region of the EU. Specific reference should be made to the study "Priority Interconnection Plan" issued by DG-TREN. Different network levels should be addressed:

- Regarding electricity: medium, high and very high Voltage Transmission - including renewable energy feed-in and storage;
- Regarding gas - regional, national and trans-national networks including off-shore pipelines, biogas feed-in and underground storage;
- Regarding heating systems: different regional scenarios, including district and industrial networks and heat/cold storage options.

The role and influence of new energy providers and services should be taken into account.

Funding scheme: Collaborative project.

Expected impact: Results should provide input, in terms of tools, criteria, benchmarks, for political, infrastructure and network decision makers, power distributors and should ease PAN-European approaches and harmonisation.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

ACTIVITY ENERGY.8: ENERGY EFFICIENCY AND SAVINGS

The vast potential for energy savings and improvements in energy efficiency⁵ need to be harnessed through the optimisation, validation and demonstration of new concepts and technologies for buildings, services and industry. This incorporates the combination of sustainable technologies and dynamic strategies for increased energy efficiency, the use of renewable energy and polygeneration and the integration of demand management systems at large scale in industry, cities and communities. These large-scale actions may be supported by innovative R&D addressing specific components or technologies, e.g. industrial poly-generation and eco-buildings. A key aim is the optimisation of the local community energy system, balancing a significant reduction in energy demand with the most affordable and sustainable supply solution, including the use of new fuels in dedicated fleets⁶.

Policy context: this research activity would facilitate the actual implementation of the Directive on the energy performance of buildings (2002/91/EC, O.J. L 1 of 4.1.2003), the Directive on the promotion of cogeneration based on a useful heat demand in the internal energy market (2004/8/EC, L 52 of 21.2.2004), the Directive on eco-design requirements for end-use energy-using products (2005/32/EC, O.J. L 191 of 22.7.2005) and the Directive on energy end-use efficiency and energy savings (2006/32/EC, O.J. L 114 of 27.4.2006).

AREA ENERGY.8.1: EFFICIENT ENERGY USE IN THE MANUFACTURING INDUSTRY

The manufacturing industry is consuming large quantities (percentage of primary energy) of energy - electricity, heat, cold, fuels - for the production of industrial and consumer goods; any increase in energy efficiency in the manufacturing processes would deliver significant benefits on security of energy supply as well as reduction of green house gases emissions while reducing the cost of the manufactured goods. Activities will focus on the demonstration of innovative production processes in the manufacturing industry with significant energy savings and improved environmental performance. Emphasis will be given on innovative recovery of waste heat in industrial processes and efficient management of industrial and community waste and residues while maximising the overall energy efficiency.

Topic ENERGY.2007.8.1.1: Manufacturing industry: wastes and waste heat recovery and transfer

Content/scope: Development and demonstration of medium to large scale industrial and community waste recovery technologies/systems for energy uses will be supported. Demonstration of innovative material and heat recovery technologies/systems in industrial processes and innovative heat transfer systems, integrated in the different steps of the manufacturing industry energy cycle will also be supported.

Funding scheme: Collaborative project with predominant demonstration component.

Expected impact: New or improved industrial waste and waste heat recovery processes with improved energy and environmental performance and efficient use of natural resources.

⁵ As recognised by the Green Paper on Energy Efficiency or “Doing More for Less”, COM(2005)265 of 22 June 2005,

⁶ Building upon the experience of the CONCERTO and CIVITAS initiatives supported in the 6th Framework Programme.

Other information: SMEs are expected to be important contributors to such technology development.

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.8.1.2: Manufacturing industry: SMEs energy innovation

Content/scope: Development and demonstration of innovative energy systems in SME manufacturing facilities aiming to reduce the cost and environmental impact of the various processes and maximising the overall energy efficiency and optimizing the use of natural resources.

Funding scheme: Collaborative project with predominant demonstration component.

Expected impact: New or improved SME processes and products with improved energy and environmental performance and efficient use of natural resources.

Other information: SMEs are expected to be important contributors to such technology development.

Open in call: COOP-ENERGY-2007-2-TREN

AREA ENERGY.8.2: HIGH EFFICIENCY POLY-GENERATION

Polygeneration has the objective of providing more than two energy vectors - any combination of electricity, heat, cooling, and biofuels (solid, liquid or gaseous) - for energy applications as well as materials. The overall aim is to maximise the energy efficiency of any given process and to optimise the use of natural resources. Activities will focus on the demonstration of application driven innovative poly-generation technologies for the industrial and tertiary sector. The projects should demonstrate high technical reliability and economic viability improving the market strength of the European industry. Emphasis will be given to the innovative combination of technologies and processes in existing applications which can significantly improve the overall energy efficiency of the utility (during production, distribution and use) or an industry sector. The supported projects should have high visibility and provide solutions to existing problems (such as high volatile energy prices, lack of high quality grids etc.) limiting the performance of the European industry. Priority will be given to sustainable solutions.

Topic ENERGY.2007.8.2.1: High efficiency poly-generation - applications with renewable energies

Content/scope: Poly-generation applications with RES resources for industrial and tertiary applications with emphasis in maximising the overall efficiency and optimizing the use of natural resources can improve the overall efficiency of energy systems. Attention will be given on sustainable solutions with emphasis on application driven projects.

Funding scheme: Collaborative project with predominant demonstration component.

Expected impact: New or improved poly-generation applications with renewable energy sources with improved energy and environmental performance and efficient use of natural resources.

Other information: SMEs are expected to be important contributors to such technology development.

Open in call: COOP-ENERGY-2007-2-TREN

AREA ENERGY.8.3: LARGE-SCALE INTEGRATION OF RENEWABLE ENERGY SUPPLY AND ENERGY EFFICIENCY IN BUILDINGS: ECO-BUILDINGS

Innovative integration of external energy supply with large self-supply from renewable energies and radical approaches for energy efficiency measures suited to different building types, in different climate zones and under different regional conditions will be supported. This should include design and planning, followed by the construction phase of the building and the integration of energy efficient technologies such as co-generation/tri-generation.

For this Area, no topics are open in calls published in 2007.

AREA ENERGY.8.4: INNOVATIVE INTEGRATION OF RENEWABLE ENERGY SUPPLY AND ENERGY EFFICIENCY IN LARGE COMMUNITIES: CONCERTO

An innovative integration of the external supply together with large self-supply from renewable energies and relevant energy efficiency measures in communities will be supported. An integrated design and planning process, the utility supply and construction activities of the communities as well as energy efficient technologies such as co-generation/tri-generation should be demonstrated with high EU visibility. The CONCERTO initiative will apply for both new and retrofitted communities and municipal zones, with the objective of a drastic reduction in the specific and overall consumption of energy, especially conventional energy.

For this Area, no topics are open in calls published in 2007.

AREA ENERGY.8.5: INNOVATIVE STRATEGIES FOR CLEAN URBAN TRANSPORT: CIVITAS-PLUS

(To be also covered by: Transport Work Programme SST.2007.3.4)

The objective of CIVITAS-Plus is to test and increase the understanding of the frameworks, processes and packaging required to successfully introduce bold, integrated and innovative strategies for clean and sustainable urban transport that address concerns related to energy-efficiency, transport policy, alternative fuels and the environment. This work will build upon the latest research results and incorporate past experiences of the CIVITAS Initiative. Special attention will be paid to the specific requirements of clean and sustainable urban transport in Europe's countries and regions under rapid development, aiming at economic convergence in the context of Cohesion Policy.

Expected overall impacts:

1. Increased energy efficiency in urban transport in line with EU policy.
2. Contribute to improving road safety in urban areas.
3. Increased share of bio-fuels and other alternative road transportation fuels in compliance with EU legislation.
4. Reduction of CO₂, pollutant emissions and noise in compliance with EU legislation.
5. Contribute to improving efficiency and effectiveness of urban transport and increasing modal share towards sustainable modes.

Topic ENERGY.2007.8.5.1: Testing innovative strategies for clean urban transport

(See also Topic SST.2007.3.4.1 from Transport Work Programme)

To achieve policy objectives in the fields of energy, transport, and in other relevant fields, innovative, integrated and bold strategies for clean and sustainable urban transport need to be introduced. The barriers towards change remain significant, which leads to failures in the acceptance of new and improved policies, services and technologies. Experimental testing, combined with targeted research, can help to better understand the frameworks, processes and packaging required to successfully introduce these strategies.

Content/scope: CIVITAS-Plus builds upon and adds value to the earlier experiences of the CIVITAS Initiative. This topic addresses Europe's leading and learning cities.

Leading cities

In each leading city, the existence of an ambitious local transport plan together with clear intentions, political commitment and stakeholder support are absolutely needed. The cities will test, demonstrate and evaluate the key elements of the plan in an innovation area, i.e. in one specific zone or corridor. An ambitious mix of bold tools and measures should be implemented in that aims at an increased energy-efficiency in transport, better and safer transport conditions for all, a higher share of alternative fuels and a cleaner environment.

Each city-proposal should combine, in an integrated way, tools and measures from as many as possible (but only where relevant) of the following categories that contribute to:

- Increasing the use of alternative fuels and of clean and energy efficient vehicles, and enhancing their integration into the urban transport system⁷;
- Stimulating high quality and innovative energy-efficient collective passenger transport services, including intermodal integration with other transport modes;
- Implementing demand management strategies based upon economic (dis)incentives, regulatory measures (including zoning and spatial planning), and tele-services;
- Influencing travel behaviour and modal choice through mobility management plans, marketing, communication, education and information campaigns;
- Developing safe and secure road-infrastructure and means of travel for all users;
- Introducing mobility services that promote new forms of more energy-efficient vehicle use and/or ownership and a less car-dependent lifestyle;
- Promoting efficient freight logistics services and new concepts for goods distribution;
- Enhancing the use of innovative transport telematics systems for traffic management and traveller support, including solutions based upon satellite applications/GALILEO.

⁷ Key elements of this integration are innovative energy-efficient, cost-effective and clean public and/or private vehicle fleets for passenger and/or freight transport (minimum IV standard) that use alternative fuels, and the necessary infrastructure, in particular for the storage of the alternative fuels and the specific fuelling equipment. The focus should be put on short/medium term alternatives, i.e. innovative bio-fuels and natural gas, including hybrid vehicles that use these fuels, and electric transport. A vehicle fleet is a coherent group of vehicles operated by a single operator in a single urban area.

Learning cities

A learning city is a city that is developing a policy package and wants to learn from the leading cities involved in the project. The existence of an outline plan together with clear political commitment and stakeholder support are absolutely needed. Learning cities, at the end of the project, should aim at having an ambitious integrated transport plan in place that is adapted to their local circumstances and ready for city-wide implementation. In line with the approach outlined for leading cities, small elements of this plan can be tested, demonstrated and evaluated in an innovation area as part of the plan-making process.

Consortia

Particular emphasis in this call is put on small and medium-sized cities providing clear evidence of added value. Proposals should be prepared by of city-led consortia, with each city being located in a different country. Proposals should consist of at least three leading cities of which at least one should be from one of Europe's countries and regions under rapid development, aiming at economic convergence in the context of Cohesion Policy. It may also include up to two learning cities.

This call focuses on cities that have not been involved in previous demonstration projects under the CIVITAS Initiative except for "follower cities" from previous CIVITAS projects that now want to play to a leading role. Large scale infrastructure investments will not be co-financed. The Commission may decide to cluster and/or merge successful proposals.

Funding scheme: Collaborative project.

Expected impact: For each city, conclusions and recommendations should be developed that also pay attention to indirect effects and that cover different sectorial policies. This should lead to a better understanding of the difficult choices and questions that face policy makers and politicians, as well as increased knowledge on the frameworks, processes and packaging required to successfully introduce innovative, integrated and bold strategies for clean and sustainable urban transport.

Participating cities will need to implement a robust ex-ante impact assessment and evaluation plan, based upon a do-nothing scenario, and an own local dissemination plan. These plans should fit within a common approach that will be developed and coordinated by the support actions. Active participation of all cities in the activities organised by the CIVITAS Initiative is expected. Cities will co-operate with each other and with the support actions in managing dissemination activities and in co-ordinating training activities.

Open in call: COOP-ENERGY-2007-2-TREN

AREA ENERGY.8.6: SOCIO-ECONOMIC RESEARCH AND INNOVATION

The following topics concerning socio-economic research in the field of energy efficiency will be addressed:

1. Use of models for the assessment of the overall energy performance of the ECO-Buildings and CONCERTO communities and CIVITAS cities.
2. Identification of factors related to the assessment and monitoring of the planning and implementation processes of the Ecobuildings, CONCERTO and CIVITAS projects.
3. Assessment of the relevant institutional, political, cultural, educational, organisational, financial and legal contexts necessary for successful projects.
4. Identification of human behaviour and other factors improving the outcome of the projects.

5. Assessment of the quality, social impacts, added values and risks associated with the energy services provided by each of the Ecobuildings and CONCERTO communities and CIVITAS cities.
6. Develop sustainability criteria for the industry and communities on the use of energy.
7. Evaluation of the integrative aspects promoted by the CONCERTO and CIVITAS approaches.

Topic ENERGY.2007.8.6.1: Support action for evaluation and monitoring CIVITAS-Plus

(See also Topic SST.2007.3.4.2 from Transport Work Programme)

As part of this CIVITAS-Plus call, one separate support action is envisaged to develop and undertake an independent evaluation and monitoring programme⁸

Content/scope: This support action should cover the following tasks:

1. The development and implementation of a European cross-site evaluation programme, which will consist of an impact evaluation and a process evaluation. This will be managed in full independence but in close co-operation with the demonstration cities and projects, on the basis of before and after data as well as of regular process information that will be provided by the demonstration cities.
2. In support of the European Commission, taking care of independent project monitoring and providing specialist and independent advice on the progress in the implementation of the demonstrations based upon a review of the regular technical and management reports provided by the demonstration cities to the Commission. This task might also include site visits and technical audits. This task should be undertaken in strict separation from any other activities inside or outside the support action.

The performance of the evaluation, coordination and dissemination tasks will be supported and monitored by three independent experts (the CAC). They will be appointed by the European Commission and contractually linked to this support action.

Funding scheme: Coordination and support action

Expected impact: It is expected that the project will deliver the following specific results:

- an independent cross-site evaluation programme
- independent monitoring of the implementation of the projects
- ensuring comparable city-results and identification of causal connections;
- clear European-level policy recommendations;
- contribution to the development of European expertise on the evaluation of large projects;
- the provision of specialist and independent advice to the Commission.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

⁸ Neither the partners of the consortium nor the sub-contractors should have a direct or indirect involvement in the work of the demonstration sites. Full confidentiality in the relationship with the demonstration cities should be respected.

Key elements of this integration are innovative energy-efficient, cost-effective and clean public and/or private vehicle fleets for passenger and/or freight transport (minimum IV standard) that use alternative fuels, and the necessary infrastructure, in particular for the storage of the alternative fuels and the specific fuelling equipment. The focus should be put on short/medium term alternatives, i.e. innovative bio-fuels and natural gas, including hybrid vehicles that use these fuels, and electric transport. A vehicle fleet is a coherent group of vehicles operated by a single operator in a single urban area.

AREA ENERGY.8.7: THEMATIC PROMOTION AND DISSEMINATION

In order to mobilise the above indicated technology markets and the socio-economic research and innovation, important promotion and dissemination activities are necessary. This should include marketing campaigns and the optimisation in the society of the concepts, experiences and results from new technology demonstration projects, education and market activities. Each action should set its messages in the context of the relevant associated EU policy and legislation, for example the Directives indicated in the introduction of the activity ENERGY.8, and in coherence with the complementary non-technological programme Intelligent Energy Europe (IEE), and the energy related part of the Competitiveness and Innovation Programme (CIP).

Topic ENERGY.2007.8.7.1: Promotion and dissemination

Content/scope: Promotion and dissemination activities aiming at facilitating the smooth penetration of energy saving technologies in the manufacturing industry and polygeneration sectors. Activities should include marketing and promotion campaigns, dissemination of experiences and results from successful projects; and educational activities. Each action should set its messages in the context of the relevant associated EU policy and legislation, in coherence with the complementary non-technological programme Intelligent Energy Europe (IEE), and the rest of the CIP.

Funding scheme: Coordination and support action

Expected impact: Accelerated use of innovative RES-fuel-technology.

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.8.7.2: Support action for coordination and dissemination CIVITAS-Plus

(See also Topic SST.2007.3.4.3 from Transport Work Programme)

As part of this CIVITAS-Plus call, one separate support action is envisaged to develop and implement a programme of European-level coordination, dissemination and awareness raising activities.

Content/scope: This support action should cover the following tasks:

1. The development and implementation of a European programme for dissemination and awareness raising activities, in close co-operation with the cities. This includes providing information on contents and results of the city-projects as well as promoting the CIVITAS Initiative as a whole.
2. The coordination and facilitation of certain activities that are common for all cities and demonstration projects and that will be decided after user needs assessment. This might include dissemination/evaluation liaison groups and technical working groups looking at one specific tool or measure area, and training activities.
3. Providing the secretariat of the CIVITAS Political Committee (PAC) as well as the organisation of the annual CIVITAS Forum meetings

Funding scheme: Coordination and support action

Expected impact: It is expected that the project will deliver the following specific results:

- a programme for European-level dissemination and awareness raising activities, in order to support acceptance and normalisation and to maximise policy impacts;
- coordination and facilitation of certain common activities;
- providing the secretariat of the PAC and the organisation of the annual CIVITAS Forum.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

DRAFT – NOT FOR PUBLICATION

Common information for CIVITAS-Topics ENERGY.2007.8.5.1, ENERGY.2007.8.6.1 and ENERGY.2007.8.7.2

Applicants are requested to provide a detailed breakdown of budgets and to take into account the information given under every topic that is part of this call. It is anticipated that a Memorandum of Understanding will be signed between the two support actions and the cities to formalise the co-operation and co-ordination. A separate guidance document for applicants will be prepared.

Draft

ACTIVITY ENERGY.9: KNOWLEDGE FOR ENERGY POLICY MAKING

Development of tools, methods and models to assess the main economic and social issues related to energy technologies. Activities will include the building of databases and scenarios for an enlarged EU and the assessment of the impact of energy and energy-related policies on security of supply, environment, society and competitiveness of the energy industry. Of particular importance is the impact of technological progress on EU policies.

AREA ENERGY.9.1: KNOWLEDGE TOOLS FOR ENERGY-RELATED POLICY MAKING

Creating and developing the tools, methods and models needed to provide the knowledge required for informed energy-related policy making.

Topic ENERGY.2007.9.1.1: Energy security of supply

Content/scope: Development of new methods to study, measure and assess security of energy supply in the EU energy system, including one or more of such issues as geopolitical risks, high energy prices, costs of energy interruption, common understanding of the functioning of the liberalised energy market, optimisation of the infrastructure investment, limits of cross-border capacities, accidents and impacts of terrorist attacks.

Funding scheme: Collaborative project (expected to be small-medium size) with predominant research and policy components.

Expected impact: Input for quantified measures aiming at improving energy security in Europe.

Other information:

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.9.1.2: Energy behavioural changes

Content/scope: Development and implementation of models, stakeholders participatory methods and surveys to measure social acceptability of new energy technologies. Examples of issues to be covered are behavioural changes, demographic trends, social patterns and lifestyles, gender differences, consumer preferences, cultural context, willingness and readiness to pay, reaction to demand side measures (especially for transport and building sectors) and energy education.

Funding scheme: Collaborative project (expected to be small-medium size) with a predominant research component.

Expected impact: Improved scientific basis for future EU policies related to new energy technologies.

Other information: This topic should be carried out in cooperation with Area 5.1.2, SiS.2007.Cta, "Framing deliberative processes fostering sustainable consumption and production" of the Capacities Programme Science in Society. Civil society and industrial partners are encouraged to participate.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.9.1.3: Energy technological foresight

Content/scope: Development and use of qualitative and quantitative tools, also incorporating the concept of probabilities. Sustainability and competitiveness issues should be covered. The projects should address medium and long-term scenarios and assess the impact of technology development and deployment in relation to targets in energy and

environmental policies at world and European level. The development of new databases for the energy sector can be included.

Funding scheme: Collaborative project (expected to be small-medium size) with predominant research and policy components.

Expected impact: Systematic understanding of future trends of the energy system covering the electricity, transport and building sectors with a time frame of 2050.

Other information:

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.9.1.4: Energy technology transfer

Content/scope: Development of strategies and tools aimed at a better exploitation of energy research results and the take-off of one or several new energy technologies in neighbouring and/or developing countries in connection to know-how transfer, capacity building and in the framework of the EU Emission Trading Scheme and the Kyoto Clean Development Mechanism.

Funding scheme: At least one Support Action.

Expected impact: Improved uptake of new energy technologies in neighbouring and/or developing countries.

Other information: *This is a Specific International Cooperation Action.*

Open in call: COOP-ENERGY-2007-1-RTD

AREA ENERGY.9.2: SCIENTIFIC SUPPORT TO POLICY

In the context of EU energy policy, aiming to security of supply, sustainability and competitiveness, different levels of analysis are needed to assess the potential of all energy resources, in particular from renewable energy sources, and their impacts. In particular references should be made to the regular Strategic EU Energy Review. The impact of the supply side, the technology and infrastructure developments and demand side influences should be assessed by refining, up-dating, specifying and extending energy technology models, by including energy efficiency and savings and renewable energy aspects.

Topic ENERGY.2007.9.2.1: Analysis and assessment of sustainable energy potential and impact of technology development in the framework of the security of energy supply, climate change and environmental protection

Content/scope: Assessment tools, methods and models to build medium and long-term scenarios for the enlarged Union based on the sustainable energy potentials to improve the security of energy supply and environmental protection to tackle climate change, taking into account the expected contribution of RES new technologies (pre-market to marketable technologies to produce electricity, heating/cooling, biofuels, energy carriers – such as hydrogen, energy storage, energy efficiency and sustainable coal). Scope is to develop dedicated medium long-term scenarios for market penetration of RES electricity, heating and cooling and biofuels, energy efficiency, including storage options.

Funding Scheme: Coordination and support action

Expected impact: Future development of RES contribution to the energy sector.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.9.2.2: Analysis and assessment of sustainable energy potential and impact of technology development in the society and the economy

Content/scope: Assessment tools, methods and models to build medium and long-term scenarios for the enlarged Union based on the energy potentials to improve the competitiveness of the European energy industry, create jobs and increase foreign market export opportunities. A broad economic analysis including macro and micro aspects. The aim is to develop dedicated medium and long-term scenarios concerning the potential growth of the European sustainable energy industry and innovative business, including both EU and foreign markets, in the fields of RES electricity, heating and cooling and biofuels, including storage, and energy carriers such as hydrogen.

Funding Scheme: Coordination and support action

Expected impact: Future development of European energy industry in both internal and external markets.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

Topic ENERGY.2007.9.2.3: Analysis and assessment of sustainable energy potential and impact of technology development in the context of the European Union Energy Initiative (EUEI)

Content/scope: Assessment tools, methods and models to build medium and long-term scenarios for the enlarged Union to comply with international agreements by provided concrete opportunities for cooperation with Third Countries in the field of sustainable energy.

These actions could be considered in line with the European Union Energy Initiative (EUEI) launched at Johannesburg Earth Summit (2002) or the EU Emissions Trading Scheme (EU ETS) linked to the Clean Development Mechanisms (CDM) of the Kyoto Protocol.

Funding Scheme: Coordination and support action

Expected impact: Future development of RES in the framework of international cooperation, including the alleviation of poverty.

Other information:

Open in call: COOP-ENERGY-2007-2-TREN

ACTIVITY ENERGY.10: HORIZONTAL PROGRAMME ACTIONS

The topics described in the section have a horizontal character not linked specifically to any particular technology.

Topic ENERGY.2007.10.0.1: Optimise EU action through a better coordination of the international cooperation initiatives of the EU and Member States

Content/scope: The goal of this specific action should aim at improving international cooperation on energy matters with targeted ICPC or a groups of ICPC through a better coordinated action with Member States' and Associated States' initiatives using the ERA NET scheme. The ERA NET should focus on: enhancing the collaboration/ communication amongst Member States and Community on S&T international cooperation, thus promoting an effective and efficient international scientific EU cooperation strategy at EU level; supporting the ongoing bilateral S&T cooperation initiatives of Member States and/or Associated States with third countries in order to allow broader participation from Member States and/or Associated States; Supporting the implementation of a shared vision on RTD energy strategies by facilitating innovative programmatic approaches.

Funding scheme: Coordination Action or Support Action under the ERA-Net scheme.

Expected impact: Contribute to better define the overall European strategy on S&T International cooperation and improve the efficiency of implementation.

Other information: The targeted regions for this action are China, India, Russia, LAC, MED. The participation of a partner from the targeted countries/ regions is recommended.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.10.0.2: Trans-national co-operation among NCPs

Content/scope: Reinforcing the network of National Contact Points (NCP) for the Seventh Framework Programme under the Energy Theme, by promoting trans-national co-operation. The action will focus on identifying and sharing good practices. This may entail various mechanisms such as benchmarking, joint workshops, training, and twinning schemes. Practical initiatives to benefit cross-border audiences may also be included, such as trans-national brokerage events. The specific approach should be adapted to the nature of the theme and to the capacities and priorities of the NCPs concerned. Special attention will be given to helping less experienced NCPs rapidly acquire the know-how accumulated in other countries.

Funding scheme: Co-ordination Action.

Expected impact: An improved NCP service across Europe, therefore helping simplify access to FP7 calls, lowering the entry barriers for newcomers, and raising the average quality of submitted proposals. A more consistent level of NCP support services across Europe. More effective participation of organisation from third countries, alongside European organisations, in line with the principle of mutual benefit.

Other information: The Commission expects to receive a single proposal under this heading. Proposals are expected to include all NCPs who have been officially appointed by the relevant national authorities. Other participants from the EU and associated countries are ineligible. If certain NCPs wish to abstain from participating, this fact should be explicitly documented in the proposal. Third countries may be included, where there is mutual benefit.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.10.0.3: Fostering coordination between national and European energy RTD strategies and programmes

Content/scope: This action aims at improving cooperation among Member- and Associated States in the field of energy RTD strategy making, programming implementation and assessment. Building on the experience and progress achieved in energy related ERA-NETs so far, this initiative, to be implemented also via the ERA-NET scheme, will focus on actions aimed at:

- contributing to the development of a European Strategic Energy Technology Plan;
- improving cooperation in setting up or updating energy RTD strategies by mutual information, exchange of experts and other suitable methods;
- improving synergies between Members States and EU RTD agendas;
- facilitating and enhancing cooperation in the implementation of national and EU energy RTD strategies and programmes;
- fostering cooperation in assessment and evaluation.

Activities could include :

- monitoring energy research activities at the national, EU and global levels, including the development of a common set of indicators for energy research;
- improving intelligence and facilitating the dissemination of information on energy RTD in Europe;
- facilitating the exchange of experience and information between energy research programme managers in the Member states and at the European Commission.

Funding scheme: Coordination or Support Action under the ERA-Net scheme.

Expected impact: A definite step towards the construction and consolidation of the European Research Area in Energy. Contribution to the development of a coherent European energy RTD strategy while fully respecting the independence and heterogeneity of national priorities and approaches.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.10.0.4: Development of a methodology for monitoring the expected impacts of FP7 Energy projects

Content/scope: The analysis should consider appropriate methodologies for monitoring the progress towards the objectives and outcomes of projects and broader impacts of research in the Energy work programme, including how the results will be disseminated and taken up by target users.

The following types of impacts should be considered:

Strengthening industrial competitiveness of the European industry by identifying the potential user sector(s), the type of impact (new/ improved process technologies/ products/ services etc., environmental, cost, performance improvements etc.) and mechanisms for disseminating and promoting uptake of the research;

Contributing to security of energy supply, sustainable development and addressing societal problems in terms of generating new knowledge relevant to social, environmental and economic issues;

Improving Community and public policies by disseminating knowledge generated and engaging the target users (policy makers at regional/ national/ EU/ international);

The work should propose the appropriate evidence to be collected to validate impacts and the appropriate time-scale framework for collection of such data. Consideration should be given to the potential impacts of “technology” bottlenecks or other barriers (e.g. access to finance, appropriate regulatory and market frameworks) in the process of technology deployment and ways to assess the leverage effects of EU RTD funding.

Funding scheme: Support Action

Expected impact: Generation of evidence to demonstrate the outputs, outcomes and impacts of Energy research activities in FP7.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.10.0.5: Identification, promotion and dissemination of energy research results

Content/scope: Development and implementation of a methodology for the identification, collection, synthesis and appropriate presentation for the dissemination of results from energy research projects and other activities under the FP with a view to:

- raising awareness with general public and policy decision makers of the importance of energy research;
- outreach concerned policy makers, researchers, industry and the wide public on the impact and results of Community research activities;
- develop awareness and common understanding in Europe about the EU Energy research agenda, goals and opportunities for cooperation.

Means of communications may include general and targeted paper and electronic publications, with the use of existing and newly developed distribution channels, and information multipliers, as well as the organisation of contributions to both general and more targeted events to support the exchange of information and experience relevant to Energy research.

Funding scheme: Support Action

Expected impact: Increased awareness and enhancement of the positive perception of EU funded research, enhanced value for policy makers at all levels and faster dissemination of research results to scientists.

Other information: The consortium should include publishers targeting different audiences and with a proven track record in the management and dissemination of scientific and technical information, preferably in the fields of energy and energy research.

Open in call: COOP-ENERGY-2007-1-RTD

Topic ENERGY.2007.10.0.6: The role and impact of SMEs in Energy Research Framework Programme projects

Content/scope: The objective is to investigate the role and impact of SME participation in all energy related projects in the Sixth Framework Programme. The work should identify the SMEs, their degree of participation, their role in the consortia and the technologies covered. The SME participation should be benchmarked against the SME share within the individual energy technology sectors in the EU. Results of the analysis should be explained and recommendations given for further SME oriented Community actions.

Funding scheme: Support Action

Expected impact: The results of the study will be used to focus the strategy to increase SME participation in energy related projects in the Seventh Framework Programme and beyond.

Other information:

Open in call: COOP-ENERGY-2007-1-RTD

5.3. IMPLEMENTATION OF CALLS

Call title: Energy Call Part 1

Call identifier: COOP-ENERGY-2007-1-RTD

Date of publication: December 2006/ January 2007 (*tbc*)

Closure date: April 2007 (*tbc*)

Topics called: (*as in chapter 5.2 - to be completed once finalised*)

Activity/ Area	Topics called	Funding Schemes

Evaluation procedure: the evaluation shall follow a single stage procedure; remote evaluation may be used in this call; proposals will not be evaluated anonymously. The evaluation criteria to be applied to proposals are specified in Annex 2 of the Work Programme.

Indicative evaluation and contractual timetable: evaluation May 2007 (*tbc*)

- Evaluation results: estimated to be available within some 4 months after the closure date.
- Conclusion of first contracts: it is estimated that the contracts related to this call will come into force before the end of 2007.

Indicative budget: 150 M€⁹

Consortium agreements: participants in Collaborative Projects are required to conclude a consortium agreement; participants in Coordination and Support Actions are encouraged, but not required, to conclude a consortium agreement.

Particular requirements for participation, evaluation and implementation: none

⁹ 106 M€ of this amount is from the 2007 budget; the remaining amount relates to the 2008 budget and is under the condition that the preliminary draft budget for that year is adopted without modifications by the budgetary authority.

DRAFT – NOT FOR PUBLICATION

Call title: Energy Call Part 2

Call identifier: COOP-ENERGY-2007-2-TREN

Date of publication: December 2006/ January 2007 (*tbc*)

Closure date: July 2007 (*tbc*)

Topics called: (*as in chapter 5.2 - to be completed once finalised*)

Activity/ Area	Topics called	Funding Schemes

Evaluation procedure: the evaluation shall follow a single stage procedure; proposals will not be evaluated anonymously. The evaluation criteria to be applied to proposals are specified in Annex 2 of the Work Programme.

Indicative evaluation and contractual timetable: evaluation September 2007 (*tbc*)

- Evaluation results: estimated to be available within some 4 months after the closure date.
- Conclusion of first contracts: it is estimated that the contracts related to this call will come into force before the end of 2007.

Indicative budget: 120 M€

Consortium agreements: participants in Collaborative Projects are required to conclude a consortium agreement; participants in Coordination and Support Actions are encouraged, but not required, to conclude a consortium agreement.

Particular requirements for participation, evaluation and implementation: none

5.4. INDICATIVE PRIORITIES FOR FUTURE CALLS

In 2008, the relatively small call ($\approx 50\text{M€}$) COOP-ENERGY-2008-1-RTD will focus on:

- topics complementary to those in the first call;
- areas not well covered by the outcome of the first call;
- additional topics identified as being strategically important by technology platform SRAs;
- opportunities for Future and Emerging Technologies (FET), ERA-Nets and Specific International Cooperation Actions (SICA).

The next major call for research activities having a longer term perspective will be open in 2009 (Call COOP-ENERGY-2009-1-RTD).

The call COOP-ENERGY-2008-2-TREN will be open, *inter alia*, for "Large-scale Integration of Renewable Energy Supply and Energy Efficiency in Buildings: Eco-Building" (Area ENERGY.8.3), "Innovative Integration of Renewable Energy Supply and Energy Efficiency in large Communities: CONCERTO" (Area ENERGY.8.4) and gas networks (in Activity ENERGY.7).

Draft