



## *SP1 – Priority 6-1*

### **6.1 Sustainable energy systems**

## **Work Programme**

**Revision 5 for the Energy-4 Call  
September 2005**

# 6.1 Sustainable Energy Systems

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## 6.1.1.Introduction

Europe's energy system demonstrates unsustainable patterns of development characterised by growing dependence on imported fossil fuels, rising energy demand and growing CO<sub>2</sub> emissions. These unsustainable patterns are exacerbated in key sectors like buildings and transport that are intimately linked with the quality of life of European citizens. The challenge is to alleviate and reverse these adverse trends to achieve a truly sustainable energy system, while preserving the equilibrium of ecosystems and encouraging economic development.

The strategic and policy objectives of this programme of research<sup>1</sup> into sustainable energy systems include reducing greenhouse gases and pollutant emissions (Kyoto), increasing the security of energy supplies, improving energy efficiency and increasing the use of renewable energy, as well as enhancing the competitiveness of European industry and improving quality of life both within the EU and globally (Johannesburg follow-up)<sup>2</sup>.

In addressing these objectives through this Work Programme, a clear differentiation is made between research activities having the potential for exploitation in the short to medium term and those which are expected to have an impact in the medium to longer term. This distinction between the short-to-medium and medium-to-long term time frames is applicable to all indirect research actions in the sustainable energy sector and it is intended that the budgetary appropriations be split equally between the two time frames.

### ***Research activities having an impact in the short to medium term***

Community research is one of the main instruments which serve to support the development and implementation of new legislative instruments and other policy measures in the field of energy and to change significantly current unsustainable patterns of development. In the short to medium term, the goal is to pave the way for the introduction of innovative and cost competitive renewable and energy efficiency technologies into the market as quickly as possible through demonstration and other research actions aiming at the market, thus supporting the future development and implementation of the EU Directives on electricity from renewable energy sources and on the energy performance of buildings, as well as the proposed Directives on cogeneration (CHP) and the establishment of regulatory and fiscal measures for the promotion of liquid biofuels.

From a programme implementation perspective the objective is to bring forward and demonstrate the next generation of cost-effective technologies at full scale. The scale of demonstration projects should allow a comprehensive life-cycle assessment under real life conditions. New integrated projects will mobilise the necessary actors and resources to create real life laboratories to investigate the optimal market penetration paths and the most sustainable alternatives. Projects will include socio-economic research into the interfaces between the new energy technologies and their markets, for example innovative policy packages, financing mechanisms and user/consumer acceptance.

Proposals addressing short-to-medium term research should comply with the following guidelines:

- Deliver results, which will accelerate the market penetration of innovative energy technologies with a particular emphasis on 2010 energy policy objectives.

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<sup>1</sup> The word "research" used in the general sense refers to research, technological development and demonstration activities.

<sup>2</sup> The research will also contribute to the ambitious objectives of the EU Environmental Technologies Action Plan (ETAP), which aims to facilitate the development and uptake of environmentally sound technologies (COM/2004/38 of 28.01.2004).

- Consist mainly of integrated demonstration actions with an optional research component of up to about 20%, including, where appropriate, pre-normative research and energy technology integration.
- Include a dissemination component (an innovation related activity).
- The risks to be addressed are mainly technological and might include market related and financial issues.
- Demonstrate reductions in the costs associated with implementation of new technologies and/or demonstrate how innovative technological solutions can be integrated under full-scale operating conditions.
- Provide inputs for the future development of energy policy and legislation, including the improvement of existing regulatory measures, whilst serving EU research and related policies.

The research components of short to medium term projects should adopt a multidisciplinary approach, including, where appropriate, socio-economic research on the future policy, market and end user impacts of the innovative energy technologies involved, in addition to technology focused research.

International co-operation is particularly welcome.<sup>3</sup>

### ***Research activities having an impact in the medium to long term***

The medium to long term research objective is to develop new and renewable energy sources, and new carriers such as hydrogen which are both affordable and clean and which can be well integrated into a future sustainable energy supply both for stationary and transport applications.

The future large-scale development of these technologies will depend on significant improvements in their cost and other aspects of competitiveness against conventional energy sources. The overall socio-economic and institutional context in which they are deployed will be covered in a synergetic approach, which takes account of energy and other related policies.

Proposals addressing medium-to-long term research should:

- Deliver results which could be widely exploited commercially or otherwise, with a time horizon generally beyond 2010; further development and particularly demonstration type actions may be necessary before technologies are ready for full-scale commercial use.
- Consist mainly of research and development activities (including pre-normative and socio-economic research and the validation of technical and economic feasibility in pilot plants and prototypes), research-related networking activities, training and dissemination activities. The main risks to be addressed are scientific and technological rather than market and financial.
- Lead to the generation, exploitation and dissemination of new knowledge and contribute to the implementation of EU research policy, whilst also contributing to the development of energy and associated policies.

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<sup>3</sup> International co-operation addresses the participation of organisations from “third countries”, i.e. States that are neither a Member State nor an associated State. Third countries with an S&T agreement with the EU: Argentina, Australia, Brazil, Canada, China, Chile, Egypt, India, Japan, Kazakhstan, Mexico, Morocco, Russia, South Africa, Tunisia, Ukraine.

The research activities to be funded in the medium-to-long term should address not only the technological aspects, but also incorporate in a multidisciplinary approach the socio-economic research necessary to overcome the non-technical obstacles for the penetration into markets of the technologies concerned.

## **6.1.2. Objectives, Structure and Overall Approach**

### **6.1.2.1. Implementation Principles**

The Sixth Framework Programme (FP6) differs significantly from previous ones. A key difference is its role in contributing to the creation of the European Research Area (ERA) in sustainable energy systems. This means that the aim is to assemble a *critical mass of resources*, to *integrate* research efforts by pulling them together and to make this research more *coherent* on the European scale.

Focus on priorities – to ensure concentration of effort and maximise the impact of the Programme, it is intended to focus research on a limited number of priority topics. The response to invitations to submit Expressions of Interest, together with other inputs on the strategic importance of research in certain key fields, has been used to define the content of the Work Programme and, particularly, to focus the Calls for Proposals. However, it is strongly emphasised that the previous submission of an EoI will have no bearing on the evaluation of any proposal in subsequent calls for proposals.

Priority use of the new instruments – the Commission intends to use Integrated Projects and Networks of Excellence as a priority from the start of FP6, depending upon the quality of proposals received and their relevance to the objectives of the Programme, whilst maintaining the use of the other types of instrument – Specific Targeted Research Projects, Co-ordination Actions and Specific Support Actions.

Selection of topics – approximately € 890 million is available for RTD on sustainable energy systems, spread over the four years of the Programme (2003-2006). Calls for Proposals will thus need to be selective as it will not be possible to fund all potential topics of interest within the priority areas identified in the Specific Programme. Furthermore, there may be competition between proposals both across and within research topic areas in each call, which may result in some topics not being supported.

### **6.1.2.2. Horizontal aspects to be taken into consideration by proposers**

Proposals should follow the general guidelines for submission (see FP6 InfoPack). Important general information on cross-cutting issues is mentioned in the General Introduction to the overall Work Programme, complemented by the specific aspects related to energy below:

International scientific co-operation: global international co-operation will be encouraged for research activities addressing the environmental consequences of energy policies, energy supply inter-dependency, and cross border energy and environmental issues. The focus will be on activities of mutual concern and synergy with other international programmes and initiatives such as those of the International Energy Agency. Activities will therefore be encouraged in the form of:

- initiatives aimed at securing a leading role for Europe in international research efforts on global sustainable energy issues;
- integrated bilateral co-operation activities in sustainable energy research with third countries or groups of third countries;

- participation of third country researchers and organisations in sustainable energy research projects and networks in areas of common interest.

Cross-cutting dimension in energy research: the technologies covered by this work programme are often integrated into systems combining several of them for different applications e.g. fuel cells and hydrogen, renewable energy sources in combination with reversible fuel cells and hydrogen, hydrogen production and CO<sub>2</sub> sequestration, advanced hybrid systems integrating fuel cells with conventional technologies etc. Such combinations can lead to important synergies and proposals developing such approaches can be envisaged. The integration of different renewable energy technologies into supply and distribution networks, together with energy demand management, is of particular interest (see section 6.1.3.1.1.2).

### 6.1.2.3. Modalities for implementation

This part of the work programme will be implemented using Integrated Projects (IP), Networks of Excellence (NoE), Specific Targeted Research Projects (STREP), Co-ordination Actions (CA) and Specific Support Actions (SSA), as indicated in the Roadmap (Table 1).

Proposals for Integrated Projects and Specific Targeted Research Projects can be for research and technological development projects, demonstration projects or a combination of the two. For research and technological development activities, STREPs should be focused on specific topics of an exploratory and/ or high-risk innovative nature.

Proposals for Co-ordination Actions should preferably be new initiatives for the networking and co-ordination of research and innovation activities in areas of interest for the programme. If successful, the outcome of such actions could, in due course, form a basis for future IPs or NoEs.

The purpose and nature of Specific Support Actions is described in the General Introduction to the overall Work Programme. They will include actions to stimulate, encourage and facilitate the participation of organisations from the candidate countries in the activities of the priority thematic areas, in particular via the Networks of Excellence and Integrated Projects.

Further information on all of the above instruments, including levels of funding, and the issues expected to be addressed in proposals are contained in the FP6 InfoPack.

In addition, where appropriate, the Commission will issue Calls for Tender for specific studies or services required to achieve the programme objectives, particularly with regard to the promotion and dissemination of results. A list of Calls for Tender planned for 2004 for the short-to-medium and medium-to-long term parts of the programme are shown in the tables below.

#### **Calls for Tender planned for the M-L term part of the WP in 2004:**

<b>Title</b>	<b>Status</b>	<b>Budget</b>	<b>Expected duration</b>
<b>Portfolio analysis of European Community non nuclear energy RTD projects in their overall EU context</b>	Published in OJ, ToR being sent to applicants.	Approximately 150.000 €	8 months
<b>Comparative Study of mechanisms, results and good practices in terms of Innovation and Transfer of results of energy RTD in national and Community's programmes.</b>	To be launched in second semester of 2004	Approximately 150.000 €	8 months
<b>Assessing present achievements and future potential for increased co-operation</b>	To be launched in second	Approximately 30.000 €	6 months

<b>between New Member States, Candidate Countries, other Associated States and the EU in energy RTD</b>	semester of 2004		
<b>Perspectives of cooperation between Europe and China on energy RTD; issues and recommendations.</b>	To be launched in second semester of 2004	Approximately 35.000 €	6 months

#### **Calls for Tender planned for the M-L term part of the WP in 2005-6:**

<b>Title</b>	<b>Status</b>	<b>Budget</b>	<b>Expected duration</b>
<b>Feasibility study leading to the establishment of an integrated or coordinated information system about energy research in Europe</b>	To be launched in the second semester of 2006	80 000 €	6 months
<b>Issues, perspectives and technologies for EU RTD energy cooperation with India</b>	To be launched in the fourth quarter of 2005	25 000 €	3 months

#### **Call for Tender planned for the S-M term part of the WP in 2005:**

<b>Title</b>	<b>Status</b>	<b>Budget</b>	<b>Expected duration</b>
<b>Promotion, dissemination, and analysis for the CONCERTO initiative</b>	To be launched in April / May 2005	4.5M€	4 years

In addition, in its Article 9.2(a), the Rules for Participation permit the financing of “*specific support actions for the activities of the legal entities identified in the work programmes*”. Subject to the fulfilment of all applicable procedures, the Commission intends to finance the following SSA according to this Article:

#### **SSA to be funded for the M-L part of the WP under Art 9.2(a) of the Rules for Participation:**

<b>Title and objectives</b>	<b>Beneficiary</b>	<b>Max. EC contribution</b>	<b>Expected duration</b>
<p><b>ETSER (Emerging Thematic Strategies in Energy Research)</b></p> <p>To contribute through the use of the ETSO network to a better understanding of strategic issues at hand, to assess the impact of scientific and technological developments in the energy area, to validate hypotheses made by the energy communities, to steer the definition of energy research and to support policy making by:</p> <ul style="list-style-type: none"> <li>– Researching and synthesising specific topics related to one energy field or sub field</li> <li>– Helping to identify possible options towards user friendly and cost effective networking of energy RTD information systems,</li> </ul> <p>with the objective of shaping policy making in the field of sustainable energy research.</p>	JRC - IPTS	300 000 €	3 years

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 420,000 €. 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 SP1 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.

**IEA Implementing Agreements financed under the Sustainable Energy Systems WP:**

<b>Implementing Agreement</b>	<b>Date IA signed by the European Commission</b>	<b>Estimated Annual EC Contribution in nominal currency</b>	<b>Estimated Annual EC Contribution in euro</b>
<b>IEA Implementing Agreement for Co-operation in the Research and Development of Wind Turbine Systems (Task XI)</b>	Commission signature in 1996. Expires in 2008	\$ 15,000	€ 11,589
<b>IEA Implementing Agreement for the Establishment of a Project on Solar Power and Chemical Energy Systems (SolarPaces)</b>	Commission signature in 1998. Expires in 2006	€ 5,250	€ 5,250
<b>IEA Implementing Agreement for a Programme of Energy Technology Systems Analysis (ETSAP)</b>	Commission signature in 1980. Expires in 2009	€ 24,000	€ 24,000
<b>Programme to Develop and Test Solar Heating &amp; Cooling Systems</b>	Commission signature in 1979. Expires in 2009	\$ 6,000	€ 4,636
<b>IEA Implementing Agreement for a Programme of Research, Development and Demonstration on Bioenergy (Tasks 32, 33, 34, 36, 37, 39 and 41)</b>	Commission signature in 1995. Expires in 2004(ongoing prolongation expected)	\$ 100,000	€ 77,262
<b>IEA Geothermal Implementing Agreement (GIA)</b>	Commission signature in 1997. Expires in: 2007	\$ 10,000	€ 7,726
<b>IEA Implementing Agreement on Photovoltaic Power System Programme (PVPS) (Task 1)</b>	Commission signature in 1992. Expires in 2007	\$ 7,500	€ 5,795
<b>IEA Implementing Agreement for the establishment of IEA Coal Research</b>	Commission signature in 1989. Expires in 2008	GBP 57,000	€ 82,885

<b>IEA Implementing Agreement for a Co-operative Programme on Technologies Relating to Greenhouse Gases derived from Fossil Fuel Use</b>	Commission signature in 1991. Expires in 2006	GPB 52,500	€ 76,341
<b>IEA Implementing Agreement for a Co-operative Programme on Ocean Energy Systems</b>	Commission signature in 2002. Expires in 2006	€ 7,000	€ 7,000
<b>IEA Implementing Agreement for Energy and Environment Technologies Information Centres (EETIC)</b>	Commission signature in 1998. Expires in 2005	GPB 36,000	€ 52,348
<b>IEA Implementing Agreement for Demand Side Management (DSM)</b>	Expires in 2008	€ 35,000	€ 35,000

### 6.1.3. Technical Content

The sustainable energy systems work programme will be implemented in two complementary parts – RTD activities having the potential for exploitation in the short to medium term and those which are expected to have an impact in the medium to longer term. The differing characteristic profiles of the activities expected to be supported in each part of the programme are explained in Chapter 6.1.1. Co-ordination between the two parts will be ensured.

#### 6.1.3.1. Research activities having an impact in the short and medium term

In accordance with the principle of focusing research effort, the following sections 6.1.3.1.1 to 6.1.3.1.3 describe the main objectives to be achieved and the strategically important areas in which research should be concentrated. These sections are followed by sections 6.1.3.1.4 and 6.1.3.1.5, which contain details of the priorities for the third call (Call 2005.SM), and the fourth call (Call 2006.SM).

##### ***6.1.3.1.1. Clean energy, in particular renewable energy sources and their integration in the energy system, including storage, distribution and use***

###### **6.1.3.1.1.1. Cost-effective supply of renewable energies**

[Activity Code : SUSTDEV-1.1.1]

Actions should be aimed at bringing the next generation of more cost-effective renewable energy technologies to the market, with particular emphasis on markets in Europe. The results should enable these technologies to compete in the liberalised energy markets of the future with substantially reduced levels of subsidy, and also help to bring them within reach of developing countries. The main tasks to be carried out will explore ways to reduce the costs of the energy delivered by specific renewable energy technologies, in the form of *green electricity, heating/cooling, and liquid/gaseous biofuels*.

***Electricity from biomass and/or waste derived fuels*** including solid as well as liquid resources e.g. black liquor, and waste recovered fuels (including the biodegradable fraction of Municipal Solid Waste) or effluents e.g. sludge. Projects should focus on one or more of the following: *optimisation of the fuel supply chain* taking into consideration

all aspects of fuel production (in case of dedicated energy crops and short rotation forestry) and preparation of the fuel to high standards and specifications; *combinations with fossil fuels* designed to guarantee the continuous supply of electricity to final users, such as advanced co-firing and co-combustion; *innovative technologies for large scale electricity generation*, such as integrated gasification combined cycle plants, dedicated gasification to power plants, biomass boilers, flash pyrolysis applications where the emphasis is placed on achieving high conversion efficiencies and high reliability of the technology.

***Electricity from wind*** : projects should focus on one or more of the following: *innovative wind farms, turbines, and components* for reliable electricity generation at reduced costs; *design tools* including advanced modelling of large turbines and the corresponding site assessments, that facilitate a move towards design limits, new design principles and materials, including more realistic load assumptions for a new generation of machines; *Actions aiming to facilitate the large scale deployment* of wind energy in unconventional sites including offshore, extreme climates, and complex terrains.

***Electricity from photovoltaics***. Priorities to be addressed are: *Innovative manufacturing concepts* for high efficiency PV cells/modules to be integrated into larger scale (multi-MW) photovoltaic production facilities in order to lower the Wp cost; and including low cost integrated components or devices for grid connected or stand alone PV generators; *Actions aimed at kick-starting Si-feedstock production by EU industries* to secure a reliable and affordable supply for fostering PV cell cost reductions; *Transfer to industrial scale* of a new generation of PV technologies / products to facilitate the integration of innovative solutions at lower costs; *Large area, low cost photovoltaic modules for building integrated PV (BIPV)* including architectural roof integration, and *autonomous solar electricity generation systems* in industrialised and developing countries; *Integration of photovoltaic installations* in generation schemes to feed local distribution grids, closer to the point of use and development of new devices and systems to manage these installations.

***Electricity from other renewable energy sources*** - projects should focus on one or more of the following: *Solar thermal power* for the large scale generation of electricity using power tower, trough or dish technologies, delivering reliable supplies of electricity to the grid at competitive prices; *Geothermal energy* for electricity generation and/or combined heat and power (CHP) generation employing innovative, environmentally sustainable and cost competitive technologies; *Small-scale hydro power plants*, for electricity generation with reduced costs, acceptable environmental impacts and competitive performance; *Ocean energy technologies*, including wave, ocean current and tidal technologies, which are ready for demonstration at full scale with a view to commercial exploitation.

***Heat/cooling from renewable energy sources:*** projects should focus on one or more of the following : *Heat from biofuels and/or waste derived fuels*, including applications in industry and in buildings, as well as CHP, either individually or with district heating. Preference will be given to novel systems that utilise liquid or gaseous biofuels; *Solar heating and cooling* based on a new generation of solar water heating, solar space heating and/or cooling systems, or “combi-systems”, which are designed for large scale production with improved performance and reduced costs; *Solar industrial process heating or solar desalination systems* with improved performance at competitive costs; *Geothermal energy for heating and cooling* employing innovative environmentally sustainable and cost competitive technologies, including ground coupled heat pumps.

[NOTE: Priorities in the 3<sup>rd</sup> and 4<sup>th</sup> SMT Calls for Proposals are presented in sections 6.1.3.1.4 and 6.1.3.1.5.]

#### **6.1.3.1.1.2. Large-scale integration of renewable energy sources into energy supplies**

[Activity Code : SUSTDEV-1.1.2]

Short / medium term research on the large scale integration of renewable energy sources into energy supplies is needed in support of the EU's commitments to increase the percentage of renewable energy sources to 12% of final energy consumption and 21% of final electricity consumption by 2010. At the same time, the EU is committed to major reductions in energy intensity and this will require substantial increases in the adoption of innovative technologies for the management of energy demand.

The demand for electricity is expected to grow significantly over the next decade, but the liberalisation of the energy market has led to a significant reduction in the installed over-capacity of base load power plants. In some EU countries the demand for electricity peaks more often in summer than in winter, due to a very significant increase in the demand for cooling. In a growing number of regions the low voltage distribution network to the end users shows weaknesses. Some of these problems can be addressed by installing medium and small scale power generation units, including renewable electricity generating plants, in strategic locations to stabilise the grid instead of installing new power lines.

Research on the large scale integration of renewable energy sources into existing energy supplies and networks should therefore address the inevitable and dynamic interactions between centralised and decentralised energy supplies and demands at the systems level, which is typically more complex when advanced energy management systems are employed. In this context, priority will be given to actions which contribute to a better understanding of the potential problems and solutions associated with enhanced distributed generation in existing grids, including hybrid systems and different levels of renewable energy integration, (including storage where applicable) into electricity and heat distribution grids, networks and related end-use applications.

Amongst the approaches to be adopted, the large scale integration of renewable energies should be demonstrated in clearly defined geographical areas or zones (real life laboratories), within which all of the relevant energy flows (supply and demand) can be identified, measured and assessed. Such projects are expected to involve communities together with local industries, agencies, and utilities in cities, towns and rural areas (including islands), which are committed to integrating renewable energy sources (RES) and efficient demand management technologies in a comprehensive and innovative way into their local energy economies.

Projects addressing the large scale integration of renewable energies should adopt innovative technical approaches to the production, storage, integration and use of RES electricity, RES heating and cooling and liquid and gaseous biofuels, as explained below:

**RES electricity**, such as wind, biomass and wastes, solar PV, geothermal, and hydro, including where appropriate the integration of *decentralised or distributed electricity generation* at different network voltage levels with intelligent demand side management programmes, local energy management techniques and the co-ordinated provision of sustainable energy services with a high degree of local autonomy and supply security; *electricity storage systems* including advanced batteries, hydrogen and other electricity storage devices either for supplying short-term peak demands or for balancing variations in renewable electricity supply, as well as innovative socio-economic approaches to integrated energy planning, leading to local policies, codes, and regulations;

**Medium and low temperature RES heating and cooling**, such as locally optimised schemes for providing heating and cooling from solar, geothermal and biomass sources in buildings and industry, and establishing advanced distribution systems (district heating and cooling networks) with integral storage systems as appropriate;

**Liquid and gaseous biofuels** and recovered fuel production and processing on a commercial basis and their use in buildings, industry and transport.

[NOTE: Priorities in the 3<sup>rd</sup> and 4<sup>th</sup> SMT Calls for Proposals are presented in sections 6.1.3.1.4 and 6.1.3.1.5.]

#### **6.1.3.1.2. Energy savings and energy efficiency, including those to be achieved through the use of renewable raw materials**

The overall objective is to substantially contribute directly or indirectly to the EU targets of (1) reducing energy intensity by 18% for the year 2010, (2) achieving a *global indicative community target of 18% of electricity consumption from co-generation by the year 2010*, (3) doubling the share of renewables from 6% to 12% for the year 2010 and (4) contributing to achieving the objectives of the internal market for energy, and (5) the policy of security of energy supply. Projects should also make a concrete input to the European Climate Change Programme.

The demand for cold (including air-conditioning, refrigeration, and freezing) has grown exponentially all over Europe in industry, residential and commercial buildings. This trend is expected to continue in the next years, and to penetrate also the market for private houses. Cooling and freezing are usually very energy intensive, and, if nothing is done, this predicted growth may annihilate all efforts of energy savings in buildings and industry, as targeted in the directive on the energy performance of buildings and in the green paper on security of energy supply. Today many new tertiary buildings are equipped with air conditioning, although appropriate eco-building design could have avoided the need to install air conditioning systems in the first place.

#### **6.1.3.1.2.1. Eco-buildings**

*[Activity Code : SUSTDEV-1.1.3]*

The building sector is at present responsible for more than 40% of EU energy consumption. There are technologies under development, which could substantially improve (up to 30%) the energy performance of buildings, reducing the conventional energy demand in new and existing buildings and substantially contributing to reduce energy intensity, through combined measures of rational use of energy and integration of renewable energy technologies.

The Eco-buildings concept is expected to be the meeting point of short-term development and demonstration in order to support legislative and regulatory measures for energy efficiency and enhanced use of renewable energy solutions within the building sector, which go beyond the Directive on the Energy Performance of Buildings.

The projects aim at a new approach for the design, construction and operation of new and/or refurbished buildings, which is based on the best combination of the double approach: to reduce substantially, and, if possible, to avoid the demand for heating, cooling and lighting and to supply the necessary heating, cooling and lighting in the most efficient way and based as much as possible on renewable energy sources and polygeneration.

Priority will be given to integrated research and demonstration projects aiming at improving substantially the energy performance of buildings at a large scale, transferring scientific knowledge into standards and industrial codes, and including the results of socio-economic research on integrated planning and behaviour of users. The projects must go clearly beyond the requirements of existing legislation and thus contribute to a further development of regulatory issues in this sector.

In setting this new approach, the integrated projects should bring together different skills and expertise (urban planners, architects, engineers, system integrators, investors, manufacturers, industry, energy suppliers, owners renters, etc), take advantage of advanced communication and information tools, and propose new methodologies and techniques.

*[NOTE: Priorities in the 3<sup>rd</sup> and 4<sup>th</sup> SMT Calls for Proposals are presented in sections 6.1.3.1.4 and 6.1.3.1.5.]*

#### **6.1.3.1.2.2. Polygeneration**

*[Activity Code : SUSTDEV-1.1.4]*

There is a growing awareness within the framework of the ongoing liberalisation of the energy industry, that an integrated approach to energy supply, distribution and demand management is required. For polygeneration, proposals should focus on market oriented projects involving innovative applications of energy technologies and advanced energy services, and take into account non-technological barriers such as legislative and regulatory measures. They should include EU wide dissemination of results.

**Polygeneration** applies to projects that improve the efficiency of an overall system covering supply and demand. It therefore covers the complete spectrum from primary energy sources to energy services for private or industrial consumers. Projects should demonstrate the supply of primary energy sources to the project site, their conversion to

energy, the supply and distribution of the energy produced, the provision of energy services to consumers and the eventual production of energy carriers (such as biofuels or hydrogen), or other useful products.

Projects that aim to demonstrate the development of individual energy system components such as boilers, gas turbines, fuel cells etc *in isolation*, are considered product development projects and therefore are NOT covered by this call.

***Strategic objective:***

Polygeneration is the combined production of useful electricity with heat, cold, and other useful products. It encompasses conventional co-generation (combined heat and power, CHP), tri-generation (of power, heat and cold) as well as technologies for producing fuels, chemicals and other value-added products together with the basic energy amenities. Polygeneration systems may use a wide range of fossil and renewable primary energy sources. Their main benefit is in maximising the overall efficiency of the integrated system near to the point of use. Polygeneration combined with efficient district heating and cooling may provide added benefits to a larger community. Secondary benefits may include improved reliability of the supply and distribution networks, arising from better interaction between producers and distributors.

The overall objective is to support projects which will aim to reduce the demand for primary energy by at least 30% (by 2010) compared to standard commercial applications in 2003, by improving the efficiency of providing electricity, heating and cooling services in parallel to the end users.

Reductions in energy consumption contribute to combating climate change and enhance the security of energy supply. More specifically, “Polygeneration” actions should support the Cogeneration Directive and contribute to the Community target of doubling the share of cogeneration in EU electricity generation to 18% (by 2010).

Projects should deliver results that facilitate the short to medium term implementation of policy, legislative and regulatory measures in the energy fields mentioned above for increasing the global energy efficiency through an appropriate integration of supply and demand. The Directive on energy performance of buildings, which has to be transposed before beginning of 2006, includes provisions ensuring that alternative systems such as decentralised energy supply systems, CHP, district heating/cooling systems have to be considered for new buildings. Projects also may develop appropriate tools such as demand and supply monitoring systems that may assist the implementation of this Directive.

Projects should also aim to improve the energy intensity in end use sectors, for example in residential houses, tertiary buildings, and buildings with public access, as well as industries, businesses and industrial parks. Polygeneration systems, which are appropriately integrated in the end use application, should lead to an important energy efficiency increase of the overall system. They could also demonstrate the integration of renewable sources and allow substantial reductions in installation / operating / maintenance costs.

***Applications of Polygeneration:***

Projects should concentrate on the demonstration of innovative pre-commercial technologies in market oriented actions, and with short to medium term exploitation prospects, addressing one of the following applications:

- 1) Polygeneration for residential and commercial buildings, district networks and the tertiary sector. Emphasis should be placed on measures to improve operating

efficiency, security, reliability of performance at reduced costs and a large reduction of green house gas emissions.

2) Polygeneration for industrial applications with significant improvements on energy efficiency.

Projects should be demand driven and should have short to medium term exploitation prospects. In particular, they should demonstrate how new and emerging knowledge in the area can be optimised in concrete cost effective applications. Priority will be given to projects that:

- focus on novel heating or cooling solutions, innovative energy storage and load management (where applicable),
- include a significant RES contribution (the inclusion of RES in the proposals is not essential but highly desirable, and in case of proposals of equal merit priority may be given to those proposals that include RES),
- address in particular the situation in countries and regions where the potential for improvement and better utilisation of existing district heating infrastructure is significant, for example in some of the new EU Member States.

***Expected results:***

a) Demonstration of systems that are more competitive than conventional ones through higher system efficiencies (for example plus 30%), strengthening of the supply and distribution network at strategic points, compensating higher capital cost, and ensuring shorter pay back time;

b) Innovative integration of polygeneration systems for buildings and industrial applications so that the overall increase in the energy efficiency of the polygeneration system is achieved in a cost-effective way (short pay-back period);

[NOTE: Priorities in the 3<sup>rd</sup> and 4<sup>th</sup> SMT Calls for Proposals are presented in sections 6.1.3.1.4 and 6.1.3.1.5.]

### **6.1.3.1.3. Alternative motor fuels**

[Activity Code : SUSTDEV-1.1.5]

Despite all efforts at the European, National, Regional and Local levels, greenhouse gas emissions from energy used in transport continue to grow. In addition, the transport sector remains almost exclusively dependent on oil. Activities under this heading of the work programme should contribute to the mitigation of both greenhouse gas emissions growth, over-dependence on oil and the promotion of biofuels for transport applications.

The Commission has suggested a policy objective of 20% petrol and diesel substitution by new/alternative fuels in road transport by 2020<sup>4</sup>. In the 2001 Commission Communication<sup>5</sup> on Alternative Motor Fuels three types of alternative motor fuels that could contribute to EU energy policy objectives were identified: *biofuels*, *natural gas* and *hydrogen*.

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<sup>4</sup> European Commission Green Paper: "Towards a European Strategy for the Security of Energy Supply". COM (2000) 769

<sup>5</sup> COM (2001) 547. Commission Communication on Alternative Motor Fuels

The Alternative Motor Fuel policy of the European Commission has given priority to *liquid and gaseous biofuels* in the short and medium term. Technically they are useable, according to existing legislation, either in low blends (<5%), or unblended (100%) in dedicated engines. Their introduction in the market is supported by Directive 2003/30/EC of 07.05.2003 that set indicative targets of 2% and 5.75% market shares for biofuels respectively for the years 2005 and 2010 as well as by Directive 2003/96/EC of 27.10.2003, which allows for their de-taxation up to 100% by the Member States.

At present the **production** of biodiesel from seeds (such as rape and sunflower), bioethanol from starch (such as wheat or corn) or sugar (such as sugar beet) and biogas from effluents and organic waste streams (such as sewage sludge) is well demonstrated and the various processes are considered reliable and therefore industrial. However, there are new technologies being developed such as the production of biodiesel from animal tallow, and ethanol from lignocellulosics that require full scale demonstration in order to prove their technical and economic viability. The biomass gasification to synthesis gas route (biomass to liquid, BTL) has also attracted renewed interest although the technical hurdles still need careful attention before full scale demonstration can be achieved and several research projects have recently been initiated and supported under the first call of the sixth framework programme.

In the **market** biofuels face obstacles related to the low blend limitations and differences in their nature compared with petrol and diesel often give rise to problems such as increased volatile evaporative emissions or engine parts deterioration. However, options like BTL fuels face less demand side obstacles because there are no blending restrictions. Higher ethanol blends such as 10% (as in the USA) and 25% (as in Brazil) are widely applied by the industry and the market in some countries due to the use of dedicated vehicles. Pure ethanol is also in use in Brazil and has recently received high impetus. Fuel flexible vehicles using an 85% ethanol blend are widely introduced in both the USA and Brazil and have been used successfully since 2002 in Sweden. In the EU the use of unblended biodiesel has been demonstrated in captive fleets - mainly buses but also agricultural tractors. Buses have also been operated with diesel-ethanol blends and pure ethanol in large-scale projects in Sweden for more than 10 years.

Recent developments in the global political arena are pushing **hydrogen** beyond the usual research circles. The European Commission established a High Level Group on Hydrogen and Fuel Cells in 2002 that presented its conclusion in the form of a vision report at a European Conference in June 2003 ([http://europa.eu.int/comm/research/energy/pdf/hydrogen-report\\_en.pdf](http://europa.eu.int/comm/research/energy/pdf/hydrogen-report_en.pdf)). Following the recommendation of the High Level Group the European Commission has now created a European Hydrogen Technology Platform which aims at accelerating the development of the Sustainable Hydrogen Economy. On the international front, the recently created International Partnership for the Hydrogen Economy signed in November 2003 by 16 governmental partners, provides a framework for global cooperation, including developing countries.

All these initiatives acknowledge that hydrogen demonstration activities are a key priority to guide and advance the research and deployment efforts on the path to a future hydrogen economy.

Within the European Union several demonstration initiatives and projects aiming to use *hydrogen as a transport fuel*, or in general as a new energy vector, are currently being implemented, including demonstrations of hydrogen fuelled fuel cell buses and cars and the corresponding fuelling and maintenance infrastructure. Major cities like Berlin, London, or Grenoble and regions like Lombardia, or Baden-Württemberg have also shown their commitment to develop the hydrogen economy.

The short to medium term research programme will concentrate on large-scale demonstration initiatives designed to identify and assess ways to remove existing technical, commercial, operational, organisational, and institutional barriers, which prevent alternative motor fuels and energy efficient vehicles from significantly entering the market.

The whole Well to Wheel chain should be taken into account and optimised to decrease energy losses and bring costs down to competitive levels. The final aim would be to demonstrate the environmental and societal benefits of these alternatives and to widely spread knowledge about them that would increase and ensure their progressive acceptance.

In cities, and in general in urban areas, it is easier to set up a new/alternative distribution and refuelling infrastructure for demonstration of alternative fuels and energy efficient vehicles. Furthermore, in cities the impact of such demonstration projects is much greater. Therefore, these large-scale initiatives should include demonstrations in cities of vehicle fleets<sup>6</sup> and of their supply and fuelling infrastructure. The scale of the activities should allow the assessment of the alternative fuel pathways in real life environments. Research on socio-economic, public acceptance and dissemination aspects would also be part of the initiatives.

Application driven research and large scale demonstration working on both the supply and demand sides, will deliver a better understanding of the organisational, institutional and financial frameworks required to successfully introduce innovative solutions and bold changes aiming at the reduction of oil dependency and greenhouse gas emissions in road transport.

Relevant and interested stakeholders should become part of European partnerships that will implement these innovative demonstrations of alternative fuels and energy efficient vehicles. The key stakeholders are city and regional authorities, working closely together with fleet operators, vehicle and equipment manufacturers, technology providers, fuel and feedstock suppliers and researchers.

Priority will be given to projects integrating the following topics:

- *Demonstration of alternative fleets;*
- *Demonstration of innovative, energy efficient, cost-efficient and safe production, storage and distribution of alternative fuels;*
- *Demonstration of new ways of using alternative fuels in energy efficient vehicles;*
- *Assessment and monitoring of new and ongoing activities;*
- *Communication and dissemination*

Further information can be found on the following web site:

[http://europa.eu.int/comm/dgs/energy\\_transport/rtd/6/index\\_en.htm](http://europa.eu.int/comm/dgs/energy_transport/rtd/6/index_en.htm).

**[NOTE: Priorities in the 3<sup>rd</sup> SMT Call for Proposals** are presented in sections 6.1.3.1.4 and 6.1.3.1.5.]

#### **6.1.3.1.4. Priorities for 3rd SMT Call for Proposals (2005)**

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<sup>6</sup> A vehicle fleet is considered a coherent group of at least three vehicles normally operated by a single operator. In addition, a fleet operates around a central point where specific fuelling and maintenance infrastructure is available.

### **Research areas and topics for 2005 (Call 2005.SM) – Call closed.**

See Revision 4 of the Work Programme for details of this closed call.

### **6.1.3.1.5. Priorities for 4<sup>th</sup> SMT Call for Proposals (2006)**

#### **Research areas and topics for 2006 (Call 2006.SM)**

### **Cost-effective supply of renewable energies:**

[Activity Codes: SUSTDEV-2005-1.1.1-1 to SUSTDEV-2005-1.1.1-7]

a) Proposals for Specific Targeted Research Projects (STREP's) are invited in the following areas (described in section 6.1.3.1.1.1), within which priority will be given to the highest quality proposals, to actions aiming to accelerate growth in the production of renewable heating and cooling and, where appropriate, to proposals involving partners from countries or regions, where renewable energy and energy efficiency policies, support schemes and commitments need to be strengthened, as well as third countries (notably developing countries and emerging economies):

***Demonstrations of innovative designs of automated biomass heating systems*** with substantially reduced capital costs for introduction to mass markets in the domestic and tertiary buildings sectors; priority will be given to innovative designs and systems which also permit the use of fuels with lower quality, (eg: pellets from agricultural by-products or wastes), whilst maintaining high emissions standards.

***Solar heating and cooling*** based on a new generation of solar water heating, solar space heating and/or cooling systems, or “combi-systems”, which are designed for large scale production with improved performance and reduced costs; solar industrial process heating or solar desalination systems with improved performance at competitive costs

***Geothermal energy*** using innovative integrated systems with optimised efficiency and reduced costs for heating and cooling, using environmentally sustainable technologies.

***Innovative wind farms, components and design tools*** for reliable electricity generation at reduced costs, either onshore or offshore, with particular emphasis on issues related to low wind speeds, extreme load cases, complex terrains, advanced micro-siting techniques, and micro-climates; priority will be given to actions which will facilitate the large scale deployment and grid integration of wind energy including storage and closer cooperation between the wind energy sector, public authorities, the financial community and RTD institutions;

***Demonstrations of the next generation of PV technologies / products***, including PV in buildings, which demonstrate innovative integrated solutions for supplying solar electricity at lower costs, and / or innovations in manufacturing plant aimed at mass producing solar PV technologies or products at lower costs;

***Ocean / marine energy technologies***, including wave, ocean current and tidal stream technologies, which are ready for demonstration at full scale with a view to commercial exploitation .

b) Proposals for Co-ordination Actions and Specific Support Actions are invited in the areas described in Section 6.1.3.1.1.1

### **Eco-buildings**

[Activity Code : SUSTDEV-1.1.3]

Proposals for Specific Targeted Research Projects (STREP's) are invited in the following area, described in Section 6.1.3.1.2.1, within which priority will be given to the highest quality

proposals and, where appropriate, to proposals involving partners from countries or regions, where renewable energy and energy efficiency policies, support schemes and commitments need to be strengthened, as well as third countries (notably developing countries and emerging economies)

In particular, support is envisaged for projects that focus on innovative technological solutions within the context of an holistic approach to the design and operation, and giving priority to retro-fitted buildings. Projects should demonstrate ambitious reductions in energy consumption (lower by at least 30% compared with national regulations for new buildings based on the Energy Performance of Buildings Directive), together with attractive payback periods.

## Grid issues

[Activity Codes: SUSTDEV-2005-1.1.7-1 to SUSTDEV-2005-1.1.7-2]

Building on the recent work carried out in these fields in the context of medium to long term research actions, proposals for Specific Targeted Research Projects (STREPs), Coordination Actions (CA's) and Specific Support Actions (SSA's) are invited in the areas of the large scale integration of renewable energy sources, described in Section 6.1.3.1.1.2 and Polygeneration described in section 6.1.3.1.2.2. In particular, support is envisaged for :

***Distributed generation:*** research and demonstrations aimed at maintaining the stability of the electricity grid as the installed capacity of distributed generation using RES and/or polygeneration is increased. Priority will be given to actions aimed at demonstrating the optimal use and management of distributed generation and storage to address existing and potential bottlenecks, achieve an increase in the security of distribution grids, improve the ability of the grid to meet peak demands, improve the stability of the grid, or improve the overall management of the grid thus saving the costs of conventional reinforcement. Demonstration actions should be implemented by market actors which are responsible for distribution grids, together with end users where appropriate, using medium and small scale CHP and RES electricity generators. *(Note; The costs of electricity generators will not be eligible for support in these demonstration actions.)*

***Management of electricity grids linked to large scale wind power generation:*** research and demonstrations addressing the design and management of electricity grids linked to large scale wind power generation. Priority will be given to strategic research actions (including system output forecasting) aimed at addressing the intermittency of wind power generation, and to demonstrations of innovative control technologies, intelligent management systems (with related information technologies), and / or storage, which address the large scale transmission of renewable electricity at trans-regional or EU level. Actions should be implemented by consortia involving organisations (market actors such as regulators, transmission system operators, developers, and manufacturers), which are responsible for the regulation, development and management of transmission networks, supplied by on- or off-shore wind farms. *(Note; The costs of electricity generators will not be eligible for support in these demonstration actions.)*

## Polygeneration

[Activity Code : SUSTDEV-1.1.4]

Proposals for Specific Targeted Research Projects (STREP's) are invited in the following area, described in Section 6.1.3.1.2.2, within which priority will be given to the highest quality proposals and, where appropriate, to proposals involving partners from countries or regions, where renewable energy and energy efficiency policies, support schemes and commitments need to be strengthened, as well as third countries (notably developing countries and emerging economies)

In particular, support is envisaged for projects that focus on innovative technological solutions aiming to improve the competitiveness of polygeneration in all applications through the demonstration of innovative technologies or innovative combinations of existing technologies. Projects should address the interaction between suppliers of electricity, heat, cold, energy carriers or other useful products and the corresponding demands. They should lead to an overall

improvement in energy efficiency, in the cost-benefit rate of the project, and in the quality and security of supply.

## CONCERTO II

[Activity Code : SUSTDEV-1.1.6]

Proposals for Integrated Projects (IP's) are invited for support under the co-ordinated initiative "CONCERTO II", which is a joint initiative between the research activities of Large-scale integration of renewable energy sources into energy supplies, Eco-buildings and Polygeneration (optional), described in sections 6.1.3.1.1.1, 6.1.3.1.1.2, and 6.1.3.1.1.3.

*Note: Proposers are reminded that IP proposals for Demonstration projects should include a description of the activities for the **full duration** of the project, and chapters of the proposal should **not exceed** the lengths recommended in the Guide for Proposers, which is associated with this Call. Additional information on how to prepare proposals for CONCERTO projects is available in the form of a "Guidance Note for CONCERTO Proposers" on the web site :*

*[http://europa.eu.int/comm/dgs/energy\\_transport/rtd/6/index\\_en.htm](http://europa.eu.int/comm/dgs/energy_transport/rtd/6/index_en.htm)*

### **Objectives and problems to be solved:**

The CONCERTO initiative should support research and demonstration focused on optimising the sustainability of energy systems in local communities through the innovative integration of RE technologies directly into eco-buildings, electricity distribution networks, district heating systems, and other energy demanding systems, with advanced thermal and electrical storage and improved energy efficiency, as well as on the measurement (including remote metering) assessment design and management of energy flows.

In particular, participation in a CONCERTO project should permit communities to demonstrate sustainable energy solutions in which energy efficiency and renewable energy sources are integrated from an economic perspective, and which deliver high quality energy services.

### **Innovation in demonstration actions:**

Priority will be given to proposals which involve trans-national technological cooperation and demonstrate innovations leading to highly improved cost effectiveness, either via improvements to individual technologies and/or via innovative integrations of technologies. Innovation is also expected with regard to the measurement and management of energy flows in CONCERTO communities.

### **Emphasis on communities in CONCERTO:**

CONCERTO is a major European initiative which will support the demonstration of new and innovative technical solutions making local communities more sustainable and highly energy-efficient. Such communities should be in clearly defined geographical areas or zones (cities, towns, rural areas or islands), within which all relevant energy flows (including centralised and decentralised) can be identified for measurement and research / assessment purposes. In each community, politicians, planners, developers, industry and citizens should actively cooperate to optimise the sustainability of their energy flows.

### **Demonstration Actions**

1. In order to substantially improve the overall performance of energy systems in new and / or existing communities, CONCERTO projects should involve integrated demonstration actions, which are economically attractive for replication. The following three components are compulsory in a CONCERTO project, and proposals should include detailed information concerning the specific costs and expected performance of each component :A significant **increase in the share of renewable energy** sources consumed by the CONCERTO community (green electricity, heating / cooling)Where appropriate, **energy storage** may be included to cover the intermittence of RE supplies.

The size of each RE demonstration plant (and energy storage system where appropriate) should be clearly specified, together with the cost per MW installed. The renewable energy produced by a CONCERTO community should, as far as possible, be utilised within the CONCERTO community and should be managed in an optimised way to fit with the local energy demands. The approach adopted by the CONCERTO community, which aims to increase the share of RES consumed within its community, should be clearly explained.

2. **Eco-buildings** focus on innovative technological solutions within the context of an holistic approach to the design and operation of new or retro-fitted buildings, and should demonstrate ambitious reductions in energy consumption compared with national regulations for new buildings based on the Energy Performance of Buildings Directive, together with attractive payback periods. For CONCERTO, priority will be given to innovative demonstrations involving the refurbishment or retrofitting of existing buildings, aiming to achieve a lower energy consumption per m<sup>2</sup> than would be achieved by a new building which meets national regulations for new buildings based on the Energy Performance of Buildings Directive in the same location. Innovative demonstrations of highly cost effective new buildings, which achieve overall energy consumptions per m<sup>2</sup>, that are substantially lower (lower by at least 30%) than those specified in national regulations for new buildings based on the Energy Performance of Buildings Directive, may also be accepted.

The gross floor area of each type of building should be specified together with the predicted annual energy consumption per m<sup>2</sup>, (broken down by space heating, cooling, water heating, lighting, etc), and the energy consumption targets according to national regulations for new buildings based on the Energy Performance of Buildings Directive. Details should also be provided of the energy efficiency measures to be employed

3. **Intelligent management, control and measurement** of energy supplies, including local distribution grids and distributed generation, together with efficient energy demand management
4. **Polygeneration** (optional for CONCERTO communities) involves CHP and / or district heating, preferably using RE sources, which should demonstrate technological solutions which improve the competitiveness of innovative technologies or innovative combinations of existing technologies. Polygeneration demonstrations should address the interaction between suppliers of electricity, heat, cold, energy carriers or other useful products and the corresponding demands. They should lead to an overall improvement in energy efficiency, in cost-effectiveness, and in the quality and security of supply.

The size of each element (electricity, heating, cooling, other) of the polygeneration demonstration plant should be clearly specified, together with the cost per MWe installed. How the energy delivered by the polygeneration plant will be utilised by the CONCERTO community should also be explained.

#### **Short to medium term Research actions:**

Research actions should be directly linked to the objectives of the CONCERTO project concerned, typically addressing the management, measurement and analysis of the energy flows in the community. Where appropriate, research in a CONCERTO project may also address specific issues related to the innovative technologies or integration schemes that are being demonstrated.

#### **Composition of CONCERTO project Consortia :**

CONCERTO proposals should demonstrate substantial EU added value from technological cooperation between partners from different countries. CONCERTO proposals should provide evidence of a strong commitment from the relevant authorities, local market actors and decision-makers. Typical CONCERTO project consortia will also include, utilities, energy technology providers, energy service providers, energy agencies, energy research and analysis teams, socio-economists and energy users. The involvement of SME's in CONCERTO projects is important, whether they participate as partners or as sub-contractors, and their roles should be clearly

explained. Proposals from communities in countries or regions, where renewable energy and energy efficiency policies and commitments need to be strengthened, are particularly welcome. CONCERTO project consortia are expected to include Associated communities, which participate in the project, but do not receive EC support for demonstration actions in their own community. Such Associated communities should have a clear role in the project, contributing to the design, development and implementation of the technology demonstration actions, as well as to the research, analysis, promotion, and dissemination of results. They should also be committed to developing local policies and plans for increasing the sustainability of the energy systems in their own communities.

#### ***Structure of a typical CONCERTO project***

CONCERTO projects should involve the full menu of activities, typically including

- about 70% for **demonstration** (of the integration of Renewable Energy and Energy Efficiency technologies),
- up to about 20% for **research** (associated communities are welcomed to participate if appropriate), including the development and analysis of innovative technology integration schemes; technology and market/economic risk assessment; socio-economic analysis; and performance management, monitoring and optimisation of energy flows at the level of local communities,
- up to about 5% for the promotion and **dissemination** of project results, including the involvement of “associated communities”.
- up to about 2% for **training** (optional)
- up to about 7% for **management**

#### **Expected results**

Projects are expected to produce well monitored field experience of energy flows (supply and demand patterns), in local communities having a high percentage of renewable energy supply, together with detailed information on the performance and reliability of the innovative energy supply and end use technologies involved. A socio-economic research component should analyse the local trends in energy costs, prices and savings, as well as the social impacts, quality and added values of the energy services provided. The projects are also expected to include analyses of technical and market risks, cost reduction potentials and future market potentials for the technologies and approaches adopted.

The results from such projects will demonstrate the high potential for improving the sustainability of energy systems in cost effective ways in local communities, which can be achieved by addressing energy supply and demand with a fully integrated approach. They should also result in new “good practices”, which can be used in the future as examples to raise the confidence of potential decision-makers, investors and final users.

In addition, the technical and socio-economic analyses from such projects, which integrate technology, social and economic aspects, will support the future development and implementation of energy policy, by providing well documented field experience which can be used as a basis for

- developing new regulations (e.g. for distributed electricity generation),
- improving the security of energy supplies in future energy markets,
- the further development of support schemes for Renewable Energy and Energy Efficiency technologies (e.g. feed in laws, green certificate schemes, energy taxation),
- planning guidance, and
- energy cost and price reductions.

## **Thematic Promotion and Dissemination**

[Activity Codes: SUSTDEV-2005-1.1.8-1 to SUSTDEV-2005-1.1.8-7]

Proposals for Specific Support Actions (SSA's) are invited for the promotion and dissemination of the results of international, national, and / or other actions in all of the areas described in Sections 6.1.3.1, within which priority will be given to the highest quality proposals and, where appropriate, to proposals involving partners from countries or regions, where renewable energy and energy efficiency policies, support schemes and commitments need to be strengthened, as well as third countries (notably developing countries and emerging economies)

The promotion of renewable energy supplies together with the efficient management of energy demand and alternative motor fuels, should lead to well integrated, efficient and cost effective solutions for reducing the dependency of the EU on conventional fuels.

The actions proposed here should not replace the dissemination which is carried as part of each individual FP6 project, but should use the combined results from different projects as the basis for a thematic approach to promotion and dissemination.

The actions proposed here should be based mainly on promoting and disseminating the results of technology research and demonstration projects, including any lessons learned concerning the policy and legislative context in which they were implemented.

They should provide significant added-value to the actions which will be launched following the Call S-M 2005 (third Call). Actions which are designed mainly to tackle non-technological market barriers will not be funded in the research programme. Such proposals should be submitted to the Intelligent Energy – Europe programme. Together, these two programmes act as an incubator for the policies and measures that promote renewable energy technologies and the rational use of energy in the EU.

In particular, support is envisaged for actions which address :

**Renewable electricity technologies**, for use in large scale grid connected applications, including marketing campaigns and the dissemination of results from new technology demonstration projects. Each action should set its messages in the context of the relevant EU policy and legislation, for example the Directive on the promotion of electricity from renewable energy sources (2001).

**Renewable heating and cooling technologies**, for applications in buildings and industry, including marketing campaigns and the dissemination of results from new technology demonstration projects. Each action should set its messages in the context of the relevant EU policy and legislation, for example in the White Paper on renewable energy sources (1997).

**Production and distribution of liquid and gaseous biofuels**, for applications in buildings and transport, including marketing campaigns and the dissemination of results from new technology demonstration projects. Each action should set its messages in the context of the relevant EU policy and legislation, for example the Directives on Biofuels (2003).

**Eco-buildings**, for domestic and tertiary applications, including marketing campaigns and the dissemination of results from new technology demonstration projects. Each action should set its messages in the context of the relevant EU policy and legislation, for example the Directive on the Energy Performance of Buildings (2002).

**Polygeneration**, for applications in buildings and industry, including marketing campaigns and the dissemination of results from new technology demonstration projects. Each action should set its messages in the context of the relevant EU policy and legislation, for example the Directive on Cogeneration (2004).

**Energy demand management and renewable energy supply in high performance communities** , including marketing campaigns and the dissemination of results from new technology demonstration projects. Each action should set its messages in the context of the relevant EU policy and legislation, for example the Green Paper on the security of energy supplies (2001).

*Alternative Motor Fuels*, including marketing campaigns and the dissemination of results from new technology demonstration projects. Each action should be co-ordinated with the actions supported under the Biofuels Cities initiative, and set its messages in the context of the relevant EU policy and legislation, for example the Directives on Biofuels (2003).

## **CIVITAS Dissemination and Best Practice Transfer Action**

[Activity Code : SUSTDEV-2005-3.1.1.1.6]

Proposals are invited for a Specific Support Action (SSA) for the CIVITAS Initiative.

**Objective:** The CIVITAS Initiative addresses Energy and Transport objectives in an integrated way. The Clean Urban Transport demonstrations and evaluation activities undertaken within the CIVITAS are producing a wealth of experiences that are relevant for politicians, technicians and the scientific world. In the year 2006 the first group of demonstration projects is coming to an end. The objective of this action is to ensure that that these projects experiences are exploited up to a maximum level; that the validation and promotion of results and knowledge transfer are continued; that innovative means for dissemination and take up are implemented; that networks for information exchange are maintained and expanded; and that the wider impacts of CIVITAS are assessed.

**Scope:** The practical work programme should include studies and actions to promote the transfer and take up of project results; preparation of publications and topic-based best practice guides; establishment of interactive partnerships between cities; organised site-visits; 'on the job' information exchange and learning; presentations and workshops; international networking; impact studies; and the preparation of scientific articles and conferences.

**Expected results:** It is expected that the selected project will offer an umbrella for a number of activities that should address:

First target group - cities and local level actors:

- Ensuring knowledge transfer, identification, description and active promotion of the CIVITAS results and best practices through different means, paying attention to the achieved technical results, the processes and the framework conditions;
- Maintaining topic or project-based networks for information exchange and validation of results that were established between the CIVITAS demonstration cities at technical and political level, and enlarging them with committed 'newcomers';
- Establishing partnerships to transfer results between CIVITAS demonstration cities and cities that will be or are candidates for receiving funding to improve their urban transport systems in the framework of the European Union's Regional Policy.

Second target group – policy-makers and implementers at all levels:

- Assessing the contribution of CIVITAS and the project results to EU policy and development of policy recommendations, with a specific emphasis on the Lisbon Strategy, Sustainable Development Strategy, Energy policy, Transport policy and Environmental policy;
- Undertaking scientific validation of the CIVITAS project results, both public and political acceptance, as well as scientific validation, including some post-project monitoring, and ensuring a high quality and targeted dissemination of these results to the scientific world and to Member States programmes;

- Setting up, maintaining, where appropriate translating, and exploiting an electronic library of the educational material developed by the CIVITAS projects, as part of the CIVITAS website.

The selected project should consolidate, build on and provide added value to the results of the CIVITAS I and II demonstration projects and the activities undertaken by the METEOR and GUARD projects. Dissemination activities will also need to be coordinated with other energy and transport dissemination projects. The cities and local level actors that will benefit from the projects' activities should be (largely) identified in a transparent way after contract signature and should provide a reasonable own contribution.

### **6.1.3.2. Research activities having an impact in the medium and longer term**

In accordance with the principle of focussing research effort, the following sections 6.1.3.2.1 to 6.1.3.2.5 first describe the main objectives to be achieved and the strategically important areas in which research should be concentrated. They then go on to provide details of the technical content of the third call (Call 2005.ML) and the fourth call (Call 2006.ML). Section 6.1.3.2.6 sets out the areas and topics open in the fourth call.

Where appropriate, quantified targets are set out in the Work Programme. They are ambitious long-term targets (15-20 years) and not easy to achieve. Nevertheless, they are a clear indication of the scale of achievements to which an individual proposal should aspire.

#### **6.1.3.2.1. Fuel cells, including their applications**

*[Activity Code : SUSTDEV-1.2.1]*

Research is needed to reduce the cost and improve the performance, durability and safety of fuel cell systems for stationary and transport applications, to enable them to compete with conventional combustion technologies. This will include the optimisation and simplification of fuel cell components and sub-systems as well as modelling, testing and characterisation protocols. The long term goal is to achieve commercial viability by 2020 for many applications.

For fuel cells, the strategically important areas in which research should be concentrated are:

**1) the development of competitive fuel cell and related component technologies for stationary and transport applications** (*covering both low temperature fuel cell systems, including stacks, fuel processors, etc. and high temperature fuel cell systems*). RTD in this area will be on functional materials, manufacturing processes and component level development, aimed at improving performance and durability, whilst also reducing costs. *N.B. Aspects relating to materials research are the subject of a Co-ordinated Call with the nano-materials technologies programme – part of Thematic Priority 3. Where applicable, this is clearly indicated in the individual topics described below.*

**2) Fuel cell systems applications** (*research will concentrate on systems and integration for various applications, exploiting, where appropriate, synergies between applications, e.g. technologies for multi-fuel capability*). In this area the research will include mathematical modelling, systems simulation and testing, system simplification and optimisation and cost reduction of auxiliary components and balance of plant. Stationary fuel cell CHP systems for small domestic (~ 1 to 5kW) and large scale de-centralised (MW scale) are covered in this section. Medium scale stationary (typically 100-500kW), and large and small FC systems and generic on-board fuel processing for transport (APUs, automotive, truck, rail, marine and aircraft applications) are covered under the *Joint Call on component development and systems integration of hydrogen and fuel cells for transport and other applications* with the express intention to promote component and sub-system synergies for these applications (see section 6.1.4.2.2).

**Research areas and topics for 2005 (Call 2005.ML) – Call closed.**

See Revision 3 of the Work Programme for details of this closed call.

Projects arising from this call will be financed from both the 2005 and 2006 budgets.

**Research areas and topics for 2006 (Call 2006.ML)**

See Section 6.1.3.2.6 of this Work Programme for details of the areas and topics open in this call.

***6.1.3.2.2. New technologies for energy carriers/transport and storage, in particular hydrogen***

*[Activity Codes : SUSTDEV-1.2.2 (hydrogen); SUSTDEV-1.2.3 (electricity)]*

Hydrogen and electricity have the potential to become the principal, interlinked energy carriers in a future sustainable energy economy. Together they can provide a unique pathway for gradually becoming progressively less dependent on fossil fuels, reducing greenhouse gas and pollutant emissions and increasing the contribution of renewable energy sources.

In the long term, hydrogen could play a key role in adapting energy supply to energy demand as hydrogen has the potential for large-scale, even seasonal, energy storage. The transition towards future sustainable energy networks based on a large share of renewable and distributed generation requires the preparation of the European energy system for the large-scale integration of Distributed Energy Resources (DER). This concept will play a key role in transforming the conventional electricity transmission and distribution grid into a *unified and interactive energy service network* using common European planning and operation methods and systems.

For hydrogen, the strategically important areas in which research should be concentrated are : **clean production** (*development and techno-socio-economic assessment of cost-effective pathways for hydrogen production from existing and novel processes*), **storage** (*exploration of innovative methods, including hybrid storage systems, which could lead to breakthrough solutions*), **basic materials** (*functional materials for electrolysers and fuel processors, novel materials for hydrogen storage and hydrogen separation and purification*), **safety** (*pre-normative RTD required for the preparation of regulations and safety standards at EU and global level*), and **preparing the transition to a hydrogen energy economy** (*support the consolidation of current EU efforts on hydrogen pathway analysis and road mapping*).

For electricity, the strategically important areas in which research should be concentrated are : **a new approach for large-scale implementation of Distributed Energy Resources (DER) in Europe** (*design, development and validation of novel components and DER solutions needed for future interactive energy service networks, including the integration of intermittent Renewable Energy Sources and Distributed Generation*), and **the development of key enabling technologies** (*for distributed energy networks with high*

energy efficiency, power quality and security of service, including analysis of RTD needs for transmission systems; advanced power electronic converters and distributed storage systems for network applications; and high temperature superconductor based components for electrical applications, such as generators, fault current limiters and transformers).

**Research areas and topics for 2005 (Call 2005.ML) – Call closed.**

See Revision 3 of the Work Programme for details of this closed call.

Projects arising from this call will be financed from both the 2005 and 2006 budgets.

**Research areas and topics for 2006 (Call 2006.ML)**

See Section 6.1.3.2.6 of this Work Programme for details of the areas and topics open in this call.

**6.1.3.2.3. *New and advanced concepts in renewable energy technologies***

[Activity Codes : SUSTDEV-1.2.4 (PV); SUSTDEV-1.2.5 (biomass); SUSTDEV-1.2.6 (Other RES)]

Renewable energy technologies have, in the long term, the potential to make a large contribution to the EU and world energy supply. The main targets are to decrease the cost of electricity and fuel to competitive levels through developing highly efficient concepts and bringing about major cost reductions in the entire production chain, as well as improving the reliability, safety, availability and durability of renewable energy systems.

For **photovoltaics**, the strategically important areas in which research should be concentrated are : **innovative concepts and fundamental materials research for the next generation of PV technologies** (e.g. organic or hybrid solar cells), **thin film PV technology** (development of cost-effective PV cells and modules based on new and improved technologies and materials), **PV processing and automated manufacturing technologies** (to reduce the costs and improve materials usage in the manufacture of PV cells and modules), **PV components and systems – balance of systems** (research into components and their integration into the overall system) and **the research for innovative applications of PV in buildings and the built environment** (to develop integrated PV module systems which are configured for ease of mounting on building roofs and facades, hybrid PV/heating systems). The main targets are to: decrease the investment cost for PV systems to 1-2 €/Wp (with a module cost of 0.5-1 €/Wp) by 2015 and to decrease PV electricity cost to significantly below 0.1 €/kWh by 2015.

For **biomass**, the strategically important areas in which research should be concentrated are : RTD for **reliable, efficient and cost-effective combustion technologies** (with significant reduction of atmospheric pollutants, operation of large scale systems with multifuel resources including co-firing, self-running processes for small scale systems using standardised feed-stock), **reliable and cost-effective gasification systems** (aimed at the efficient production of electricity and clean hydrogen-rich gas), **new methods for cost effective production of clean biofuels** (primarily from lignocellulosic feedstock) **to be used in combustion engines and fuel cells including pre-normative research and standardisation, energy from bio-residues and energy crops** (innovative, low emission waste-to-energy and crop-to-energy concepts and technology development) and **biomass**

**fractionation processes (bio-refinery)** for the integrated production of energy and other products. The main targets are: to decrease the cost of electricity production with biomass to 0.05 €/kWh by 2015-2020 and to decrease the cost of biofuels to 10 €/GJ (0.036 €/kWh) by 2020.

For **other renewable energy sources** having the potential to contribute significantly to the EU energy supply in the medium-to-long term, the strategically important areas in which research should be concentrated are : **wind** (*research and integration of efforts needed to solve the challenges of on- and off-shore systems by developing innovative new materials, enhanced aerodynamics, and novel designs for structures and foundations, along with associated pre-normative research. Methods and techniques that reduce the uncertainty of costs and production, on the basis of more accurate and cheaper measurement and modelling of site climate conditions - both for resource assessment and design*), **geothermal** (*to verify the technical feasibility, cost-effectiveness and environmental sustainability of electricity production from enhanced geothermal systems and other unconventional geothermal resources, through innovative research into exploration, resource assessment and management techniques, cheaper and more advanced drilling and stimulation technologies, and more efficient power cycles*), **ocean** (*new concepts to improve the availability and predictability of deliverable energy, coupled with better installation and production methods, and harmonised testing methods to support the development of cheaper and safer on- and offshore systems*), and **concentrated solar thermal** (*for electricity and heat generation: new concepts for low-cost, efficient and reliable components and systems, and hybrid systems capable of operating with solar and other fuels; for non-electrical processes: high temperature chemical solar reactors for the production of energy carriers such as hydrogen*). The main target is to decrease the cost of electricity production with these RES to 0.05 €/kWh by 2020.

**Research areas and topics for 2005 (Call 2005.ML) – Call closed.**

See Revision 3 of the Work Programme for details of this closed call.

Projects arising from this call will be financed from both the 2005 and 2006 budgets.

**Research areas and topics for 2006 (Call 2006.ML)**

See Section 6.1.3.2.6 of this Work Programme for details of the areas and topics open in this call.

#### **6.1.3.2.4. Capture and sequestration of CO<sub>2</sub>, associated with cleaner fossil fuel plants**

[Activity Code : SUSTDEV-1.2.7]

Global and EU energy supply will, for the foreseeable future (2015 - 2020), be dominated by fossil energy sources. However, their CO<sub>2</sub> emissions are a major drawback in the context of global climate change. The challenge is therefore to be able to use these fossil fuels whilst eliminating CO<sub>2</sub> through cost-effective capture and sequestration and at the same time maintaining EU industrial competitiveness in global markets. *Targets: reduce the cost of CO<sub>2</sub> capture from 50-60 € to 20-30 € per tonne of CO<sub>2</sub> captured, whilst aiming at achieving capture rates above 90%, and assess the reliability and long term stability of sequestration.*

For capture and sequestration of CO<sub>2</sub>, the strategically important areas in which research should be concentrated are : **post-combustion CO<sub>2</sub> capture** (RTD on new and retrofit options for post-combustion capture of CO<sub>2</sub> and suitability for subsequent sequestration options.), **pre-combustion CO<sub>2</sub> capture** (RTD on pre-combustion CO<sub>2</sub> capture options such as de-carbonisation and oxy-fuel techniques. RTD on suitability of captured gases for subsequent sequestration options will form part of this research.), **geological sequestration of CO<sub>2</sub>** (RTD aiming at safe, reliable and stable cost-effective sequestration options such as saline aquifers, enhanced coal bed methane and enhanced oil recovery. Sequestration potential, long term geological stability and geochemical interactions, public acceptance and cost are key issues.), and **chemical/ mineral sequestration of CO<sub>2</sub>** (Comparison of the available options, as well as other innovative solutions and uses of the products. Public acceptance, sequestration potential, transport and mining activities, environmental impact, applied chemistry and kinetics are key issues.).

#### **Research areas and topics for 2005 (Call 2005.ML) – Call closed.**

See Revision 3 of the Work Programme for details of this closed call.

Projects arising from this call will be financed from both the 2005 and 2006 budgets.

#### **Research areas and topics for 2006 (Call 2006.ML)**

See Section 6.1.3.2.6 of this Work Programme for details of the areas and topics open in this call.

#### **6.1.3.2.5. Socio-economic tools and concepts for energy strategy**

[Activity Code : SUSTDEV-1.2.8]

Socio-economic research related to energy RTD will be systematically integrated into research carried out in the technological areas described in the preceding sections. Nevertheless, common and harmonised tools should be developed to tackle the complex social and economic issues of new energy technologies. Competition with conventional energy technologies in a medium to long term perspective, questions of socio-environmental damages of energy production and consumption, of the implementation of new and emerging energy technologies into society and of shaping the future sustainable

energy system should be covered. Foresight exercises should be carried out to build up strategies for energy governance as well as to define alternative ways to achieve sustainable development objectives.

For socio-economic tools and concepts, the strategically important areas in which research should be concentrated are: **energy total costs** (*to evaluate and compare the systems costs including the quantification of the social and environmental damages*), **social acceptability and behaviour** (*optimal conditions for implementing the medium and long term energy technologies including economic aspects, consumer preferences and citizen needs*), **socio-economic impact of sustainable policies** (*to evaluate these policies in a EU and world perspective, especially focusing on the New EU Member States and the Mediterranean Countries*), **quantitative and qualitative forecasting methods** (*Energy-Economy-Environment forecasts for the long and very long-term, i.e.2030-2100 dealing with issues such as resource depletion, climate change, radioactive waste management and ethical issues*).

**Research areas and topics for 2005 (Call 2005.ML) – Call closed.**

See Revision 3 of the Work Programme for details of this closed call.

Projects arising from this call will be financed from both the 2005 and 2006 budgets.

**Research areas and topics for 2006 (Call 2006.ML)**

See Section 6.1.3.2.6 of this Work Programme for details of the areas and topics open in this call.

**6.1.3.2.6. Priorities for the 4<sup>th</sup> MLT Call for Proposals (Call 2006-ML)**

The areas and topics open for the fourth call for “research activities having an impact in the medium and longer term” (Call 2006.ML; Call ID FP6-2005-Energy-4) are described in the box below.

**Research areas and topics for 2006 (Call 2006.ML)**

**1. Preparing the transition to FP7 and support to the running of technology platforms**

a) Proposals to support the establishment and running of European Technology Platforms in the fields of “**biofuels for transport**”, “**electricity networks of the future**” and “**zero emission fossil fuel power generation**”.

*Instrument: this topic is open only for SSA proposals. To address the goals of this topic it is expected that more than one SSA could be funded.*

b) Proposals for the networking and coordination of research and innovation activities in the areas of:

- **Fuel cells:** up to two coordination actions may be funded, addressing i) High Temperature MEAs for PEM FC, and ii) SOFC systems (especially large scale),

including aspects relating to Balance of Plant and possibly power electronics. Emphasis should be on the coordination of leading edge research, involving new partners capable of contributing fresh input. These CA's will facilitate the comprehensive coordination and networking between ongoing European actions and will be required to support the further development and refinement of the Strategic Research Agenda of the European hydrogen and fuel cell technology platform;

- **CO2 capture and storage:** with particular emphasis on building upon and extending the networking activity in this area of RTD to new Member States and linking with the technology platform on zero emission power generation; and
- **Stable organic PV cells and modules:** the objective is to co-ordinate the EU research in the area of organic and dye-sensitized nanocrystalline materials, with a view to the accelerated development of low-cost, stable PV cells. Activities could include the development of a research strategy for the area, the setting-up of efficient tools and structures for communication between researchers, and dissemination of information to industry. Efforts should be made to include innovative SMEs.

*Instrument: this topic is open only for CA proposals. To address the goals of this topic it is expected that more than one CA could be funded.*

c) Supplementary proposal to extend the duration and activities of the running FP6 project HyCELL-TPS, providing the Secretariat for the European hydrogen and fuel cell technology platform (Contract No. 006272).

*Instrument: this topic is open only for a proposal to supplement the work being carried out by this SSA project. To address the goals of this topic it is expected that one SSA extension could be funded.*

NOTE: For the above Coordination Actions and Specific Support Actions, the involvement of committed stakeholder organisations is strongly encouraged and they would be expected to contribute to the costs of the activity, where appropriate (i.e. the EC contribution is expected to be significantly less than 100% of the total costs).

## **2. Enhancing strategically important international cooperation initiatives**

Proposals for projects to facilitate and enhance the international cooperation dimension of running FP6 projects dealing with major technical and non technical barriers to hydrogen and fuel cell deployment and CO2 capture and storage technologies. Preference will be given to proposals designed to stimulate co-operation and exchange through the established international cooperation frameworks IPHE<sup>7</sup> and CSLF<sup>8</sup> and their recognised projects. Activities could include, for example, workshops, studies, joint dissemination activities, actions addressing cross validation and calibration of theoretical studies and experimental results, benchmarking, round-robin testing, gap analysis and development of complementary research action plans and strategies.

*Instrument: this topic is open only for SSA and STREP proposals. To address the goals of this topic it is expected that more than one SSA or STREP could be funded. Note that the normal rules for participation of Third and INCO country partners will apply. Proposal*

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<sup>7</sup> International Partnership for the Hydrogen Economy (IPHE) members : Australia, Brazil, Canada, China, France, Germany, Iceland, India, Italy, Japan, Korea, Norway, Russia, United Kingdom, United States, European Commission.

<sup>8</sup> Carbon Sequestration Leadership Forum (CSLF) members : Australia, Brazil, Canada, China, Colombia, European Commission, Germany, India, Italy, Japan, Mexico, Norway, Russian, Federation, South Africa, United Kingdom, United States.

consortia should include European partner(s) representing the running FP6 project (e.g. co-ordinator or work package leader) as well as the international partner(s). If appropriate and more cost-effective, the EC may consider merging the new activities with the corresponding running FP6 projects.

### **3. Strategically important topics not well covered by running projects**

a) **Integrated production of energy and other products through the concept of biorefinery.** The objective is to cover the whole chain from various biomass feedstock to upgraded bio-products (chemicals and/or materials), refined fuels and energy through the biorefinery approach. Research should address advanced fractionation and conversion processes combining biochemical and thermochemical pathways. The proposal should involve process development from lab scale to pilot plant.

*Instrument: this topic is only open for IP proposals. To address the goals of the topic, it is expected that one IP could be funded.*

b) **Pre-normative research and standardisation on solid biofuels.** Research should address the development of rapid testing methods and quality management and should aim to prepare for future standardisation and certification.

*Instrument: this topic is only open for STREP proposals. To address the goals of the topic, it is expected that one STREP could be funded.*

c) **R&D on high throughput industrial manufacturing of thin-film silicon PV modules using low-cost roll-to-roll technology.** The objective is to develop roll-to-roll technology for multi-junction thin film silicon resulting in modules costing less than 0.5 €/Wp and with at least 11% efficiency and with a stability of more than 20 years.

*Instrument: this topic is only open for STREP proposals. To address the goals of the topic, it is expected that one STREP could be funded.*

d) **Research to support the development of permitting guides for the installation of (small-sized) stationary hydrogen and fuel cell-based systems with the aim of establishing a common EU reference code of best practice, to remove non-technical and safety barriers.** Critical areas to be addressed comprise safety concepts for stationary fuel cell systems, including H<sub>2</sub> storage, delivery and on-site production. The work to be carried out could include appropriate research activities to support the definition of best practice for safe handling and use of hydrogen, as well as system and component development and testing, including sensors. This pre-normative effort should build on current and previous RTD and demonstration experiences in the area, and should be aligned with relevant EU and international research and standardisation activities, with the aim of providing the basis for a framework comprising regulations and codes of best practice.

*Instrument: this topic is open only for STREP proposals. To address the goals of this topic it is expected that one STREP could be funded. Opportunities for including research organisations from third countries specialising in relevant pre-normative research should be explored, in particular those participating in the IPHE.*

e) **Experimental test sites for Monitoring and Verification of CO<sub>2</sub> Storage with Enhanced Coal Bed Methane.** The main objective of the work is to prove the reliability and safety, in the long term, of the CO<sub>2</sub> stored in ECBM and to provide the R&D necessary to have a basis for monitoring, measurement and verification leading to guidelines for site certification and broadly accepted standards. An important element is the simulation studies and monitoring, measurement and verification tools needed for the research. Also important is the development of tools to study the long term behaviour of CO<sub>2</sub> in CBM reservoirs as well as to prove storage integrity.

*Instrument: this topic is open only for STREP proposals. To address the goals of this topic it is expected that one STREP could be funded. The inclusion of research organisations from third countries is important – including in particular those participating in the Carbon Sequestration Leadership Forum (CSLF).*

**f) Assessing the potential for a hydrogen-oriented economy in the New Member States and Accession Countries.** Comparative analysis of regional hydrogen supply options and energy scenarios, including renewable energies, leading to the formulation of realistic regional options to build a hydrogen energy infrastructure. This activity must be compatible with the methodology being developed in the running FP6 project HyWAYS.  
*Instrument: this topic is open only for SSA proposals. To address the goals of this topic it is expected that one SSA could be funded. If appropriate and more cost-effective, the EC may consider merging the new activities with the corresponding running FP6 project.*

**g) System integration, development, test and validation of new generation, small distributed domestic PEMFC CHP systems (1 to 5 kW) fuelled by reformed gaseous hydro-carbon fuels and developed from a global market perspective.** To develop packaged solutions for small international fuel cell combined heat and power systems, with 40,000 hour durability, 40% electrical efficiency and with a target cost of 400€/kW (at production volumes). Research and development will focus on system level issues including: new system design; modularity; system modelling and integration; balance of plant; electronic control systems for optimal heat and power management; grid connection; fully integrated natural gas fuel processor; system safety; energy/environmental life cycle analysis; bench marking and verification of components and systems; and recycling and disposal.

*Instrument: this topic is open only for STREP proposals. To address the goals of this topic it is expected that one STREP could be funded.*

*Important Note: Within the framework of the existing EU-US Cooperation Agreement on fuel cells, this project is intended to be a EU-US collaborative effort, with funding provided from both sides to the corresponding participant organisations, as a result of co-ordinated calls in the EU and US. This topic will only receive an EU contribution if the proposers succeed in securing financing from the EU and US sides and satisfactory implementation arrangements are signed. Information on the US call can be found at: <http://www.eere.energy.gov/hydrogenandfuelcells/financial.html>*

## 6.1.4. Links to Other Research Topics and Technical Content of Joint Calls

### 6.1.4.1. Links to other research topics - general

Activities will be integrated and co-ordinated, as necessary, within and between actions and activities in this and other priorities, including the activities of the Joint Research Centre and national programmes.

#### Co-ordination within this priority thematic area (No. 6)

The potential for future collaboration will be closely monitored in the following areas :

- Priority 6.2 : Sustainable surface transport;
- Priority 6.3 : Global change and eco-systems.

Proposals that address more than one thematic area will be accommodated by the Commission, provided the proposal addresses areas covered by this work programme. The general principle for the submission of proposals is:

- Proposals must clearly address the objectives and priorities set out in the relevant work programme sections and should be submitted to the priority area to which they are most closely linked. For example, generic RTD on fuel cells (stacks, catalysis, components, systems, ...) is tackled in the medium to long term priorities of sustainable energy systems; research for the integration of stacks, components and systems into transport vehicles should be dealt with by sustainable surface transport.

#### Co-ordination with other priority areas for research

The potential for future collaboration will be closely monitored in the following areas :

- Priority 2 : Information Society technologies;
- Priority 3 : Nanotechnologies and nanosciences, knowledge-based multifunctional materials and new production processes and devices;
- Supporting policies and anticipating scientific and technological needs;
- Support for the co-ordination of national activities.

Proposals that address more than one thematic area will be accommodated by the Commission, provided the proposal addresses areas covered by this work programme. The general principle for the submission of proposals is:

- Proposals which intend to develop a new technology (e.g. information and communication, biotechnology, nanotechnology, ...) should seek funding from the priority area most directly linked with such a technology; proposals aimed at the use or integration of a given technology in RTD activities to pursue the objectives of “Sustainable “Energy Systems” should be addressed to this priority.

In addition, it should be noted that energy related RTD may also be carried out in the context of the Specific Programme “Structuring the European Research Area”, for example in the areas of “*horizontal research activities involving SMEs*”, “*specific measures in support of international co-operation*”, “*human resources and mobility*”, “*research infrastructures*”, and “*science and society*”.

## **6.1.4.2. Technical Content of Joint Calls in the field of hydrogen and fuel cells**

### **6.1.4.2.1. Rationale**

Hydrogen and fuel cell technologies are recognised as core long term technologies for realising global sustainable energy. Hydrogen complements electricity and together they represent the most promising mass market energy vectors for delivering sustainable energy for stationary heat and power and transport in the long term. However hydrogen and fuel cell energy systems represent a radical paradigm shift in the way Europe produces and uses energy. To bring hydrogen and fuel cells to the point of commercial readiness and viability in terms of performance and cost, substantial effort on research, technological development and validation is still needed.

The availability of new materials with improved performance and at competitive cost will be a key factor to commercialisation. In particular, nanotechnology can open new solutions for innovative products and processes.

Deepening co-operation through co-ordinated and joint calls will deliver benefits in terms of building critical mass, better coverage of the domain, cross-fertilisation of ideas between an extended range of disciplines and stakeholders, and ensure that cross-cutting evaluations deliver the best strategic combination of complementary projects.

Where appropriate, Integrated Projects should address societal, health, environmental, ethical and regulatory issues. In particular, validation and benchmarking, as well as education and training aspects should be included. Strategies for management of risk should be included in IPs, where relevant. All IPs should have strong industrial participation.

A well co-ordinated, strategically selected set of FP6 projects will provide a concerted and essential technical input to the European Hydrogen and Fuel Cell Technology Platform, as well as to the transport related technology platforms ERTRAC, ERRAC and ACARE and the Alternative Motor Fuels policy initiative. It will also help establish the definition and detailed planning phase of a substantial and broad ranging hydrogen communities technology initiative designed to stimulate growth and accelerate the move towards the hydrogen economy, under the Growth initiative<sup>9</sup>

The results of the activities to be funded under these joint and other coordinated calls on the field of H<sub>2</sub> and fuel cells will form the basis for delivering the technologies which should be tested, validated and demonstrated in the hydrogen economy projects identified as Quick-Start in the Growth initiative.

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<sup>9</sup> Following the Growth Initiative (\*), the European Council of 12 December 2003 invited the European Commission to implement public private partnerships and to orient projects and funds in the field of hydrogen towards the priorities identified in the Quick Start Programme, namely hydrogen production and use in communities.

(\*) COM(2003)690: Commission Communication on a European initiative for Growth investing in networks and knowledge for growth and jobs. It includes the so-called "Quick Start Programme"

**6.1.4.2.2. *Joint Call on component development and systems integration of hydrogen and fuel cells for transport and other applications***

(Joint Call between Thematic Priorities 4, 6.1.ii and 6.2 – Call closed.)

See Revision 3 of the Work Programme for details of this closed call.

Projects arising from this call will be financed from both the 2005 and 2006 budgets.

**6.1.4.2.3. *Joint Call for the support of the co-ordination, assessment and monitoring of research to contribute to the definition phase for a hydrogen communities initiative***

(Joint Call between Thematic Priorities 4, 6.1.ii and 6.2 – Call closed.)

See Revision 3 of the Work Programme for details of this closed call.

Projects arising from this call will be financed from both the 2005 and 2006 budgets.

**6.1.4.2.4. *Co-ordinated Calls on materials development and processes for fuel cells and sustainable hydrogen production and storage technologies***

(Co-ordinated Calls between Thematic Priorities 3 and 6.1.ii)

See the December 2004 Edition of the Priority 3 (NMP) Work Programme for details of a complementary call (FP6-2004-NMP-TI-4) dealing with other aspects of the above areas. The call will close in September 2005.

## **6.1.5. Implementation Plan and Related Issues**

### **6.1.5.1. Indicative timetable and budget attribution (roadmap)**

It is intended to implement the Programme through a series of Calls for Proposals, with fixed closing dates. Table 1 shows the indicative roadmap for the whole of the Sixth Framework Programme.

Specific details of the calls for proposals are provided in Sections 6.1.6 (Call information) and 6.1.3 (Technical content).

### **6.1.5.2. Evaluation criteria**

The set of criteria applicable to this work programme, together with the corresponding evaluation thresholds, is given in Annex B. In addition, Annex B outlines how the following will be addressed: gender issues, ethical and/or safety aspects, and the education dimension.

### **6.1.5.3. Information Days**

The European Commission, EU Member States and Associated States frequently organise Information Days, where those interested in submitting proposals may attend for a presentation of the Calls and the Framework Programme, obtain documentation, ask questions and meet potential consortium partners.

Details of Information Days planned by the Commission are available on the Cordis website:

<http://www.cordis.lu/sustdev/energy/>

For national Information Days, please contact the relevant National Contact Point:

<http://www.cordis.lu/fp6/ncp.htm>

**Table 1 : Roadmap**

The following table shows the indicative timetable and budget allocation for the whole of the duration of the Specific Programme. In addition, for each call, the technical areas open and the types of instrument\* to be used are also shown. N.B. The Joint Calls are shown separately in Table 2.

Call Identifier :	2003.SM	2003.ML	2004.SM	2004.ML	2005.SM	2005.ML	2006.SM	2006.ML
<b>Planned launch date :</b>	17 December 2002		17 June 2003	10 Oct 2003	8 June 2004	8 Sept 2004	June 2005	Sept 2005
<b>Planned closing date :</b>	18 March 2003		17 December 2003		8 December 2004		December 2005	
<b>Research activities having an impact in the short and medium term</b>								
<i>6.1.3.1.1 Cost-effective supply</i>	IP, STRP, CA, SSA	-	-	-	IP, STRP, CA, SSA	-	STRP, CA, SSA	-
<i>6.1.3.1.1.2 Large-scale integration</i>	CA, SSA	-	IP (CONCERTO), STRP, CA, SSA	-	-	-	IP (CONCERTO)	-
<i>6.1.3.1.2.1 Eco-buildings</i>	IP, STRP	-	IP only (CONCERTO)	-	-	-	IP (CONCERTO), STREP, SSA	-
<i>6.1.3.1.2.2 Polygeneration</i>	-	-	IP only (CONCERTO)	-	IP, STRP, CA, SSA	-	IP (CONCERTO), STREP, SSA	-
<i>6.1.3.1.3 Alternative motor fuels</i>	IP, STRP, CA, SSA	-	IP, SSA	-	IP, STRP, CA, SSA	-	SSA	-
<b>Research activities having an impact in the medium and longer term</b>								
<i>6.1.3.2.1 Fuel cells</i>	-	All instr.	-	CA, SSA	-	IP, NoE, STRP, CA	-	IP, STRP, CA, SSA
<i>6.1.3.2.2 Energy carriers</i>	-	All instr.	-	CA, SSA	-	IP, NoE, STRP, CA	-	
<i>6.1.3.2.3 Renewables</i>	-	All instr.	-	CA, SSA	-	IP, NoE, STRP, CA	-	
<i>6.1.3.2.4 CO<sub>2</sub> sequestration</i>	-	All instr.	-	CA, SSA	-	IP, NoE, STRP, CA	-	
<i>6.1.3.2.5 Socio-economic tools</i>	-	All instr.	-	CA, SSA	-	IP, NoE, STRP, CA	-	
<b>Indicative % of the overall budget</b>	10%	24.5%	13%	0.5%	16%	25%	15%	2.25%
<b>Indicative Budget</b>	82 M€	198 M€	107 M€	up to 3 M€	132M€	190 M€	125M€	20 M€
<b>Tentative % for the New Instruments</b>	65%	65%	65%	0%	65%	65%	65%	40-50%

*Notes: Dates and budget figures are indicative. Applicants should verify the closing dates in the text of the relevant call, as published in the Official Journal. The proposals will be evaluated and selected according to the guidelines and procedures laid down in the Guidelines on Proposal Evaluation Procedures, using the single stage submission procedure. Complementary calls could be launched if the proposals from above calls do not adequately cover the priority topics of the WP. These complementary calls could also include funds for topping up or expanding consortia in on-going activities.*

\* Integrated Projects (IP), Networks of Excellence (NoE), Specific Targeted Research Projects (STRP), Co-ordination Actions (CA) and Specific Support Actions (SSA).

**Table 2 : Roadmap for joint calls in the area of hydrogen and fuel cells**

<b>Call Identifier :</b>	<b>Joint Call (1)</b>	<b>Joint Call (2)</b>
<b>Planned launch date :</b>	8 June 2004	8 June 2004
<b>Planned closing date :</b>	8 December 2004	8 December 2004
<b>Thematic priorities involved in the Joint Call</b>	4, 6.1.ii and 6.2	4, 6.1.ii and 6.2
<b>Instruments</b>	IP, STRP	IP
<b>Indicative Budget</b>	35 M€	4.5 M€
<b>Tentative % for the New Instruments</b>	65%	100%
<i>Notes: Dates and budget figures are indicative. Applicants should verify the closing dates in the text of the relevant call, as published in the Official Journal.</i>		
<i>The proposals will be evaluated and selected according to the guidelines and procedures laid down in the Guidelines on Proposal Evaluation Procedures, using the single stage submission procedure.</i>		

Note : There are also Co-ordinated Calls on “materials development and processes for fuel cells and sustainable hydrogen production and storage technologies”, in conjunction with Thematic Priority 3 (nanotechnologies). Topics relating to these areas are included in the Call 2005.ML described in this Work Programme. A complementary call, dealing with other aspects of the same areas, is being undertaken by the Thematic Priority 3 (NMT): Call FP6-2004-NMP-TI-4, closing in September 2005.

## 6.1.6. Call Information

The following sections describe the indicative content of the Calls for Proposals envisaged to cover the final two years of FP6. Note, however, that only the Call Information published in the Official Journal has legal effect.

### 6.1.6.1. Content of Call 2005.SM<sup>10</sup>

*Call closed.*

1. **Specific Programme:** Integrating and strengthening the European Research Area
2. **Activities:**
  - Priority thematic area of research “Aeronautics and Space”.
  - *Priority thematic area of research “Sustainable development, global change and ecosystems”. Sub-priority “Sustainable energy systems”*
  - Priority thematic area of research “Sustainable development, global change and ecosystems”. Sub-priority “Sustainable surface transport”
3. **Call title:** Periodic call in the area of “Aeronautics and Space”, “*Sustainable energy systems*” and “Sustainable surface transport”.
4. **Call identifier:** FP6-2004-TREN-3
5. **Date of publication**<sup>11</sup>: 8 June 2004
6. **Closure date(s)**<sup>12</sup>:
  - “Aeronautics and Space”:
  - “*Sustainable energy systems*”: **8 December 2004 at 17.00 (Brussels local time).**
  - “Sustainable surface transport”:
7. **Total indicative budget:** 252 M €, broken down as follows
  - “Aeronautics and Space”: 64 M€
  - “*Sustainable energy systems*”: **132 Million €**
  - “Sustainable surface transport”: 56 M €

Instrument <sup>13</sup>	€ (millions)
IP	176
STREP and CA	76
SSA	

<sup>10</sup> Note that the call for the short-to-medium term part of “sustainable energy systems” will form part of a call including elements of “aeronautics and space” as well as “sustainable surface transport”.

<sup>11</sup> The director-general responsible for the publication of this call may publish it up to one month prior or after its envisaged publication date.

<sup>12</sup> When the envisaged publication date is either advanced or delayed, closure date(s) will be adjusted accordingly, if needed, in the published call for proposals.

<sup>13</sup> IP = Integrated project; NOE = Network of excellence; STREP = Specific targeted research project; CA = Coordination action; SSA = Specific support action

## 8. Areas called and Instruments:

– Aeronautics and Space

Area	Topic	Instrument

– *Sustainable energy systems*

Area	Topic	Instrument
Section 6.1.3.1.1.1 « Cost effective supply of renewable energies »	Innovative combinations of biomass with fossil fuels	IP
	Innovative demonstrations of improvements to energy recovery and renewable electricity production using waste materials and other commonly available biomass feedstocks	IP
	Innovative approaches to improving the yield of medium to large scale biogas plants	STREP
	Innovative combinations of biomass and wastes with fossil fuels	STREP
	Innovative wind farms, components and design tools	STREP
	Innovations in PV manufacturing plant at industrial scale	STREP
	Geothermal energy	STREP
	Ocean / marine energy technologies	STREP
	All	CA and SSA
	Section 6.1.3.1.1.2 “Large scale integration of renewable energy sources and energy efficiency” and Section 6.1.3.1.2.2 “Polygeneration”	Grid issues - Distributed electricity generation
Grid issues - Management of electricity grids linked to large scale decentralised wind power generation		STREP, CA and SSA
Section 6.1.3.1.2.2 “Polygeneration”	Improvement of the competitiveness of polygeneration	IP and STREP
	Innovative integration of polygeneration	IP and STREP
Section 6.1.3.1.3 “Alternative motor fuels”	Biofuel-Cities.	IP, STREP, CA
	Hydrogen for transport	IP, CA
Section 6.1.3.1. “Thematic promotion and dissemination”	Renewable electricity technologies	SSA
	Renewable heating and cooling technologies	SSA
	Production and distribution of liquid and gaseous biofuels	SSA
	Eco-buildings	SSA
	Polygeneration	SSA

	Energy demand management and renewable energy supply in high performance communities	SSA
	Alternative motor fuels	SSA

– Sustainable surface transport

Area	Topic	Instrument

**9. Minimum number of participants<sup>14</sup>:**

Instrument	Minimum number of participants
IP, STREP and CA	3 independent legal entities from 3 different MS or AS, with at least 2 MS or ACC
SSA	1 legal entity from a MS or AS

**10. Restriction on participation:** None.

**11. Consortia agreements:**

- Participants in IP are required to conclude a consortium agreement.
- Participants in STREP, CA, and SSA resulting from this call are encouraged, and may be required, to conclude a consortium agreement.

**12. Evaluation procedure:**

- The evaluation shall follow a single stage procedure.
- Proposals will not be evaluated anonymously.

**13. Evaluation criteria:** See Annex B of the work programme for the applicable criteria (including their individual weights and thresholds and the overall threshold) per instrument.

**14. Indicative evaluation and contractual timetable:**

- Evaluation results: estimated to be available within some 4 months after the closure date
- Conclusion of first contracts: it is estimated that the first contracts related to this call will come into force 8 months after the closure date.

**15. Additional terms:**

- It is expected that this call should not result in more than 40 to 50 projects

<sup>14</sup> MS = Member States of the EU; AS (incl. ACC) = Associated States; ACC = Associated candidate countries.

Any legal entity established in a Member State or Associated State and which is made up of the requested number of participant may be the sole participant in an indirect action.

## 6.1.6.2. Content of Call 2006.SM<sup>15</sup>

1. **Specific Programme:** Integrating and strengthening the European Research Area
2. **Activities:**
  - Priority thematic area of research “Aeronautics and Space”.
  - *Priority thematic area of research “Sustainable development, global change and ecosystems”. Sub-priority “Sustainable energy systems”*
  - Priority thematic area of research “Sustainable development, global change and ecosystems”. Sub-priority “Sustainable surface transport”
3. **Call title:** Periodic call in the area of “Aeronautics and Space”, “Sustainable energy systems” and “Sustainable surface transport”.
4. **Call identifiers:** **FP6-2005-TREN-4-Aero** (for “Aeronautics and Space”) / **FP6-2005-TREN-4** (for “Sustainable energy systems” and “Sustainable surface transport”).
5. **Date of publication:** 08/07/2005.
6. **Closure dates:** 04/11/2005 at 17.00 (Brussels local time) (for “Aeronautics and Space”) and 22/12/2005 at 17.00 (Brussels local time) (for “Sustainable energy systems” and “Sustainable surface transport”).
7. **Total indicative budget: 214 M€**, broken down as follows
  - “Aeronautics and space”: 53 M€
  - *“Sustainable energy systems”*: 125 M €
  - “Sustainable surface transport”: 36 M €

Instrument <sup>16</sup>	€ (millions)
IP	139
STREP or CA	75
SSA	

<sup>15</sup> Note that the call for the short-to-medium term part of “sustainable energy systems” will form part of a call including elements of “aeronautics and space” as well as “sustainable surface transport”.

<sup>16</sup> IP = Integrated project; STREP = Specific targeted research project; CA = Coordination action; SSA = Specific support action

## 8. Areas called and Instruments:

### - Aeronautics and Space

Area	Topic	Instrument
Open Upstream Research (See Section 1.3.1.4.)	Reduced separation standards Research Domain 4.c	STREP
	Innovative air traffic management research Research Domain 4.g	STREP
	Co-ordination Action Research Domain 4.h	CA
	Air Transport System Wide Information Management Research Domain 4.j	STREP
	ATM Safety regulation and supervisory functions Research Domain 4.k	STREP
	Mitigating capacity constraints due to Wake vortex Research Domain 4.l	STREP
	Environmentally responsible air transport Research Domain 4.m	STREP
1.3.2 Integrated Focused Downstream Research	Subject 13. Improvement of ATM system processes through validation	IP

### - Sustainable energy systems

Area	Topic	Instrument
Section 6.1.3.1.1.1 « Cost effective supply of renewable energies »	Demonstrations of innovative designs of automated biomass heating systems	STREP
	Solar heating and cooling	STREP
	Geothermal energy	STREP
	Innovative wind farms, components and design tools	STREP
	Demonstrations of the next generation of PV technologies / products	STREP
	Ocean / marine energy technologies	STREP
	All	CA, SSA
Section 6.1.3.1.1.2 “Large scale integration of renewable energy sources and energy efficiency” and Section 6.1.3.1.2.2 “Polygeneration”	Grid issues - Distributed electricity generation	STREP, CA and SSA
	Grid issues - Management of electricity grids linked to large scale decentralised wind power generation	STREP, CA and SSA

Section 6.1.3.1.2.1 “Eco-buildings	Eco-buildings	STREP
Section 6.1.3.1.2.2 “Polygeneration”	Polygeneration	STREP
Section 6.1.3.1.1.2 “Large scale integration of renewable energy sources and energy efficiency”	CONCERTO II– Managing energy demand and renewable energy supply in high performance communities	IP
Section 6.1.3.1.2.1 “Eco-buildings”		
Section 6.1.3.1.2.2 “Polygeneration”		
Section 6.1.3.1. “Thematic promotion and dissemination”	Renewable electricity technologies	SSA
	Renewable heating and cooling technologies	SSA
	Production and distribution of liquid and gaseous biofuels	SSA
	Eco-buildings	SSA
	Polygeneration	SSA
	Energy demand management and renewable energy supply in high performance communities	SSA
	Alternative motor fuels	SSA
Section 6.1.3.1.3 “Alternative Motor fuels	CIVITAS Dissemination and Best Practice Transfer Action	SSA

- Sustainable surface transport

<b>Area</b>	<b>Topic</b>	<b>Instrument</b>
Objective 1 « New technologies and concepts for all surface transport modes (road, rail and waterborne) »	CIVITAS Dissemination and Best Practice Transfer Action	SSA
Objective 3 « Re-balancing and integrating different transport modes »	New concepts for trans-European rail freight services	IP
	Motorways of the sea (MoS)	IP
	EU co-ordination and promotion forum on intermodal passenger travel	CA
	Knowledge base for intermodal passenger travel	STREP
	Vessel data management (Voyage data recorder, Electronic logbooks)	STREP
Objective 4 « Increasing road, rail and waterborne safety and avoiding traffic congestion »	Improve infrastructure cost allocation methods	STREP
	Design appropriate contractual relationships	STREP

**9. Minimum number of participants<sup>17</sup>:**

Instrument	Minimum number of participants
IP, STREP and CA	3 independent legal entities from 3 different MS or AS, with at least 2 MS or ACC
SSA	One legal entity from a MS or AS.

**10. Restriction on participation:** None.

**11. Consortia agreements:**

- Participants in IP are required to conclude a consortium agreement.
- Participants in STREP, CA and SSA resulting from this call are encouraged, and may be required, to conclude a consortium agreement.

**12. Evaluation procedure:**

- The evaluation shall follow a single stage procedure
- Proposals will not be evaluated anonymously.

**13. Evaluation criteria:** See Annex B of the work programme for the applicable criteria (including their individual weights and thresholds and the overall threshold) per instrument.

**14. Indicative evaluation and contractual timetable:**

- Evaluation results: estimated to be available within some 3 - 4 months after the closure date;
- Conclusion of first contracts: it is estimated that the first contracts related to this call will come into force 10 months after the closure date.

**15. Additional terms:**

- It is expected that this call should not result in more than 60 to 70 projects.

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<sup>17</sup> MS = Member States of the EU; AS (incl. ACC) = Associated States; ACC = Associated candidate countries.

Any legal entity established in a Member State or Associated State and which is made up of the requested number of participant may be the sole participant in an indirect action.

### 6.1.6.3. Content of Joint Call (1)

**Call closed.** Projects arising from this call will be financed from both the 2005 and 2006 budgets.

**1) Specific programme:** Integrating and strengthening the European Research Area

**2) Activities:** Priority thematic areas of research of:

“Aeronautics and space”,

“Sustainable development, global change and ecosystems, 1) Sustainable Energy Systems, ii) Research activities having an impact in the medium and longer term” and

“Sustainable development, global change and ecosystems, 2) Sustainable surface transport”.

**3) Call title:** Thematic call in the area of “Component development and systems integration of hydrogen and fuel cells for transport and other applications”.

**4) Call identifier:** FP6-2004-Hydrogen-1

**5) Date of publication<sup>18</sup>:** 8 June 2004

**6) Closure date<sup>19</sup>:** 8 December 2004 at 17.00 (Brussels local time).

**7) Total indicative budget:** 35 Million €, broken down as follows:

Instrument <sup>20</sup>	€ (millions)
IP	35
STREP	

**8) Areas called and instruments:**

Area	Instrument
Fuel Cell and Hybrid Vehicle Development.  See Section 6.1.4.2.2.1 of the “Sustainable Energy Systems” Work Programme, Section 4.1.1 of the “Sustainable Surface Transport” Work Programme or Section 1.4.2.1 of the “Aeronautics and Space” Work Programme.	IP, STREP

<sup>18</sup> The director-general responsible for the publication of this call may publish it up to one month prior or after its envisaged publication date.

<sup>19</sup> When the envisaged publication date is either advanced or delayed, closure date(s) will be adjusted accordingly, if needed, in the published call for proposals.

<sup>20</sup> IP = Integrated project; STREP = Specific targeted research project

[Activity Code : SUSTDEV-AERO-2004-Hydrogen-1.1]	
<p>Integration of fuel cell systems and fuel processors for aeronautics, waterborne and other transport applications.</p> <p>See Section 6.1.4.2.2.2 of the “Sustainable Energy Systems” Work Programme, Section 4.1.1 of the “Sustainable Surface Transport” Work Programme or Section 1.4.2.1 of the “Aeronautics and Space” Work Programme.</p> <p>[Activity Code : SUSTDEV-AERO-2004-Hydrogen-1.2]</p>	IP

**9) Minimum number of participants<sup>21</sup>:**

<b>Instrument</b>	<b>Minimum number of participants</b>
IP and STREP	3 independent legal entities from 3 different MS or AS, with at least 2 MS or ACC.

**10) Restrictions on participation:** None.

**11) Consortium agreements:**

- Participants in IP are required to conclude a consortium agreement.
- Participants in STREP resulting from this call are encouraged, but not required, to conclude a consortium agreement.

**12) Evaluation procedure:**

- The evaluation shall follow a single stage procedure.
- Proposals will not be evaluated anonymously.

**13) Evaluation criteria :** See Annex B of the work programme for the applicable criteria (including their individual weights and thresholds and the overall threshold) per instrument and their application.

**14) Indicative evaluation and contractual timetable:**

- Evaluation results: estimated to be available within some 4 months after the closure date;
- Conclusion of first contracts: it is estimated that the first contracts related to this call will come into force before the end of 2005.

<sup>21</sup> MS = Member States of the EU; AS (incl. ACC) = Associated States; ACC = Associated candidate countries.

Any legal entity established in a Member State or Associated State and which is made up of the requested number of participants may be the sole participant in an indirect action.

#### 6.1.6.4. Content of Joint Call (2)

**Call closed.** Projects arising from this call will be financed from both the 2005 and 2006 budgets.

**1) Specific programme:** Integrating and strengthening the European Research Area

**2) Activities:** Priority thematic areas of research of:

“Aeronautics and space”,

“Sustainable development, global change and ecosystems, 1) Sustainable Energy Systems, ii) Research activities having an impact in the medium and longer term” and

“Sustainable development, global change and ecosystems, 2) Sustainable surface transport”.

**3) Call title:** Thematic call in the area of “Support of the co-ordination, assessment and monitoring of research to contribute to the definition phase for a hydrogen communities initiative”.

**4) Call identifier:** FP6-2004-Hydrogen-2

**5) Date of publication<sup>22</sup>:** 8 June 2004

**6) Closure date<sup>23</sup>:** 8 December 2004 at 17.00 (Brussels local time).

**7) Total indicative budget:** 4.5 Million €, broken down as follows:

Instrument <sup>24</sup>	€ (millions)
IP	4.5

**8) Areas called and instruments:**

Area	Instrument
Support of the co-ordination, assessment and monitoring of research to contribute to the definition phase for a hydrogen communities initiative.  See Section 6.1.4.2.3 of the “Sustainable Energy Systems” Work Programme, Section 4.1.2 of the “Sustainable Surface Transport” Work Programme or Section 1.4.2.2 of the “Aeronautics and Space” Work Programme.  [Activity Code : SUSTDEV-AERO-2004-Hydrogen-2]	IP

<sup>22</sup> The director-general responsible for the publication of this call may publish it up to one month prior or after its envisaged publication date.

<sup>23</sup> When the envisaged publication date is either advanced or delayed, closure date(s) will be adjusted accordingly, if needed, in the published call for proposals.

<sup>24</sup> IP = Integrated project

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**9) Minimum number of participants<sup>25</sup>:**

<b>Instrument</b>	<b>Minimum number of participants</b>
IP	3 independent legal entities from 3 different MS or AS, with at least 2 MS or ACC.

**10) Restrictions on participation:** None.

**11) Consortium agreements:**

- Participants in IP are required to conclude a consortium agreement.

**12) Evaluation procedure:**

- The evaluation shall follow a single stage procedure.
- Proposals will not be evaluated anonymously.

**13) Evaluation criteria :** See Annex B of the work programme for the applicable criteria (including their individual weights and thresholds and the overall threshold) per instrument and their application.

**14) Indicative evaluation and contractual timetable:**

- Evaluation results: estimated to be available within some 4 months after the closure date;
- Conclusion of first contracts: it is estimated that the first contracts related to this call will come into force before the end of 2005.

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<sup>25</sup> MS = Member States of the EU; AS (incl. ACC) = Associated States; ACC = Associated candidate countries.

Any legal entity established in a Member State or Associated State and which is made up of the requested number of participants may be the sole participant in an indirect action.

### 6.1.6.5. Content of Call 2005.ML

**Call closed.** Projects arising from this call will be financed from both the 2005 and 2006 budgets.

- 1) **Specific programme:** Integrating and strengthening the European Research Area
- 2) **Thematic priority/ domain:** Priority thematic area of research “Sustainable development, global change and ecosystems, 1) Sustainable Energy Systems, ii) Research activities having an impact in the medium and longer term”.
- 3) **Call title:** Thematic call in the area of “Sustainable development, global change and ecosystems, 1) Sustainable Energy Systems, ii) Research activities having an impact in the medium and longer term”.
- 4) **Call identifier:** FP6-2004-Energy-3
- 5) **Date of publication**<sup>26</sup>: 8 September 2004
- 6) **Closure date(s)**<sup>27</sup>: 8 December 2004 at 17.00 (Brussels local time).
- 7) **Total indicative budget:** 190 Million €, broken down as follows:

Instrument <sup>28</sup>	€ (millions)
IP and NOE	124
STREP and CA	66

There will be competition between proposals both across and within research topic areas in this call, which may result in some topics not being supported. Whilst quality will be the determining factor in the selection of proposals, it is expected that at least 50% of the overall budget for this call be allocated to the Areas “*Renewable energy technologies*” and “*Socio-economic tools and concepts*” and about 50% to the Areas “*Fuel cells*”, “*New technologies for energy carriers*” and “*Capture and sequestration of CO<sub>2</sub>*”.

#### 8) Areas called and instruments:

Section of the Work Programme	Topic/ area	Instrument
See section 6.1.3.2.1 (Fuel cells) [Activity Code : <i>SUSTDEV-1.2.1</i> ]	See the pertinent sections of the Work Programme for precise details of the topics and	IP, NOE, STREP and CA, as specified in the pertinent sections of the Work Programme.
See section 6.1.3.2.2 (New technologies for energy carriers) [Activity Codes : <i>SUSTDEV-1.2.2 and SUSTDEV-1.2.3</i> ]		

<sup>26</sup> The director-general responsible for the publication of this call may publish it up to one month prior or after its envisaged publication date.

<sup>27</sup> When the envisaged publication date is either advanced or delayed, closure date(s) will be adjusted accordingly, if needed, in the published call for proposals.

<sup>28</sup> IP = Integrated project; NOE = Network of excellence; STREP = Specific targeted research project; CA = Coordination action.

See section 6.1.3.2.3 (Renewable energy technologies) [Activity Codes : SUSTDEV-1.2.4, SUSTEDEV-1.2.5 and SUSTDEV-1.2.6]	areas open for this call.	
See section 6.1.3.2.4 (Capture and sequestration of CO <sub>2</sub> ) [Activity Code : SUSTDEV-1.2.7]		
See section 6.1.3.2.5 (Socio-economic tools and concepts) [Activity Code : SUSTDEV-1.2.8]		

**9) Minimum number of participants<sup>29</sup>:**

<b>Instrument</b>	<b>Minimum number of participants</b>
IP, NOE, STREP and CA	3 independent legal entities from 3 different MS or AS, with at least 2 MS or ACC.

**10) Restrictions on participation:** None.

**11) Consortium agreements:**

- Participants in IP and NOE are required to conclude a consortium agreement.
- Participants in STREP and CA and resulting from this call are encouraged, but not required, to conclude a consortium agreement.

**12) Evaluation procedure:**

- The evaluation shall follow a single stage procedure.
- Proposals will not be evaluated anonymously.

**13) Evaluation criteria :** See Annex B of the work programme for the applicable criteria (including their individual weights and thresholds and the overall threshold) per instrument and their application.

**14) Indicative evaluation and contractual timetable:**

- Evaluation results: estimated to be available within some 4 months after the closure date;
- Conclusion of first contracts: it is estimated that the first contracts related to this call will come into force before the end of 2005.

<sup>29</sup> MS = Member States of the EU; AS (incl. ACC) = Associated States; ACC = Associated candidate countries.

Any legal entity established in a Member State or Associated State and which is made up of the requested number of participant may be the sole participant in an indirect action.

### 6.1.6.6. Content of Call 2006.ML

- 1) **Specific programme:** Integrating and strengthening the European Research Area
- 2) **Thematic priority/ domain:** Priority thematic area of research “Sustainable development, global change and ecosystems, 1) Sustainable Energy Systems, ii) Research activities having an impact in the medium and longer term”.
- 3) **Call title:** Thematic call in the area of “Sustainable development, global change and ecosystems, 1) Sustainable Energy Systems, ii) Research activities having an impact in the medium and longer term”.
- 4) **Call identifier:** FP6-2005-Energy-4
- 5) **Date of publication**<sup>30</sup>: 22 September 2005
- 6) **Closure date(s)**<sup>31</sup>: 10 January 2006 at 17.00 (Brussels local time).
- 7) **Total indicative budget:** 20 Million €

There will be competition between proposals both across and within research topic areas in this call, which may result in some topics not being supported. Whilst quality will be the determining factor in the selection of proposals, it is expected that the budget will be equally shared between the area “*Renewable energy technologies*” and the rest of the M-L term Sustainable Energy Systems Programme.

#### 8) Areas called and instruments:

Section of the Work Programme	Instrument
See the section 6.1.3.2.6 of the Work Programme for precise details of the topics and areas open for this call.	IP, STREP, CA and SSA, as specified in section 6.1.3.2.6 of the Work Programme.

#### 9) Minimum number of participants<sup>32</sup>:

Instrument	Minimum number of participants
IP, STREP and CA	3 independent legal entities from 3 different MS or AS, with at least 2 MS or ACC.
SSA	One legal entity from a MS or AS.

<sup>30</sup> The director-general responsible for the publication of this call may publish it up to one month prior or after its envisaged publication date.

<sup>31</sup> When the envisaged publication date is either advanced or delayed, closure date(s) will be adjusted accordingly, if needed, in the published call for proposals.

<sup>32</sup> MS = Member States of the EU; AS (incl. ACC) = Associated States; ACC = Associated candidate countries.

Any legal entity established in a Member State or Associated State and which is made up of the requested number of participants may be the sole participant in an indirect action.

**10) Restrictions on participation:** None.

**11) Consortium agreements:**

- Participants in IP are required to conclude a consortium agreement.
- Participants in STREP, CA and SSA are encouraged, but not required, to conclude a consortium agreement.

**12) Evaluation procedure:**

- The evaluation shall follow a single stage procedure.
- Remote evaluation may be used in this call.
- Proposals will not be evaluated anonymously.

**13) Evaluation criteria :** See Annex B of the work programme for the applicable criteria (including their individual weights and thresholds and the overall threshold) per instrument and their application.

**14) Indicative evaluation and contractual timetable:**

- 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 2006.