WORK PROGRAMME 2012

COOPERATION

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(European Commission C(2011)5068 of 19 July 2011)

Annex 1: List of International Cooperation Partner Countries (ICPC)[1]

ACP *

- AFRICAN

- Angola LM
- Benin L
- Botswana UM
- Burkina-Faso L
- Burundi L
- Cameroon LM
- Cape Verde LM
- Central African Republic L
- Chad L
- Comoros L
- Congo (Republic) LM
- Congo (Democratic Rep.) L
- Côte d'Ivoire L
- Djibouti LM
- Equatorial Guinea UM
- Eritrea L
- Ethiopia L
- Gabon UM
- Gambia L
- Ghana L
- Guinea L
- Guinea-Bissau L
- Kenya L
- Lesotho LM
- Liberia L
- Madagascar L
- Malawi L
- Mali L
- Mauritania L
- Mauritius UM
- Mozambique L
- Namibia LM
- Niger L
- Nigeria L
- Rwanda L
- Sao Tome and Principe L
- Senegal L
- Seychelles UM
- Sierra Leone L
- Somalia L
- South Africa[2] UM
- Sudan L
- Swaziland LM
- Tanzania L
- Togo L
- Uganda L
- Zambia L
- Zimbabwe L

- CARIBBEAN

- Barbados UM
- Belize UM
- Cuba LM
- Dominica UM
- Dominican Rep. LM
- Grenada UM
- Guyana LM
- Haiti L
- Jamaica LM
- Saint Kitts and Nevis UM
- Saint Lucia UM
- Saint Vincent and Grenadines UM
- Suriname LM
- Trinidad and Tobago UM

- PACIFIC

- Cook Islands UM
- Timor Leste L
- Fiji LM
- Kiribati LM
- Marshall Islands LM
- Micronesia, Federal States of LM
- Nauru UM
- Niue UM
- Palau UM
- Papua New Guinea L
- Samoa LM
- Solomon Islands L
- Tonga LM
- Tuvalu LM
- Vanuatu LM

ASIA

- Afghanistan L
- Bangladesh L
- Bhutan L
- Burma/Myanmar L
- Cambodia L
- China[12]** LM
- Democratic People's Republic of Korea L
- India[2]** L
- Indonesia LM
- Iran LM
- Iraq LM
- Lao People's Democratic Rep. L
- Malaysia UM
- Maldives LM
- Mongolia L
- Nepal L
- Oman UM
- Pakistan L
- Philippines LM
- Sri Lanka LM
- Thailand LM
- Vietnam L
- Yemen L

EASTERN EUROPE AND CENTRAL ASIA (EECA)

- Armenia[3] LM
- Azerbaijan[3] LM
- Belarus[3] LM
- Georgia[3] LM
- Kazakhstan LM
- Kyrgyz Republic L
- Moldova[3,4] LM
- Russia[2]** UM
- Tajikistan L
- Turkmenistan LM
- Ukraine[2,3] LM
- Uzbekistan L

LATIN AMERICA

- Argentina[2] UM
- Bolivia LM
- Brazil[2]** LM
- Chile[2] UM
- Colombia LM
- Costa Rica UM
- Ecuador LM
- El Salvador LM
- Guatemala LM
- Honduras LM
- Mexico[2] UM
- Nicaragua LM
- Panama UM
- Paraguay LM
- Peru LM
- Uruguay UM
- Venezuela UM

MEDITERRANEAN PARTNER COUNTRIES (MPC)

- Algeria[3] LM
- Egypt[2,3] LM
- Jordan [2,3] LM
- Lebanon[3] UM
- Libya[3] UM
- Morocco[2,3] LM
- Palestinian-administered areas[3] LM
- Syrian Arab Rep.[3] LM
- Tunisia[2,3] LM

WESTERN BALKAN COUNTRIES (WBC)

- Kosovo[5] LM

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*In the 'Specific international cooperation actions', Africa can also be considered as a region on its own, while the Caribbean countries can also participate with Latin American and the Pacific countries with Asia.

**For participation in the 'Specific international cooperation actions' each of Brazil, China, India and Russia may be considered individually as a region on its own. Thus, the required two or more partners can be located in these countries. However, in this case, at least two different partners from different provinces, oblasts, republics or states within Brazil, China, India or Russia are necessary.

In accordance with Article 2(12) of the Rules for Participation in FP7, 'International Cooperation Partner Country' (ICPC) means a third country which the Commission classifies as a low-income (L), lower-middle-income (LM) or upper-middle-income (UM) country. Countries associated to the Seventh EU Framework Programme do not qualify as ICP Countries and therefore do not appear in this list.

Legal entities established in countries in which the European Union under Articles 75 and 215 of the Treaty on the Functioning of the European Union has issued actions to interrupt or to reduce, in part or completely, economic relations, may only participate and receive a financial contribution if it complies with these actions.

[2]Signed an agreement with the EU covering Science & Technology.

[3]These countries are also part of the European Neighbourhood Policy (ENP).

[4]Until the country becomes Associated to FP7

[5]As defined by UNSC resolution 1244 of 10 June 1999.

[1] Legal entities established in the high-income territories Hong Kong, Macao and Taiwan, are not eligible under the ICPC provisions.

Annex 2: Eligibility and Evaluation Criteria for Proposals

Eligibility criteria
A proposal will only be considered eligible if it meets all of the following conditions:

- It is received by the Commission before the deadline given in the call text.
- It involves at least the minimum number of participants given in the call text.
- It is complete (i.e. both the requested administrative forms and the proposal description are present)
- The content of the proposal relates to the topic(s) and funding scheme(s), including any special conditions, set out in those parts of the relevant work programme

Other eligibility criteria may be given in the call text.

Evaluation criteria
The evaluation criteria against which proposals will be judged are set out in article 15 of the Rules for Participation. For the 'Cooperation' specific programme these are:

- scientific and/or technological excellence;
- relevance to the objectives of these specific programmes[2];
- the potential impact through the development, dissemination and use of project results;
- the quality and efficiency of the implementation and management.

Within this framework, the work programmes will specify the evaluation and selection criteria and may add additional requirements, weightings and thresholds, or set out further details on the application of the criteria.

The purpose of this annex is to set out such specifications. Unless otherwise indicated in the relevant parts of this work programme, the criteria, weightings and thresholds given here will apply to all calls for proposals.

Proposals will be evaluated in line with the Commission 'Rules on Submission of Proposals and the Related Evaluation, Selection and Award Procedures'.

A proposal which contravenes fundamental ethical principles, fails to comply with the relevant security procedures, or which does not fulfil any other of the conditions set out in the specific

[2] **Relevance** will be considered in relation to the topic(s) of the work programme open in a given call, and to the objectives of a call. In the scheme set out on the following page, these aspects will be integrated in the application of the criterion "S/T excellence", and the first sub-criterion under "Impact" respectively. When a proposal is **partially relevant** because it only marginally addresses the topic(s) of a call, or because only part of the proposal addresses the topic(s), this condition will be reflected in the scoring of the first criterion. Proposals that are clearly not relevant to a call ("out of scope") will be rejected on eligibility grounds.

programme, the work programme or in the call for proposals shall not be selected. Such a proposal may be excluded from the evaluation, selection and award procedures at any time. Details of the procedure to be followed are given in the Commission rules mentioned above.

The arrangements for a particular call will be set out in the relevant Guide for Applicants.

		1. Scientific and/or technological excellence *(relevant to the topics addressed by the call)* (award)	2. Quality and efficiency of the implementation and the management (selection)	3. The potential impact through the development, dissemination and use of project results (award)
All funding schemes		• *Soundness of concept, and quality of objectives*	• Appropriateness of the management structure and procedures • Quality and relevant experience of the individual participants	• *Contribution, at the European [and/or international] level, to the expected impacts listed in the work programme under relevant topic/activity*
Collaborative projects		• *Progress beyond the state-of-the-art* • Quality and effectiveness of the S/T methodology and associated work plan	• Quality of the consortium as a whole (including complementarity, balance) • Appropriateness of the allocation and justification of the resources to be committed (staff, equipment,…)	• Appropriateness of measures for the dissemination and/or exploitation of project results, and management of intellectual property.
Networks of Excellence		• *Contribution to long-term integration of high quality S/T research* • Quality and effectiveness of the joint programme of activities and associated work plan	• Quality of the consortium as a whole (including ability to tackle fragmentation of the research field, and commitment towards a deep and durable integration) • Adequacy of resources for successfully carrying out the joint programme of activities	• Appropriateness of measures for spreading excellence, exploiting results, and disseminating knowledge, through engagement with stakeholders and the public at large.
Co-ordination & Support Actions	**CA**	• Contribution to the co-ordination of high quality research • Quality and effectiveness of the co-ordination mechanisms, and associated work plan	• Quality of the consortium as a whole (including complementarity, balance) [for SA: only if relevant] • Appropriateness of the allocation and justification of the resources to be committed (staff, equipment,…)	• Appropriateness of measures for spreading excellence, exploiting results, and dissemination knowledge, through engagement with stakeholders, and the public at large.
	SA	• Quality and effectiveness of the support action mechanisms, and associated work plan		
Research for the benefit of specific groups		• Innovative character in relation to the state-of-the art • Contribution to advancement of knowledge / technological progress • Quality and effectiveness of S/T methodology and associated work plan	• Quality of the consortium as a whole (including complementarity and balance) • Appropriateness of the allocation and justification of the resources to be committed (staff, equipment,…)	• Appropriateness of measures for the dissemination and/or exploitation of project results, and management of intellectual property

Notes:

1. Evaluation scores will be awarded for each of the three criteria, and not for the sub-criteria. Each criterion will be scored out of 5. No weightings will apply. The threshold for individual criteria will be 3. The overall threshold, applying to the sum of the three individual scores, will be 10.

2. The second column corresponds to the **selection criteria** in the meaning of the financial regulation[3] (article 115) and its implementing rules[4] (article 176 and 177). They also will be the basis for assessing the 'operational capacity' of participants. The other two criteria correspond to the **award criteria**.

3. For the evaluation of first-stage proposals under a two-stage submission procedure, only the sub-criteria in italics apply.

Priority order for proposals with the same score

As part of the evaluation by independent experts, a panel review will recommend one or more ranked lists for the proposals under evaluation, following the scoring systems indicated above. A ranked list will be drawn up for every indicative budget shown in the call fiche.

If necessary, the panel will determine a priority order for proposals which have been awarded the same score within a ranked list. Whether or not such a prioritisation is carried out will depend on the available budget or other conditions set out in the call fiche. The following approach will be applied successively for every group of *ex aequo* proposals requiring prioritisation, starting with the highest scored group, and continuing in descending order:

(i) Proposals that address topics not otherwise covered by more highly-rated proposals, will be considered to have the highest priority.

(ii) These proposals will themselves be prioritised according to the scores they have been awarded for the criterion *scientific and/or technological excellence*. When these scores are equal, priority will be based on scores for the criterion *impact*. If necessary, any further prioritisation will be based on other appropriate characteristics, to be decided by the panel, related to the contribution of the proposal to the European Research Area and/or general objectives mentioned in the work programme (e.g. presence of SMEs, international co-operation, public engagement).

(iii) The method described in (ii) will then be applied to the remaining *ex aequos* in the group.

NOTE: the call fiche may indicate provisions that supplement or override the above.

[3] OJ L248 16.9.2002, p1.
[4] OJ L357 31.12.2002, p1

Annex 3: Forms of Grant and Maximum Reimbursement Rates for Projects Funded Through the Cooperation Work Programme

Forms of Grant

The FP7 'Rules for Participation' propose three potential forms of grant for the Community financial contribution: reimbursement of eligible costs, flat rate financing including scale of unit costs, and lump sum financing. In this work programme, for all funding schemes, the reimbursement of eligible costs (including the different options for flat rates on indirect costs as established in Article 32 of the Rules for Participation)[5] will be the only form of grant used.

Three exceptions to this will apply. Pursuant to Article 30 of the Rules for Participation and Commission Decision C(2007)2287 of 4 June 2007, participants from International Cooperation Partner Countries (see Annex 1) may choose to opt for lump sum financing.

In accordance with Article 2 of the Commission Decision of 23 March 2009 under reference C (2009) 1942, the present work programme provides for the possibility to use flat rates to cover subsistence costs incurred by beneficiaries during travel carried out within grants for indirect actions. The applicable flat rates are available at the following website http://cordis.europa.eu/fp7/find-doc_en.html under 'Guidance documents/Flat rates for daily allowances'. Please note this option is only available when stated explicitly in the call fiche.

In addition, under chapter 5 of this work programme 'Energy', some actions under Activity 8 'Energy Efficiency and Savings', may combine the reimbursement of eligible costs with flat rate financing in the form of scale of unit costs. Further information on this is given in chapter 5.

Maximum Reimbursement Rates

The upper limits foreseen in the Rules for Participation (Article 33) for the Community financial contribution are summarised in the following table.

	Non-profit public bodies, secondary and higher education establishments, research organisations and SMEs	All other organisations
Research and technological development activities	75%	50%[6]
Demonstration activities	50%	50%
Coordination and support actions	100%	100%
Management, audit certificates and other activities[7]	100%	100%

[5] As confirmed by Decision C(2009)4459 of 15 June 2009.

[6] For security related research and technological development activities, (Chapter 10 of this work programme) the Community financial contribution may reach a maximum of 75% in the case of the development of capabilities in domains with very limited market size and a risk of 'market failure' and for accelerated equipment development in response to new threats. Further information is given in Chapter 10.

[7] Including, inter alia training in actions that do not fall under the funding schemes for training and career development of researchers, coordination, networking and dissemination (as set out in Article 33(4) of the Rules for Participation).

Annex 4 General Activities

In this annex, the activities which are funded across the Programme are presented. These activities concern in particular the following:

Dissemination, knowledge transfer and broader engagement

1. The CORDIS services

Co-ordination of non-European Union research programmes

2. The ERA-NET scheme
3. Research organisations in the EU
4. Strengthened coordination with EUREKA
5. Scientific and technological cooperation activities carried out in COST

Risk-Sharing Finance Facility

6. Contribution to the European Investment Bank (EIB) – Risk-Sharing Finance Facility

A4.1 THE CORDIS SERVICES

CORDIS, the Community Research and Development Information Service, supports the European Commission's dissemination of information on EU-funded research projects and their outcomes, as well as their exploitation, since 1990. The web portal is available at: *http://cordis.europa.eu*.

As expressed in the FP7 Cooperation Specific Programme, CORDIS continues "to foster the dissemination of knowledge in a user-friendly way and the exploitation of research results".

As referenced in the 2011 Work Programme and based on the agreement between the Directorates-General and Agencies of the research and innovation family, the clear focus for each of the key Commission research web portals (CORDIS, Participant Portal and Europa research websites) will continue to be implemented in 2012.

The specific objectives for CORDIS activities in 2012 will be:

- SO 1: **Continued availability and improved usability** for users of CORDIS services including content management, maintenance, operational and supporting activities;
- SO 2: **Consolidation of services** to reflect decisions on the web-based communication strategy;
- SO 3: Improvement and development of services to **disseminate and exploit research results** according to the needs as defined by the research and innovation Directorates-General/Agencies**;**
- SO 4: **Editorial harmonisation, technical interoperability and ensuring seamless navigation** with the other research-related websites and systems, in particular the Participant Portal and Europa websites.

The budget foreseen for these activities in 2012 is EUR 7.9 million.

The CORDIS services are managed by the Publications Office of the European Union under the governance of the CORDIS Service Management Board (where all research and innovation Directorates-General/Agencies and other stakeholders are represented). Administrative arrangements are set out in the applicable Service Level Agreement between the Research and Innovation Directorate General and the Publications Office. A detailed Work Programme for the CORDIS 2012 activities, including a detailed budget forecast, will be drawn up.

A4.2 THE ERA-NET SCHEME

The objective of the ERA-NET scheme is to develop and strengthen the coordination of national and regional research programmes through two specific actions:

- 'ERA-NET actions' - which provide a framework for actors implementing public research programmes to coordinate their activities.
- 'ERA-NET Plus actions'- which, *in a limited number of cases*, can provide additional EU financial support to facilitate joint calls for proposals between national and/or regional programmes.

Under the ERA-NET scheme, national and regional authorities identify research programmes they wish to coordinate or open up mutually. The participants in these actions are therefore programme 'owners' (typically ministries or regional authorities defining research programmes) or programme 'managers' (such as research councils or other *research funding* agencies managing research programmes).

Since the introduction of the scheme, a large number of ERA-NETs have been funded, involving hundreds of national research programmes[8].

ERA-NETs span a wide range of research fields such as transport, energy, environment, industrial technologies, plant and human health, astrophysics and social sciences. ERA-NET actions have been also set up to address more horizontal topics such as international cooperation, SMEs, metrology or the promotion of gender balance in research.

Thanks to the ERA-NET scheme, tangible progress has been made in reducing fragmentation across the European Research Area (ERA).

For the full list of projects, please refer to:

http://cordis.europa.eu/coordination/projects.htm
http://cordis.europa.eu/fp7/coordination/home_en.html
http://netwatch.jrc.ec.europa.eu/nw

A4.2.1 Approach

The networking and mutual opening of research programmes require a progressive approach. The ERA-NET scheme therefore has a long-term perspective and it is flexible in order to accommodate the different ways in which public research funding is organised in Member States and Associated Countries.

In contrast to FP6, the ERA-NET scheme is no longer conceived as a 'stand-alone' action in FP7, but as an implementation tool available to the Themes of the Cooperation specific programme and to the Parts of the Capacities Programme.

Several ERA-NETs have been already able to contribute and interact with proposed Joint Programming Initiatives, aimed at addressing major societal challenges. The involvement of programme managers and programme owners in ERA-NETs renders them a useful instrument also in this context.

[8] ERA-NET actions cover both national and regional research programmes. To avoid repetition, the term 'national research programme' will be used in this section to refer to both national and regional research programmes.

A4.2.2 Content of the *FP7-ERANET-2012-RTD* Call

In 2012, the ERA-NET scheme foresees a cross-thematic call for proposals, open to challenge-oriented strategic priorities explicitly specified in the thematic sections of this work programme. The concerned Themes will be responsible for providing the required funding *(please refer to the Call Fiche for details).*

Proposals submitted to the 2012 ERA-NET call should be able to clearly demonstrate the innovation potential of the planned activities. Participants are encouraged to adopt a global approach in their proposals and the inclusion of partners from relevant non-EU countries is encouraged.

The cross-thematic call will include also centrally-managed Horizontal Support Actions, aimed at optimising implementation modalities and support mechanisms applicable to trans-national R&D programme collaborations and, particularly, Joint Programming in Research.

ERA-NET topics might be present also in other calls which, for logistical and organisational reasons, are kept distinct from the present one. In order to provide a complete reference on the way in which the scheme will be implemented in 2012, a list of further subjects open for ERA-NETs is provided in appendix to the call fiche.

A4.2.2.1 Activity: ERA-NET actions

Funding Scheme: Coordination and Support Actions (Coordinating Action)

The aim of ERA-NET actions is to network research programmes carried out at national or regional level, with a view to their mutual opening and the development and implementation of joint activities.

"Research programmes carried out at national or regional level" refers to entire research programmes, parts of such programmes or similar initiatives. Such programmes shall have all the following characteristics:

a) Be strategically planned (i.e. be composed of a number of research projects focused on a defined subject area or set of problems, that are scheduled to run for a set period of time and that have a co-ordinated management).

b) Be carried out at national or regional level.

c) Be either financed or managed directly by national or regional public bodies, or by structures (e.g. agencies) closely related to, or mandated by, public authorities.

Eligibility

The minimum number of participants in an ERA-NET consortium is ***3 independent legal entities*** which finance or manage publicly funded national or regional programmes***. Each of these must be established in a different Member State or Associated Country***.

Partners for ERA-NET actions eligible to satisfy the above condition are:

- Programme owners: typically national ministries/regional authorities responsible for defining, financing or managing research programmes carried out at national or regional level.
- Programme 'managers' (such as research councils or funding agencies) or other national or regional organisations that *implement* research programmes under the supervision of the programme owners.

- Programme owners (typically national ministries/regional authorities) which do not have a running or fully fledged research programme at the moment of submitting an ERA-NET proposal, but which are planning, and have committed, to set up such a programme, are also eligible if their participation is well justified and adds value to the overall programme coordination. As such, countries or regions which have less diverse research programmes (in particular new Member States and candidate Associated Countries) will find their involvement in the ERA-NET scheme greatly facilitated.

Please note that research organisations or universities which are not programme owners or managers are not eligible partners for ERA-NET actions.

In addition to the minimum number of independent legal entities mentioned above, private legal entities (e.g. charities) which manage research programmes may enter the consortium if their participation is well justified and adds value to the overall programme coordination.

Non-European programme owners and programme managers are eligible partners at full title, assuming the ERA-NET consortium is already validly constituted (with 3 independent legal entities each of them established in a different Member State or Associated Country).

Sole participants (as referred to in Article 10 of the Rules for Participation) may be eligible if the above-mentioned specific criteria for eligible ERA-NET partners are respected. A sole participant shall explicitly indicate which of its 'members', forming a sole legal entity, is either a programme owner or programme manager in the proposed action, and indicate for these members the respective national/regional programmes which are at the disposal of the proposed ERA-NET action.

Technical content/scope

ERA-NET actions cover the networking of national research programmes on selected topics of science and technology which are identified in the annual work programmes of the Cooperation Themes and the relevant Parts of the Capacities Programme.

The networking of programmes may involve several levels of cooperation and coordination, depending on the degree of maturity of the network. The use of the ERA-NET scheme should make this evolution possible and should adopt a step-by-step approach.

In this respect, a four-step approach covering the following activities could be envisaged:

1) Information exchange
2) Definition and preparation of joint activities
3) Implementation of joint activities
4) Funding of joint trans-national research.

ERA-NET actions should be ambitious and should aim to reach step 4. They should result in concrete progress towards the opening up of, or cooperation between, the participating research programmes. The cooperation should be sustainable beyond the duration of the ERA-NET action itself.

Activities funded

The EU contribution shall take the form of a grant consisting of a reimbursement of the eligible costs related to the action.

Activities eligible for funding correspond to the four steps identified in the *'technical content/scope* section above. More specifically, these include:

(i) Information exchange

This step aims to gather information on the structure and programmes covered by each national research system. It could also improve communication, develop better reciprocal knowledge and promote trust-building among programme owners or managers in similar scientific and technological areas through a mutual learning process, and the systematic exchange of information and good practices.

(ii) Definition and preparation of joint activities

This key part of the action should analyse the information gathered in step 1 and identify the type of cooperation and the areas which will be addressed.

It should result in an **Action plan**, which sets out common strategic issues and prepares for a concrete implementation of joint activities.

(iii) Implementation of joint activities

Experience has shown that much of the added value in co-ordinating national programmes is gained by trying to implement joint activities, even if in a pilot form.

ERA-NET actions are therefore encouraged to develop and implement, from an early stage in the project, common, joint, strategic activities such as:

- Clustering of nationally-funded research projects, to develop complementarities or mutual reinforcement of ongoing nationally-funded research programmes.
- Multinational project evaluation procedures (common evaluation criteria and methods of implementation). This could contribute in the long-term to the integration of evaluation practices across national research systems (covering proposal, project and programme evaluation).
- Schemes for joint training activities, such as co-supervised theses and international PhD schemes, to help support a wider cooperation in research.
- Schemes for the mutual opening of facilities or laboratories in one country for scientists from another.
- Converging schemes for programme monitoring and evaluation, including joint monitoring or evaluation.
- Schemes for personnel exchange, in the context of the above activities.
- Specific cooperation agreements or arrangements between participating programmes. These would prepare the ground for further trans-national research programmes and ensure that legal barriers are removed.

(iv) Funding of joint trans-national research

The strongest form of programme networking implies the funding and implementation of a joint programme of trans-national research projects or actions. This is likely to involve the setting-up of a common strategy, a joint work programme, common (mutually open) or joint calls for proposals or tenders, a common trans-national evaluation system and a common plan for dissemination of results or experiences. In such schemes, projects funded out of a common or joint call for proposals should involve ***at least two teams from two different countries***.

In this step, other ways of implementing joint research actions could also be developed or explored. For example, a complex or very ambitious research agenda could be divided in

various parts, which are each addressed through differentiated national calls. Results would then be shared.

Expected Impact

The ERA-NET scheme aims to reduce the fragmentation of the European Research Area by increasing coordination between participating national research programmes, avoiding unnecessary duplications of effort and developing expertise from mutual learning.

In general, ERA-NET actions should not cover very restricted research domains and should not overlap with other ongoing ERA-NET actions, as this could create further fragmentation. Complementarities to, or coordination with, FP7 activities should be ensured where possible.

ERA-NET actions should deliver concrete results: establishment of solid networks, mutual opening of activities, development and implementation of joint programmes.

The level of ERA-NET actions will depend on their previous experience:

- Existing ERA-NETs wishing to submit a new proposal must include a strong coordination action, directly focusing on steps 3 and 4. As such, these proposals shall aim to broaden the partnership and/or deepen the coordination between the relevant national programmes in the concerned field. In particular, a global approach including non-European research programmes is encouraged.
- New ERA-NETs, addressing topics not covered by previous ones, should target steps 1 to 3 as a minimum, but are encouraged to aim at the 'four step approach' described above.

The scheme will also enable national or regional systems to collectively take on tasks that they would not have been able to tackle independently.

ERA-NET actions are expected to have a lasting impact. The cooperation developed should provide reliable indications that it could continue beyond the EU funding. Lessons learned and knowledge gathered should be disseminated in the European Research Area.

In addition to the general impact described above, more specific expected benefits of ERA-NET actions include:

- Achieving critical mass, to ensure the better use of scarce resources.
- Joining forces to provide common answers to common research problems.
- Addressing global issues, common to many countries.
- Addressing specific geographical issues.
- Developing common governance principles (e.g. with respect to ethics, good practices).
- Bring together national programmes which deal with cooperation with third countries, and enable them to speak with a 'single voice'.
- Adopt a global approach, involving third-country research programmes in the ERA-NET activities.

Indicative budget for A4.2.2.1: Please refer to *Call Fiche FP7-ERANET-2012-RTD*

A4.2.2.2 Activity: ERA-NET PLUS actions

Funding Scheme: Coordination and Support Actions (Coordinating Action)

Under ERA-NET Plus actions, the Commission provides an incentive to the organisation of joint calls between national or regional research programmes by 'topping-up' joint trans-national funding with EU funding. These joint calls will entail the award of grants to third parties participating in calls for proposals launched under the ERA-NET Plus actions.

These actions require programme owners or programme managers ***from at least 5 different Member States or Associated Countries*** to plan a single joint call with a clear financial commitment from the participating national or regional research programmes.

Activities funded

The EU will top up the total of the national contributions to the joint call with additional funding for RTD activities. The EU contribution will be limited to a maximum of 33% of the total contributions to the joint call budget. The combined national/regional and EU contributions to the joint calls have to reach ***at least EUR 5 million.***

The EU contribution shall take the form of a grant. This grant will combine the reimbursement of eligible costs covering the activities linked to the preparation and coordination of the joint call[9], and the reimbursement of eligible costs as an agreed proportional contribution to the national pooling of funds (for activities relating to the funding of selected trans-national projects, maximum 33%).

In accordance with the Decisions concerning the Seventh Framework Programme[10] and the 'Cooperation' Specific Programme[11], the provisions of Article 120(2) of the Council Regulation on the Financial Regulation applicable to the general budget of the European Communities[12] and Article 184a of the Commission Regulation laying down detailed rules for the implementation of Council Regulation on the Financial Regulation applicable to the general budget of the European Communities,[13] shall not be applicable with regard to the financial support provided by the participants in the ERA-NET Plus actions to third parties participating in projects selected following calls for proposals launched under these actions.

The total duration of a given ERA-NET Plus action and of the resulting projects shall ***not exceed 5 years***.

Specific Eligibility criteria for ERA-NET Plus actions

ERA-NET Plus proposals must meet the following eligibility criteria:

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9 No further supporting costs will be eligible once a 'selection decision' has been taken by the consortium as a result of the joint call.

10 OJ L 412, 30.12.2006, p. 1 Decision No 1982/2006/EC of the European Parliament and of the Council of 18 December 2006

11 OJ L 400, 30.12.2006, p. 86

12 Council Regulation No. 1605/2002 of 25.6.2002 on the Financial Regulation applicable to the general budget of the European Communities (OJ L248, 16.09.2002, p1).

13 Commission Regulation No, 2342/2002 of 23.12.2002 laying down detailed rules for the implementation of Council Regulation No. 1605/2002 (OJ L357, 31.12.2002, p1).

- A single joint call should be planned with a clear financial commitment from the participating national or regional programmes[14].
- Eligible participants are the same as for ERA-NET actions with the exception that programme owners, which do not have yet a running or fully fledged research programme at the moment of submitting a proposal, are not eligible for ERA-NET Plus actions. Furthermore, ***a consortium must include programme owners or programme managers from at least 5 different Member States or Associated Countries.***
- Beyond the minimum of 5 programme owners or managers, the same types of additional participants foreseen for ERA-NET actions are eligible.
- The total planned budget of ***the joint call shall have a minimum financial volume of EUR 5 million.***
- A common peer review mechanism for evaluating the proposals submitted to the joint call shall be foreseen.
- Each project financed out of the joint call shall be trans-national (i.e. minimum of two partners from different Member States or Associated Countries).
- A fixed common set of general evaluation/selection criteria (excellence, European added value, etc.) should be part of the common evaluation criteria of the joint call organised by the national programmes.

Detailed rules for participation in the funded trans-national projects shall be defined by the call organisers themselves (e.g. participating national or regional programmes).

Expected Impact

ERA-NET Plus actions aim to facilitate the launching of joint calls for proposals between EU Member States or Associated Countries, based on their European added value. In special cases, they may also facilitate the transition of an ERA-NET towards an Article 185 TFEU initiative, where the criteria for the latter are met.

The EU added value will be a critical criterion to evaluate the impact of ERA-NET Plus actions and will depend on the area/topic covered by the research programmes participating in the joint call. Therefore, the following criteria should help to identify the impact of ERA-NET Plus actions offering best prospects for sufficient European added value:

- **Relevance to EU objectives:** The field of the potential topic should be of major interest for the EU as a whole.
- **Framework Programme relevance**. As regards '**objective**': Demonstration that an ERA-NET Plus action in that topic shall allow the EU to reach the objective of effectively enhancing the coordination of national research programmes. As regards '**content**': The field of the potential topic shall be covered by the Framework Programme both in terms of scientific content and of budget allocation.

[14] Proposals must demonstrate that national research programmes are committed to support the call. Selected proposals will have to provide evidence that a commitment has been made by the relevant research programmes.

- **Pre-existing basis:** The ERA-NET Plus action should build on a pre-existing basis or coordination experience between national programmes in the topic identified.
- **Critical mass:** ERA-NET Plus actions will enable national programmes to address together with the EU programmes research areas, that due to the nature of the field are better addressed jointly or fields which would/could not have been addressed independently.
- **Instrument relevance**: Demonstration that ERA-NET Plus is the most appropriate instrument for achieving the Framework Programme goals with regard to coordination of national research programmes (i.e.: avoiding fragmentation, etc.). Demonstration that implementing an ERA-NET Plus action in a given field is more appropriate to coordination goals than other possible FP7 actions.

ERA-NET Plus actions are expected, where appropriate, to facilitate the development of a more global approach to the topics addressed, involving also non European research programme.

ERA-NET Plus actions are expected to have a lasting impact. The cooperation developed should provide reliable indications that it could continue beyond the joint call supported by the EU funding.

Indicative budget for A4.2.2.2: Please refer to *Call Fiche FP7-ERANET-2012-RTD*

A4.2.2.3 Activity: Support for Programme coordination and cooperation in the context of the European Research Area (Horizontal Support Actions)

Funding Scheme: Coordination and Support Actions (Supporting Action)

It is increasingly evident that Europe needs to elaborate stronger, better coordinated, more coherent and global responses to the challenges it is facing. Europe needs also to boost its innovation potential, e.g. the capacity to transform the results of research into tangible benefits for society and for the overall competitiveness of its economy

Recent policy developments (the Europe 2020 growth strategy, the Innovation Union flagship initiative, the Joint Programming process, the Green Paper for a Common Strategic Framework for EU Research and Innovation funding) are building on this basis and promoting a more effective coordination of national research programmes.

Achieving this objective will require updating and expanding the systems already in place, as well as the set of support tools so far developed for the research funding community in the context of ERA-NET, ERA-NET Plus and Article185. This goal should be accomplished with the full participation of the stakeholders and users concerned and deriving the maximum possible benefit from the experiences already matured.

In this context, it is envisaged to call for support actions in the following domains:

a) ***Organisation of events aimed at debating Joint Programming in Research****, fostering the active participation of all relevant stakeholders (policy makers, funding agencies, research performing organisations, scientists and general public).*

b) ***Monitoring progress in the domain of the "Framework Conditions"****, i.e. areas were common approaches are considered essential for an effective development and implementation of trans-national research collaborations and Joint Programming in particular (Peer Review Procedures, Foresight Activities, Evaluation of Joint Programmes, Funding of Cross-border Research by National or Regional Authorities, Optimum Dissemination and Use of Research Findings, Protection, Management and Sharing of Intellectual Property Rights).*

c) ***Expansion of existing initiatives, tools and mechanisms for the research funding community.*** *Since the ERA-NET scheme started in 2002, a wide community of programme owners and managers has been accumulating a valuable experience for the benefit of both current participants and newcomers to the scheme. In 2008, the Commission launched a first set of initiatives, the ERA-NET Learning Platform and the NETWATCH information system, which provide opportunities for mutual learning and exchange of good practice, as well as the creation of a central information platform on European trans-national programme cooperation in Research and Technological Development. Proposals should focus on pilot actions for the expansion of services and content, based on existing initiatives; tools and mechanisms to further support the coordination of national programmes and its implementation in direct response to users' needs and recent policy developments.*

Expected Impact

The selected support actions should provide useful input and devise pilot actions that, in the context of Joint Programming and, more in general, the Innovation Union Initiative and the future Common Strategic Framework for EU Research and Innovation funding, could be instrumental in driving the evolution of the methods for coordinating national research programmes.

Indicative budget for A4.2.2.3: EUR 1 000 000

****** Call Fiche FP7-ERANET-2012-RTD ******

Call title: *ERA-NET Call 2012*

- Call identifier: ***FP7-ERANET-2012-RTD***
- Date of publication: 20 July 2011[15].
- Deadline: 28 February 2012, at 17.00.00, Brussels local time[16].

Indicative budgets and Topics[17]:

A total of EUR 38.5 million is foreseen for this call and divided as follows:

- Up to EUR 37.5 million[18] will be allocated by individual Themes in the Cooperation Work Programme to the ERA-NET and ERA-NET Plus topics detailed in *Table 1* (Thematic part of the Call).
- A further EUR 1 million[19] for horizontal support actions, funded pro-rata by all the Themes in the Cooperation Work Programme, as detailed in *Table 2* (Horizontal part of the Call).

Table 1 – Overview of Thematic Coordination Actions in FP7-ERANET-2012 -RTD

Funding Scheme: Coordination and Support Actions (Coordinating Actions)

Challenge/Activity/ Area	Topic identifier	TITLE	Indicative budget (EUR million)
INNOVATION FOR SUSTAINABLE DEVELOPMENT			
KBBE 2.1 Sustainable production and management of biological resources	KBBE.2012.1.2-08	ERA-NET Plus on Innovation in the forest-based sector for increasing resource efficiency and tackling climate change with competitive customer solutions[20]	8.0
NMP 4.4 Integration of technologies for industrial applications	NMP.2012.4.0-3		
KBBE 2.1 Sustainable production and management of biological resources	KBBE.2012.1.2-13	Strengthening cooperation in European research on sustainable exploitation of marine resources in the seafood	2.0

[15] The Director-General responsible for the call may publish it up to one month prior to or after the envisaged date of publication.
[16] The Director-General responsible for the call may delay this deadline by up to two months.
[17] Under the condition that the draft budget for 2012 is adopted without modifications by the budget authority.
[18] Total indicative budget provided by the concerned Themes for ERA-NET actions. Following the evaluation of proposals, the final total budget of the call, as well the individual sub-budgets independently allocated by each Theme, may vary by up to 10% of the values initially foreseen.
[19] Total indicative budget for horizontal support actions. Following the evaluation of proposals, the final budget of the call may vary by up to 10% of the total value of the indicated budget.
[20] Topic jointly implemented by KBBE & NMP, each Theme contributing with EUR 4M

		chains - ERANET	
KBBE 2.3 Life sciences, biotechnology and biochemistry for sustainable non-food products and processes	KBBE.2012.3.6-01	ERA-NET: Systems Biology	2.0
ENERGY 5.10 Horizontal Programme Actions	ENERGY.2012.10.1.1	ERA-NET Plus on Bioenergy: Demonstrations of the European Industrial Bioenergy Initiative	15.0
ENERGY 5.10 Horizontal Programme Actions	ENERGY.2012.10.1.2	ERA-NET on Solar Electricity: Implementation of the Solar Energy Industry Initiative	2.0
SST 7.2 Sustainable Surface Transport	SST.2012.6-1	ERA-NET Transport III	3.0
CONFRONTING MAJOR THREATS TO PUBLIC HEALTH			
HEALTH 2.3 Translational Research in Major Infectious Diseases	HEALTH.2012.2.3.0-2	ERA-NET on infectious diseases	2.0
NMP 4.1 Nanosciences and Nanotechnologies	NMP.2012.1.2-3	ERA-NET on nano-medicine	1.5
SSH 8.3.2 Societal Trends and Lifestyles	SSH.2012.3.2-4	Drug demand and supply reduction (ERA-NET)	2.0

. ***Table 2 – Horizontal Support Actions in FP7-ERANET-2012 -RTD***

Funding Scheme: Coordination and Support Actions (Supporting Actions)

THEME/Activity	**Topic identifier**	**TITLE**	**Indicative budget (EUR million)**
HORIZONTAL			
A4.2.2.3 Support for Programme coordination and cooperation in the context of the ERA	ERA-JP.2012.1	Joint programming and its instruments: optimising implementation modalities and support mechanisms	1.0

General Eligibility Conditions

The general eligibility criteria are set out in Annex 2 to this work programme, and in the guide for applicants. Please note that the completeness criterion also includes that part B of the proposal shall be readable, accessible and printable. Only information provided in part A of the proposal will be used to determine whether the proposal is eligible with respect to budget thresholds and/or minimum number of eligible participants

Additional eligibility Criteria for ERA-NET proposals

The aim of ERA-NET actions is to network research programmes carried out at national or regional level, with a view to their mutual opening and the development and implementation of joint activities. Such programmes shall have all of the following characteristics:

- Be strategically planned (i.e. be composed of a number of research projects focused on a defined subject area or set of problems, that are scheduled to run for a set period of time and that have a co-ordinated management).
- Be carried out at national or regional level.
- Be either financed or managed directly by national or regional public bodies, or by structures (e.g. agencies) closely related to, or mandated by, public authorities.

The minimum number of participants in an ERA-NET consortium is ***3 independent legal entities*** which finance or manage publicly funded national or regional programmes***. Each of these must be established in a different Member State or Associated Country***.

Partners for ERA-NET actions eligible to satisfy the above condition are:

- Programme owners: typically national ministries/regional authorities responsible for defining, financing or managing research programmes carried out at national or regional level.
- Programme 'managers' (such as research councils or funding agencies) or other national or regional organisations that *implement* research programmes under the supervision of the programme owners.
- Programme owners (typically national ministries/regional authorities) which do not have a running or fully fledged research programme at the moment of submitting an ERA-NET proposal, but which are planning, and have committed, to set up such a programme, are also eligible if their participation is well justified and adds value to the overall programme coordination. As such, countries or regions which have less diverse research programmes (in particular new Member States and candidate Associated Countries) will find their involvement in the ERA-NET scheme greatly facilitated.

Please note that research organisations or universities which are not programme owners or managers are not eligible partners for ERA-NET actions.

In addition to the minimum number of independent legal entities mentioned above, private legal entities (e.g. charities) which manage research programmes may enter the consortium if their participation is well justified and adds value to the overall programme coordination.

Non-European Programme owners and programme managers are eligible partners at full title, assuming the ERA-NET consortium is already validly constituted (with 3 independent legal entities each of them established in a different Member State or Associated Country).

Sole participants (as referred to in Article 10 of the Rules for Participation) may be eligible if the above-mentioned specific criteria for eligible ERA-NET partners are respected. A sole participant shall explicitly indicate which of its 'members' forming a sole legal entity is either a programme owner or programme manager in the proposed action and indicate for these members, the respective national/regional programmes which are at the disposal of the proposed ERA-NET action.

Additional eligibility Criteria for ERA-NET Plus proposals

ERA-NET Plus proposals must meet the following eligibility criteria:

- A single joint call should be planned with a clear financial commitment from the participating national or regional programmes[21].
- Eligible participants are the same as for ERA-NET actions with the exception that programme owners, which do not have yet a running or fully fledged research programme at the moment of submitting a proposal, are not eligible for ERA-NET Plus actions. Furthermore, a consortium must include programme owners or programme managers from at least 5 different Member or Associated countries.
- The same additional participants as for ERA-NET actions are eligible, beyond the number of 5 minimum programme owners or managers.
- The total planned budget of the joint call shall have a minimum financial volume of EUR 5 million.
- A common peer review mechanism for evaluating the proposals submitted to the joint call shall be foreseen.
- Each project financed out of the joint call shall be trans-national (i.e. minimum of two partners from different countries).
- A fixed common set of general evaluation/selection criteria (excellence, European added value, etc.) should be part of the common evaluation criteria of the joint call organised by the national programmes.

Evaluation Criteria for ERA-NET and ERA-NET Plus proposals

For the evaluation of ERA-NET and ERA-NET Plus proposals, the general criteria and thresholds applicable to Coordination and Support Actions given in Annex 2, are complemented as follows:

1. Scientific and/or technological excellence - Quality of coordination (Threshold 3/5)

Level of ambition in the collaboration and commitment of the participants in the proposed ERA-NET / ERA-NET Plus action to coordinate their national/regional research programmes.

[21] Proposals must demonstrate that national research programmes are committed to support the call. Selected proposals will have to provide evidence that a commitment has been made by the relevant research programmes.

2. Quality and efficiency of the implementation (Threshold 3/5) – no additional criteria

3. Potential impact (Threshold 3/5)

Contribution to establishing and strengthening a durable cooperation between the partners and their national/regional research programmes.

***

A reserve list may be produced of proposals that pass the evaluation, but fall below the available budget.

- Proposal format:
  - Applicants must ensure that proposals conform to the page limits and layout given in the Guide for Applicants, and in the proposal part B template available through the EPSS. The Commission will instruct the experts to disregard any pages exceeding these limits. The minimum font size allowed is 11 points. The page size is A4, and all margins (top, bottom, left, right) should be at least 15 mm (not including any footers or headers).
- Evaluation procedure:
  - The evaluation will follow a single stage procedure.
  - Proposals will not be evaluated anonymously.
  - Proposals may be evaluated remotely.
- Indicative timetable:
  - Evaluation in April 2012.
  - Opening of negotiations in June 2012.
  - Selections from October 2012.
  - Grant agreements from December 2012.
- Consortia agreements:
  - Consortia Agreements are recommended.
- The forms of grant and maximum reimbursement rates which will be offered are specified in Annex 3 to the Cooperation work programme. This call provides the possibility to use flat rates to cover subsistence costs incurred by beneficiaries during travel carried out within grants for indirect actions. For further information, please refer to the relevant Guide for Applicants. The applicable flat rates are available at: *ftp://ftp.cordis.europa.eu/pub/fp7/docs/flat-rates-subsistence_en.pdf*.

***** End of *Call Fiche FP7-ERANET-2012-RTD* *****

***** Appendix to *Call Fiche FP7-ERANET-2012-RTD* *****

For information purposes: overview of **ERA-NET topics**, open for other Themes in Cooperation and Parts in Capacities, ***which are not included*** in the **cross-thematic ERA-NET Call 2012** described in the previous section.

Challenge/Activity /Area	**Topic identifier**[22]	**TITLE**	**Indicative budget (EUR million)**[23]
INNOVATION FOR INFORMATION TECNOLOGIES			
ICT 3.3 Components, systems, engineering	ICT-2011.3.5[24]	Core and Disruptive Photonic Technologies - ERA-NET Plus	10.0
ICT 3.9 Future and Emerging Technologies	ICT-2011 9.9 [25]	FET Proactive: Quantum ICT (QICT) ERA-NET Plus	7.0

***** End of Appendix to *Call Fiche FP7-ERANET-2012-RTD* *****

A4.2.3 External expertise

Funding Scheme: Coordination and Support Actions (Independent Experts[26])

It is foreseen to appoint independent experts to carry out the following tasks:

- The evaluation of the proposals submitted to the cross-thematic call *FP7-ERANET-2012-RTD* and, where appropriate, the review of running projects.

Indicative budget for A4.2.3: EUR 60 000

[22] The listed topics belonging to the ICT work programme are open also to other funding schemes: the indicated budgets represent the maximum available for ERA-NET/ERA-NET Plus actions, not the total for the topic.
[23] Under the condition that the draft budget for 2012 is adopted without modifications by the budget authority.
[24] Topic ICT-2011.3.5 is included in the call FP7-ICT-2011-8, with publication date 26/7/2011.
[25] Topic ICT-2012.9.12 is included in the call FP7-ICT-2012-9, with publication date 18/1/2012.
[26] In accordance with Articles 14(c), 17 and 27 of Regulation (EC) No 1906/2006 of 18 December 2006 laying down the rules for the participation of undertakings, research centres and universities in actions under the 7th Framework Programme and for the dissemination of research results (2007-2013).

A4.3 SUPPORT FOR COORDINATION AND COOPERATION WITH AND BETWEEN INTERGOVERNMENTAL AND OTHER HIGH-LEVEL SCIENTIFIC AND RESEARCH ORGANISATIONS IN THE EU, IN THE CONTEXT OF THE ERA.

The cooperation with European Research Organisations and their umbrella associations is object of continuous attention.

It is envisaged to pursue the effort of improving co-ordination with EIROforum and its members by creating new partnerships aimed at valorising the contributions these institutions could make towards reaching EU 2020 objectives.

On the same line, the dialogue with National Research Councils and other (non-University) Research Organisations should also be sustained, with particular attention paid to the important role that Research Councils could play, when acting as National Funding Agencies, in improving the efficiency of trans-national research collaborations.

Indicative budget for A4.3: No operational appropriations

A4.4 STRENGTHENED COORDINATION WITH EUREKA (PRO MEMORIA)

Funding Scheme: Other Actions (Subscription[27])

The Specific Cooperation Programme will support coordination activities aimed at increasing complementarities and synergy between EUREKA and the Framework Programme in areas of common interest. The EU is a member of EUREKA and, as such, contributes to the budget of the EUREKA Secretariat: membership fees are expected to total about EUR 2 million for the duration of the Seventh Framework Programme.

Indicative budget for A4.4: EUR 350 000

[27] In accordance with Article 14(d) of Regulation (EC) No 1906/2006 of 18 December 2006 laying down the rules for the participation of undertakings, research centres and universities in actions under the 7th Framework Programme and for the dissemination of research results (2007-2013), and in accordance with Article 108(2)(d) of the Financial Regulation and Article 160a of the detailed rules of the implementation of the Financial Regulation.

A4.5 SCIENTIFIC AND TECHNOLOGICAL COOPERATION ACTIVITIES CARRIED OUT IN COST

Funding Scheme: Coordination and Support Actions – Named Beneficiary[28]

COST is a long-standing, intergovernmental framework that facilitates coordination and exchanges between nationally funded scientists and research teams operating in a variety of fields. During the 6th and 7th Framework Programmes, COST underwent significant reforms: this has been most recently confirmed by the COST FP7 mid-term evaluation, which took place in 2010.

The Innovation Union Flagship sets out a *strategic approach to innovation and is* key to achieving the goals of the Europe 2020 Strategy for a smart, sustainable and inclusive economy.

COST, as an integral part of the Innovation Union and the European Research Area, will also be expected, for its part, to contribute to the delivery of the Europe 2020 agenda and the Innovation Union goals through efficient implementation of the COST networking activities.

Specifically, the Innovation Union calls for an inclusive research and innovation policy and, to this effect, COST could further contribute by bringing together "pockets of excellence", which are not yet well integrated in European and global research and visible in European cooperation, thereby also enhancing capacity building.

Under FP7, support to COST is provided through a grant agreement between the Commission and the legal entity designated by COST as its implementing agent, whose identity was communicated to the Commission by the General Secretariat of the Council and identified in the annual Cooperation work programme. The legal entity designated by COST as its implementing agent is the European Science Foundation[29].

The first four instalments of the FP7 COST grant, of EUR 30 million each, covered consecutive 12 month periods spanning until 1 June 2011. Following the FP7 COST mid-term evaluation, the grant agreement was extended in 2011 for a further 12 months, until 1 June 2012, with a contribution of EUR 43.3 million. A new extension of the grant agreement for a further 12 months is foreseen also in 2012, until 1 June 2013, with a corresponding financial contribution of EUR 43.3 million.

Indicative budget for A4.5: EUR 43 300 000

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[28] In accordance with Article 14(a) of Regulation (EC) No 1906/2006 of 18 December 2006 laying down the rules for the participation of undertakings, research centres and universities in actions under the Seventh Framework Programme and for the dissemination of research results (2007-2013).

[29] The European Science Foundation is established in 1 Quai Lezay Marnesia, Strasbourg, CEDEX 67080, France.

A4.6 RISK-SHARING FINANCE FACILITY

In accordance with Annex III to the Cooperation Specific Programme, the European Union provides a contribution (taking the form of a 'coordination and support action' (CSA-SA)) to the European Investment Bank (EIB), which is a risk-sharing partner for the Risk-Sharing Finance Facility (RSFF). RSFF which is co-funded by the European Union and the EIB, is aimed at fostering primarily private sector investment across Europe in research, technological development, demonstration and innovation[30] (RDI). This new financing instrument has been designed by the European Commission and the EIB, and launched in June 2007.

A4.6.1 Context

Innovation Union aspects

The Innovation Union initiative underlines that research and innovation are key drivers of competitiveness, jobs, sustainable growth and social progress. The RSFF work programme 2012 has been designed to support the implementation of the Innovation Union Initiative, in particular to bring together research and innovation to address major challenges and to enhance access to finance for enterprises.
Access to finance to support investments in Research and Innovation (RDI) is indeed an integral part of the Innovation Union Flagship Initiative, which contains a commitment that by 2014, on the basis of Commission proposals, the EU should put in place financial instruments to attract a major increase in private finance and close market gaps in investing in R&I.

The work programme can contribute to the innovation objective in two ways, and constitutes a significant change to the approach in earlier work programmes:
1/ By supporting more topics aimed at generating knowledge to deliver new and more innovative products, processes and services. This will include pilot, demonstration and validation activities.
2/ By identifying and addressing exploitation issues, like capabilities for innovation and dissemination.
The European Council, in its conclusions of 4 February 2011 on Innovation[31], invited the Commission to present proposals by the end of 2011 for scaling-up the RSFF and for assessing how best to meet the needs of fast-growing innovative companies through a market-based approach. This will be done in particular in the context of the Commission proposal for a Common Strategic Framework for EU research and innovation funding instruments. However, the RSFF 2012 work programme will already contribute to the innovation objective by enhancing access to finance for activities of RDI, and in particular for SMEs.

Information on the RSFF is available online[32]. The Commission will respond to further needs of potential beneficiaries for information on the RSFF (by, e.g., awareness-raising activities in conjunction with the EIB, participation to thematic events).

[30] See below under 'Innovation dimension of the activity'.
[31] Doc EUCO 2/11.
[32] http://www.eib.org/products/loans/special/rsff/?lang=en and http://ec.europa.eu/invest-in-research/funding/funding02_en.htm

Approach for 2012

Private investment in research and innovation in Europe remains below the level necessary to achieve the ambitions of the *'Europe 2020 strategy*'. In addition to grants, other mechanisms – in the form of financial instruments including the RSFF – have proven effective in leveraging private investment by firms, thus mobilising the financial markets and diversifying funding sources for European RDI actions.

The financial crisis has made access to finance for innovative companies even more difficult as banks have become more than ever risk-adverse. As a result, risk capital for private investments in RDI is very scarce. In addition, public financial support for RDI at national level is scarce, very fragmented and cyclical depending on the availability of budget resources in the EU Member States.

Improving access to loans for research and innovation actions requires public support to overcome market deficiencies for the financing of European RTD actions, which often involve a high level of risk.

One of the key challenges to be addressed through the RSFF work programme for 2012 is to improve access to the appropriate forms of finance to increase investment, especially private, in RDI in Europe.

The RSFF contributes to addressing the financing needs of innovative projects and companies, with a particular emphasis on SMEs, which vary considerably depending on sectors, types of innovation and stages of business development. It contributes to improving access to finance across the entire spectrum, from research, development to innovation. The RSFF also addresses cross-sector policy goals – as defined in the Cooperation Specific Programme[33] – and related investments/ funding needs.

The 2012 Work Programme will also respond to the recommendations of the independent experts group (IEG) in charge of the interim evaluation of the RSFF[34] relating to the period 2012-2013 and contribute to preparing the next programming period. The IEG was *'highly positive about the first rolling out phase of the RSFF*' and considered the RSFF as *'a uniquely innovative, demand driven instrument, successfully introduced in the European Union's research funding within FP7 and having dramatically expanded the financing for RDI*'. Experts therefore recommended the release of the EU contribution of up to EUR 500 million to the RSFF for the period 2011-2013 under the conditions foreseen in the FP7 legal basis. They also recommended improvements to be implemented for some already supported target groups (in particular SMEs).

Responding to the recommendation of the independent expert group in charge of the interim evaluation of the RSFF for a better support to SMEs and to the conclusions of the European Council on 4 February 2011 asking for a scaling up of the RSFF and for meeting the needs of fast-growing innovative companies, the RSFF 2012 Work Programme will open up a better access to RSFF finance for SMEs. For that purpose, a pilot scheme 'RSFF for SMEs' will be

[33] With the exception of Socio-Economic Sciences and the Humanities Themes.

[34] See Report of the Independent Expert Group in charge of the RSFF evaluation:
http://ec.europa.eu/research/evaluations/index_en.cfm?pg=rsff
and the response: European Commission Communication COM(2011) 52 *'On the Response to the Report of the Expert Group on the Interim Evaluation of the Seventh Framework Programme for Research, Technological Development and Demonstration Activities and to the Report of the Expert Group on the Interim Evaluation of the Risk- Sharing Finance Facility*':
http://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/commission_response_fp7_ie_report_2011.pdf#view=fit&pagemode=none

launched in 2012 within the current RSFF. The 'RSFF for SMEs' objective is to encourage banks and other financial intermediaries to extend loans and similar debt financing to SMEs but also to small mid-caps investing in RDI through a specific risk-sharing arrangement between the EU and the EIB Group. EIB has to preserve its excellent rating on the financial market despite the current context of extensive demand for risk-taking coverage. As a consequence, the EIB has currently to bind its risk-taking capacity. As compensation, the EU financial contribution within the present RSFF Agreement could be used as a first-loss piece[35]. Part of the 2012 EU contribution to RSFF from the Cooperation Programme should be dedicated to this pilot scheme, for an expected amount of EUR 120 million.

Innovation dimension of the activities

RSFF activities contribute to achieving the objective of the Innovation Union, as they attract a major increase in private finance and close the market gaps in investing in RDI. The risk-sharing arrangement concluded between the EC and the EIB ensures that activities covered by an RSFF Operation can be from any part of the whole value-chain (e.g. from "blue-sky" research to commercialisation activities, encompassing innovation). The RSFF interim evaluation showed that for the period 2007-2009 the majority of approved loans were dedicated to technological development and innovation activities.

As far as the use of the EU financial contribution is concerned, costs related to Innovation activities are eligible for EC RSFF Operations provided they comply with the provisions of the RSFF Co-operation Agreement between the European Union and the European Investment Bank (as stated in Article A4.6.2: *'Selection of Projects for Financing and the Eligibility Criteria'*).

Modalities of RSFF implementation

Within the framework of a maximum contribution of EUR 1 billion for the period 2007-2013, the European Union has provided its first contributions (Coordination and Support Action) to the EIB for RSFF for an amount of EUR 501.5 million for the period 2007-2010[36], EUR 400 million of which coming from the Cooperation Specific Programme. For 2012 it is expected that the EU will transfer EUR 197.28 million from the Cooperation Specific Programme[37]. The EIB Group is the sole beneficiary of this European Union action. Pursuant to a decision by the EIB Board of Directors, endorsed by the Bank's Governors on 9 June 2006, the

[35] The EU contribution would be used **first** to cover potential losses for a portfolio of loans provided to a specific target group, up to a defined percentage of losses ("first-loss" cushion). Only if potential losses were to exceed the EU contribution, the EIB contribution to the RSFF would be used to cover such further losses on an agreed basis.

[36] For the record, an amount of EUR 70 million was front-loaded from 2010 budget to the 2009 budget in response to the financial and economic crisis for the Cooperation Specific Programme. An additional contribution of EUR 1.5 million in 2009 was requested by the budgetary authority for the Capacities Specific Programme, consequently increasing the total EU contribution for 2007-2010 to EUR 501.5 million.

[37] On condition that the draft budget for 2012 is adopted without modifications by the budgetary authority. This amount corresponds to primary-credit appropriations only. It will be complemented by an additional amount of EUR 5.13 million (corresponding to the allocation to RSFF of the EFTA credits of 2,60 %) and by third-country appropriations for an amount of EUR 27 million (the latter being used to partially finance the pilot scheme 'RSFF for SMEs').

European Union contribution will be matched by an equivalent amount from the EIB (up to EUR 1 billion for the period 2007-2013).

The cooperation agreement between the European Union and the European Investment Bank (EIB) with respect to the Risk-Sharing Finance Facility (RSFF) – the RSFF Cooperation agreement – was signed on 5 June 2007 between the EIB and the European Commission (EC) and amended by the EC (on the basis of the Commission Decision C(2008)8058 – 12/12/2008 authorising the Director-General of the Directorate-General for Research to conclude further amendments of the Agreement on behalf of the EC on a number of points specified in the decision). A first amendment entered into force on 26 February 2009, a second one on 8 September 2009 and a third one on 22 December 2010.

This Agreement defines terms and conditions related to RSFF and, in particular, to the use of the European Union contribution in RSFF, the risk-sharing methodology, the indicative annual budget, the reporting conditions, the governance, the rules for establishment of network of financial intermediaries in all Member States and Associated Countries and their related conditions. The first amendment seeks to simplify and harmonise the financial reporting requirements and rules for asset management with other Commission funds managed by the EIB. The entry into force of this amendment allows, *inter alia*, for the allocation to RSFF of the Third Country Appropriations. The second technical amendment specifies the EU contribution for 2009 and simplifies reporting dates. The third technical amendment specifies the EU contribution for 2010, in compliance with the 2009 budgetary authority request.

In compliance with the recommendations of the Independent Experts Group (IEG) in charge of the RSFF interim evaluation, endorsed by the Commission in its Communication of 9 February 2011[38], the level of the European Union risk coverage, as well as the risk-sharing methodology established in the Agreement between the EC and the EIB for the RSFF implementation will be reviewed. In particular, but not exclusively, the RSFF could move from the current project-by-project approach to the use of more pooling of risk through a portfolio approach in duly justified cases, to better address financing needs of specific groups, like SMEs and small midcaps.

International Co-operation

In accordance with the provisions of the Cooperation Specific Programme, the EIB may only use the European Union contribution to RSFF to cover risk of operations limited to those borrowers or beneficiaries of guarantees from legal entities from Third Countries other than Associated Countries who participate in FP7 projects and whose costs are eligible for European Union funding.

Dissemination actions

Since 2006 the EIB, assisted by the Commission services, has carried out an intensive awareness raising campaign to reach stakeholders in as many Member States and Associated Countries as possible. Such awareness-raising actions will continue in 2012, with special focus on the most RDI-intensive sectors in Europe, target groups (including SMEs) and countries which have not yet benefited from the RSFF enough.

[38] COM(2011) 52

RSFF will involve development of financial engineering solutions adapted to the needs of European RDI actions. Such solutions will be implemented and tested by the EIB and its financing partners.

As soon as such a solution can be considered replicable, case studies of risk-sharing arrangements with financing partners and new products developed specifically for RSFF will be published on the EIB dedicated RSFF web-site.

A number of workshops for representatives of Member States and Associated Countries have been held since the launch to disseminate such financial engineering solutions and seek future co-operation opportunities. Initiatives of this kind will be continued in 2012, both at European and national level.

Cross-thematic approach

By nature, the RSFF mechanism – through the partnership between the EIB and the EC – responds to a cross-thematic approach to finance RDI activities in a wide spectrum of sectors. Moreover, the EU contribution – coming from the FP7 Cooperation Specific Programme – can be used to support RSFF operations eligible under different contributing Themes[39].

Contacts with potential clients

The launch of a RSFF dedicated website and other awareness raising activities started in 2006 have resulted in applications for financing from promoters of European actions of RDI. In parallel, the EIB loan officers have numerous contacts with highly research-intensive companies explaining the existence of new financing options made possible by RSFF.

The objective is to increase the participation in RSFF in as many Member States and Associated Countries as possible in order that all types of legal entities, irrespective of size (including SMEs in particular and research organisations, including universities)(already said) may benefit from this facility for the funding of their activities in eligible actions. The EIB shall use all reasonable efforts to ensure that RSFF is also offered by means of EIB financial-intermediary partners active in as many Member States and Associated Countries as possible and willing to offer RSFF products, in order to support eligible small and medium sized RTD projects in accordance with the EIB's usual rules and procedures. The attention of the Member States and Associated Countries is drawn to the fact that, in case of difficulties in identifying financial-intermediary partners interested in joining the EIB network for RSFF purposes, there will be a dependence on the best efforts of the Member States and Associated Countries themselves to ensure that there is no consequential damage to the interests of participants in their countries.

Addressing the financing needs of the Technology Platforms and Joint Technology Initiatives

Having identified in 2006 the most dynamic and active Technology Platforms, the EC and the EIB will continue to follow their individual development and monitor the implementation of their strategic research agendas to search for financing needs which the Bank could address.

[39] See below under A4.6.2 *'Selection of Projects for Financing and the Eligibility Criteria'*. Contributing Themes do not include Socio-Economic Sciences and Humanities.

In some cases customised products, individual or wholesale, may be developed, if necessary in co-operation with other financial institutions.

The Commission and the EIB will follow the development of Joint Technology Initiatives and the initiatives undertaken by their stakeholders and advise the stakeholders on options available to optimise their financing packages. This may involve bridge financing as well as individual customised financing solutions, specifically adapted to the financing needs.

Implementation arrangements for SMEs

The EIB can only be directly involved in operations with financing requirements in excess of EUR 7.5 million. Smaller requests will be directed to financing partners established in Member States or Associated Countries with whom the EIB has or will develop risk-sharing arrangements, including Framework Facilities designed to provide intermediated financing to smaller projects, notably those promoted by SMEs.

A Framework Facility is a line of credit advanced by the EIB to banks or other intermediary institutions which on-lend the proceeds to finance small and medium-size investments.

The deployment of Risk-Sharing Framework Facilities across the EU will reflect demand. During an initial phase, this has involved a limited number of leading EIB partner banks, based in Member States or Associated Countries.

Risk-Sharing Framework Facilities will be set up either through the introduction of risk sharing arrangements in existing credit lines or through new facilities or intermediaries.

In 2012 a higher emphasis will be given to supporting and enlisting financial intermediaries contributing to financing RDI-intensive SMEs, notably through relevant incentives to use the pilot action 'RSFF for SMEs', allowing those intermediaries to build sub-portfolios of loans for RDI investments carried out by SMEs and small Midcaps.

The independent expert group recommended an increased RSFF support to SMEs during the second part of the RSFF (2011-2013), including (1) the possible increase of risk-taking on the EU side (beyond the current limits of the EC window) and (2) the move from a project-to-project approach to a portfolio approach (with first-loss taking by the EU instead of risk-sharing between the EU and the EIB for each operation under the RSFF).

These recommendations will take wing with the launch in 2012 of the pilot action 'RSFF for SMEs'. The 'RSFF for SMEs' objective is to encourage banks and other financial intermediaries to extend loans and similar debt financing mainly to innovative SMEs, but also to small mid-caps investing in RDI through a specific risk-sharing arrangement between the EU and the EIB Group (for instance through a possible increase of risk-taking and the adoption of a portfolio and first-loss taking approach on the EU side). Part of the 2012 EU contribution to RSFF from the Cooperation Programme should be dedicated to this pilot scheme, for an expected amount of EUR 120 million. An appropriate level of coordination will be ensured with complementary EU instruments, such as the High Growth and Innovative SME Facility (GIF), a venture-capital instrument funded under the Com*petitiveness and Innovation Framework Programme 2007-13 (CIP).*

The RSFF Co-operation Agreement between the EC and the EIB will be amended accordingly in the course of 2011.

Governance

RSFF implementation is managed by the EIB in accordance with its own rules and procedures, with due regard to the terms and conditions of the RSFF Cooperation Agreement (and its subsequent amendments) between the Commission and the Bank. RSFF implementation and in particular the use of the European Union Contribution is supervised by a Steering Committee, consisting of at least four representatives, at Director level, from the Commission and the Bank respectively.

The Commission will continue to monitor closely the effective use of the European Union Contribution, including ex-post assessments of the successful features of the action, and to regularly report to the Programme Committee. In addition, the Commission will include main findings in this respect to the annual report on research and technological development activities which it will send to the European Parliament and the Council pursuant to Article 190 TFEU. In this context, it is interesting to note that the RSFF interim evaluation carried out with the assistance a group of independent experts in 2010 concluded very positively on the implementation phase of the RSFF.

A4.6.2 Selection of Projects for Financing and the Eligibility Criteria

The EIB was recognised as a beneficiary of the European Union action in the Council and Parliament decision adopting the 7th Framework Programme.

In accordance with the principles established in the Cooperation Specific Programme the EIB will use the European Union contribution on a "first come, first served basis", as provisions and capital allocation within the Bank to cover part of the risks associated with its operations supporting eligible European RTD actions.

The European Union contribution to RSFF may only be used to support activities which can be classified as "fundamental research", "industrial research" or "experimental development" as defined in the Framework for State Aid for Research and Development and Innovation. Prototypes and pilot projects, which are part of "experimental development", may be eligible if they fulfill the conditions specified therein. Innovation activities intended to prepare the commercial use of research results within the time period of the project (such as training, technology management and transfer) are eligible if they are linked to and complementary to research, technological development activities and/or demonstration activities, the later constituting the bulk of any eligible European RTD action.

The RSFF Cooperation Agreement with the Bank comprises a list of exclusions from financing with support of the European Union contribution, reflecting political agreement between the Commission, the Member States and Associated Countries as well as the European Parliament as documented in the 7th Framework Programme and the Cooperation Specific Programme.

A4.6.3 The Commission Right to Object to the Use of the European Union Contribution

The Commission has a right to express its opinion on each and every financial operation proposed by the EIB to its Board for decision under Article 21 of the EIB Statutes. Where the Commission delivers an unfavourable opinion, the EIB Board may not grant the loan or guarantee concerned, unless it votes unanimously in its favour, the Commission nominee abstaining. Should the Bank proceed with financing despite the Commission's negative opinion the European Union contribution to RSFF may not be used.

In accordance with the Rules of Participation, the Commission may object, in duly justified cases, for the use of the *European Union contribution* for provisioning and capital allocation for a loan *or a guarantee* proposed by the EIB. If such a case arises the Commission may conduct an independent, internal or external, review of such a case.

A4.6.4 European Union Financial Contribution to RSFF in 2012[40]

All Themes of this Work Programme will contribute on a proportional basis, except the Socio-Economic Sciences and the Humanities theme, which does not contribute to RSFF.

Following the interim evaluation of the RSFF, as stated in Annex II to FP7, the Commission endorsed the recommendation of the group of independent experts to release up to EUR 500 million for the period 2011-2013. By voting the EU budget 2011 (EUR 250 million for the RSFF), the Council and the European Parliament have provided their agreement of principle for the release of the second tranche. Moreover, in the conclusions of the Competiveness Council of 9 March 2011, the Council agreed with the recommendation of the Independent Expert Group, also supported by the Commission, to release an additional EU contribution of up to EUR 500 million for the period 2011-2013.[41]

As from 2009 the Commission proceeds annually with an equal amount of commitment and payment of the European Union contributions to RSFF, based on an the EIB's activity and forecast report and its request for the amount of the contribution estimated necessary for the following year. In compliance with Annex II to FP7, the Commission will commit, in 2012, an amount of EUR 197.28 million[42] coming from the contributing Themes of the Cooperation Specific Programme. Out of the total amount of the EU financial contribution in, 2012, EUR 120 million will be ring fenced for the pilot scheme "RSFF for SMEs'.

A4.6.5 Process for Recovering and Reallocating Unused European Union Funds

In order to mitigate the risk of accumulation of unused funds the multi-annual planning will be adjusted on the basis of reports including pipeline report (summary of information on projects considered for financing) and demand forecasts. Amounts committed but not earmarked, blocked or paid to the EIB – i.e. not used for the operations of RSFF – will be reallocated to other activities of the contributing themes.

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[40] On condition that the draft budget for 2012 is adopted without modifications by the budgetary authority.

[41] See final Council conclusions on the interim evaluation of the RSFF on 04/03/2011: "*Regarding the role of the Risk-Sharing Finance Facility (RSFF) in FP7, the Council WELCOMES the finding of the Independent Experts Group (IEG) that RSFF has been a success, both in quantitative and qualitative terms and that very considerable results on an EU-wide scale have been achieved since its launch. The Council therefore AGREES with the recommendation of the IEG, also supported by the Commission, to release an additional EU contribution of up to EUR 500 million for the period 2011-2013 under the conditions foreseen in the FP7 Decision in accordance with the applicable procedures. The Council CALLS ON the Commission, in liaison with the European Investment Bank, to urgently examine ways and means to improve the take-up by currently underrepresented target groups, in particular SMEs, universities and research infrastructures with a view to achieving significant progress in 2012. A specific SME lending mechanism within the current facility is being designed by the Commission, the European Investment Fund and the EIB in this respect. The Council is looking forward to the Commission proposals called for by the European Council for scaling up the RSFF*".

[42] On condition that the draft budget for 2012 is adopted without modifications by the budgetary authority. This amount corresponds to primary-credit appropriations only. It will be complemented by an additional amount of EUR 5.13 million (corresponding to the allocation to RSFF of the EFTA credits of 2,60 %) and by third-country appropriations for an amount of EUR 27 million (the latter being used to partially finance the pilot scheme 'RSFF for SMEs').

Notwithstanding the above and unless the Council and the European Parliament adopting the Common Strategic Framework for the period post 2014 decide otherwise, the Commission will recover from the EIB any unused funds of the European Union contribution (including interest and income) which on 31 December 2013 have not been used or committed to be used or are required to cover eligible costs, as defined in the RSFF Cooperation Agreement.

A4.7 FINANCIAL OVERVIEW FOR GENERAL ACTIVITIES FOR 2012

The following provides a financial overview for 2012 of the activities which are funded across the Cooperation Programme:

Activity	Funding for 2012 *
A4.1 CORDIS	EUR 7.90 million
A4.2 ERA-NET scheme (cross-thematic)	EUR 1.06 million *broken down as follows:*
*A4.2.2.1 ERA-NET Actions ** *	*EUR 0.00 million*
*A4.2.2.2 ERA-NET Plus Actions ** *	*EUR 0.00 million*
A4.2.2.3 Horizontal Support Actions	*EUR 1.00 million*
A4.2.3 External expertise	*EUR 0.06 million*
A4.3 Research Organizations	EUR 0.00 million
A4.4 EUREKA	EUR 0.35 million
A4.5 COST	EUR 43.30 million *broken down as follows:*
A4.5a COST: Baseline Contribution	*EUR 30.00 million*
A4.5b COST: Additional Contribution	*EUR 13.30 million*
A4.6 RSFF***	EUR 229.41 million
Total:	**EUR 282.02 million**

***** On condition that the draft budget for 2012 is adopted without modifications by the budget authority.

** ERA-NET and ERA-NET Plus actions are funded directly by the Themes.

*** This amount is foreseen to be released according to the conclusions of the interim evaluation of the RSFF. This amount of EUR 229.41 million corresponds to primary-credit appropriations of EUR 197.28 million, complemented by an additional amount of EUR 5.13 million (corresponding to the allocation to RSFF of the EFTA credits of 2,60 %) and by third-country appropriations for an amount of EUR 27 million (the latter being used to partially finance the pilot scheme 'RSFF for SMEs').

Budget Figures in This Work Programme

All budgetary figures given in this work programme are indicative. The final budgets may vary following the evaluation of proposals.

The final budget awarded to actions implemented through calls for proposals may vary:

- The total budget of the call may vary by up to 10% of the total value of the indicated budget for each call; and
- Any repartition of the call budget may also vary by up to 10% of the total value of the indicated budget for the call.

For actions not implemented through calls for proposals:

- The final budgets for evaluation, monitoring and review may vary by up to 20% of the indicated budgets for these actions;
- The final budget awarded for all other actions not implemented through calls for proposals may vary by up to 10% of the indicated budget for these actions.

Annex 5

RECOVERY PACKAGE

Public-Private Partnership Initiatives[43]*:*

- Factories of the Future (FoF)

- Energy-efficient Buildings (EeB)

- Green cars (GC)

Annex 5 brings together for easy reference all the WP 2012 topics of the three PPPs from the different participating Themes: NMP, ICT, Transport, Environment and Energy.

[43] The Public Private Partnership Initiative on the Future Internet, launched in 2010, is outside of the context of the Recovery Package. It is described under Theme 3

Recovery Package: Public-Private Partnerships (PPPs) and Risk Sharing Finance Facility

The European Economic Recovery Plan adopted by the European Commission on 26 November 2008 and endorsed by the European Council on 11-12 December 2008 proposes actions to develop technologies for the manufacturing, construction and automotive sectors, which have recently seen demand plummet as a result of the crisis and which face significant challenges in the transition to the green economy. The Commission proposed to increase research financing through the RSFF instrument and to launch three Public-Private Partnerships (PPPs) which provide the required support to the three sectors:

- in the manufacturing sector: a 'Factories of the Future ' initiative to help EU manufacturers across sectors, in particular SMEs, to adapt to global competitive pressures by increasing the technological base of EU manufacturing through the development and integration of the enabling technologies of the future, such as engineering technologies for adaptable machines and industrial processes, ICT, and advanced materials (EUR 1.2 billion);
- in the construction sector: an 'Energy-efficient Buildings' initiative to promote green technologies and the development of energy-efficient systems and materials in new and renovated buildings with a view to reducing radically their energy consumption and CO_2 emissions (EUR 1 billion);
- in the automotive sector: a 'Green Cars' initiative, involving research on a broad range of technologies and smart energy infrastructures essential to achieve a breakthrough in the use of renewable and non-polluting energy sources, safety and traffic fluidity (EUR 1 billion).

These initiatives are part of a comprehensive, integrated package to be implemented in cooperation between all the responsible services within the Commission, complemented by actions on the demand-side, such as public procurement, technical standards, and regulatory measures. This includes a further EUR 4 billion for non-research activities under the Green Cars Initiative.

The three PPPs are intended to prevent the crisis from deflecting attention from the EU's longer-term interests and the need to invest in its future. Research and Innovation are considered as strategic and "smart" investments to prepare the ground for the future of the EU economy which has to become a knowledge-based and low carbon economy, as stated in the Europe 2020 strategy. This is crucial for the EU to come out from the crisis stronger, more sustainable and more competitive.

The Commission, working in close collaboration with industrial representatives, has developed multi-annual roadmap and longer-term research strategies for the three sectors. For 2012, the initiatives will continue to be implemented through a series of Cross-thematic Calls under the 2012 work programmes of the relevant FP7 Themes. Responsibility for these Cross-thematic Calls is as follows:

- The 'Factories of the Future' initiative involves financial support from the NMP[44] and ICT[45] Themes;

[44] Nanosciences, Nanotechnologies, Materials & New Production Technologies
[45] Information and Communication Technologies

- The 'Energy-efficient Buildings' initiative involves financial support from the NMP, Energy, ICT and Environment Themes;
- The 'Green Cars' initiative involves financial support from the Transport, ICT, NMP, and Environment Themes.

In addressing the industrial needs and objectives of each PPP, the Themes will work closely together to ensure a coherent, complementary and holistic approach. To ensure high visibility and to promote cooperation and exchange of information between the research projects funded under the different Themes, it is intended to gather the researchers and the industrial stakeholders together in annual cross-thematic workshops and seminars for each PPP. This would be part of the implementation of the projects.

The Call Fiche for the call implemented jointly on Materials for Green Cars in the Green Car PPP is included in Annex 5. The Call Fiches for the other topics in the Green Car PPP can be found within the corresponding work programme chapter of each participating Theme. The topics in the FoF and EeB PPPs are organised in two calls implemented in a coordinated way with a common deadline and the Call Fiches are included in Annex 5 and the corresponding work programme chapter of each participating Theme. With the exception of the call implemented jointly on Materials for Green Cars, each Theme will remain responsible for its own budget and for the implementation of the related topics.

The corresponding research topics for each PPP under the work programme 2012 Cross-thematic Calls are given in the following three sections V.1 to V.3.

The RSFF is one of the instruments that can provide support to projects emerging under the PPPs through loan funding. RSFF loans have already been provided to a number of automotive companies which invest in cleaner engines and technologies. Furthermore, for the Green Car PPP, the EIB provides funding either by the RSFF or the (European Clean Transport Facility (ECTF).

In addition to the PPPs launched under the recovery package, a Public Private Partnership Initiative on the Future of the Internet is launched under Theme 3 "ICT – Information and Communications Technologies" of the Cooperation Programme. This FI-PPP focuses on the development of innovative open network and service platforms with generic common enablers serving a multiplicity of demand-driven use cases in "smart applications".

V.1 "Factories of the Future" Public-Private Partnership (FoF) - Cross-thematic coordination between NMP and ICT

Manufacturing is still the driving force of the European Economy. Manufacturing activity in Europe represents approximately **21% of the EU GDP** and provides about **20% of all jobs** (more than 30 million) in **25 different industrial sectors**, largely dominated **by SMEs**. With each job on the factory floor generating approximately two other jobs in services, about 60 million people are additionally engaged in the related service areas. Therefore, manufacturing is of high importance to Europe, with a huge potential to generate wealth, jobs and a better quality of life. The long-term shift from a cost-based competitive advantage to one based on high added value requires that European manufacturing increases its technological base, building on the EU's excellent R&D in this domain, and develops a number of **enabling trans-sectoral production technologies**.

The *Factories of the Future PPP Initiative* aims at helping EU manufacturing enterprises, in particular SMEs, to adapt to global competitive pressures by developing the necessary enabling technologies to support EU manufacturing across a broad range of sectors. It will help European industry to meet the increasing global consumer demand for greener, more customised and higher quality products through the necessary transition to a demand-driven industry with lower waste generation and energy consumption.

The activities will concentrate on increasing the technological base of EU manufacturing through the development and integration of the enabling technologies of the future, such as engineering technologies for adaptable machines and industrial processes, ICT for manufacturing, and the novel industrial handling of advanced materials. The initiative will concentrate on industry-led R&D projects and will include demonstration activities, such as large-scale production-line demonstrators for validation and market applications. The partnership will work together to identify the R&D needs of manufacturing industry and in particular SMEs. In order to further ensure the PPP character of the initiative, a large part of the activities in the projects is expected be performed by industrial organisations themselves. This initiative, being by nature **cross-sectoral** and including efforts to address the **needs of SMEs**, aims to transform Europe into a dynamic and competitive knowledge-based economy by delivering:

- A new European model of production systems for the factories of the future (e.g. transformable factories, networking factories of excellence, learning factories) depending on different drivers such as high performance, high customisation, environmental friendliness, high efficiency of resources, human potential and knowledge creation.
- ICT-based production systems and high quality manufacturing technologies capable of optimising their performance with a high degree of autonomy and adaptability for a balanced combination of high throughput and high accuracy production.
- Sustainable manufacturing tools, methodologies and processes that have the capability of cost-efficiently shaping, handling and assembling products composed of complex and novel materials.

The indicative budget for the "Factories of the Future" PPP initiative is EUR 160 million in 2012, of which EUR 100 million is from the NMP Theme and EUR 60 million from the ICT Theme.

V.1.1 "Factories of the Future (FoF)" - Topics covered by the NMP Theme

FoF.NMP.2012-1 Adaptive production systems and measurement and control equipment for optimal energy consumption and near-to-zero emissions in manufacturing processes

Technical content/scope: One of the cornerstones for a sustainable development of the manufacturing sector lies in achieving high productivity rates while reducing the environmental impacts associated with the manufacturing processes. This challenge can be tackled by designing in an integrated manner adaptive production systems for eco-efficient processes and systems, using the information of sensors and in-process measurement methods. A suitable energy efficiency performance measuring system would help fulfilling customer needs with the minimum possible use of energy and material resources. This control system needs to focus on concepts which facilitate the evaluation, control and improvement of energy efficiency in manufacturing processes. Firstly, an energy performance measurement system at European or global level with suitable and measurable energy Key Performance Indicators (KPIs) has to be developed, utilising new sensors and visual systems for in-process measurement as enablers. Secondly, concepts for evaluating this KPI related information have to be developed, followed by decision support, i.e. which control mechanisms and improvement measures have to be implemented on the basis of this information. With the development of such concepts, factories would know their energy performance in real-time, facilitating more effective business decisions based on accurate and up-to-date information.

Research activities should address all of the following areas:

- Environment-conscious, life cycle and holistic process-machine approaches, to minimise the overall impact of production systems and to produce added-value products with minimised consumption of resources and process emissions.
- The definition of effective (specific and quantitatively measureable) Energy KPIs as well as the visualisation of these KPIs, together with the development of conceptual frameworks and software to measure and evaluate Energy-KPIs.
- Technologies capable of harvesting and recovering portions of the energy involved in the production processes, both at machine and at a system level, as well as in the plant environment.

In order to ensure the industrial relevance and impact of the research effort, the active participation of industrial partners, including SMEs, represents an added value to the activities and this will be reflected in the evaluation, under the criteria Implementation and Impact. The projects are expected to cover demonstration activities, including pilot implementations in industrial settings, and this will be likewise reflected in the evaluation.

Special features: This topic is particularly suitable for collaboration at international level, particularly under the IMS scheme.[46] Project partnerships that include independent organisations from at least three IMS regions[47] are therefore encouraged.

Funding Scheme: Large-scale integrated collaborative projects.

[46] IMS (Intelligent Manufacturing Systems) is an industry-led, global, collaborative research and development programme, started in 1995 as the world's only multilateral collaborative R&D framework: *www.ims.org*

[47] The current member regions of IMS are the European Union, the United States of America, Korea, Mexico and the EFTA states of Norway and Switzerland.

Expected impact: An efficient use of material and energy resources along the lifecycle of manufacturing processes will lead to notable reductions in environmental impacts while at the same time a sustainable economic growth and an increased social well-being will be assured. These processes will know their energy performance in real-time, facilitating more effective business decisions and reactions, based on accurate and up-to-date information.. In quantified terms, the new generation of production processes and systems of near-to-zero emissions will be expected to lead to the following impacts along their lifecycle:

- At the use stage, reduction above 40% in the consumption of energy resources when compared with conventional manufacturing processes.
- At the use stage, reduction in the process emissions (e.g. chemicals, hazardous materials, dust, air, water, oil) far below the prescriptive limits and standards to almost zero.
- At the end-of-life stage, contribution towards a 100% reuse of machine components in new life cycles.

These quantified impacts will have to be corroborated by appropriate Life Cycle Assessment techniques. Moreover tools and methods developed in this research topic will help end-users become compliant with the new standards 'EN16001 or ISO50001' for Energy Management Systems. Projects are also expected to generate knowledge of new scientific, technical, economic and social factors to support European policy development and promote the standardisation and definition of eco-labelled processes and products. Finally, projects will have to support EU policies and legislation on eco-design activities in the manufacturing sector.

FoF.NMP.2012-2 Methodologies and tools for the sustainable, predictive maintenance of production equipment

Technical content/scope: Maintenance methodologies and approaches based on intelligent data processing techniques are crucial when improving productivity and reducing machine stoppages, but also in order to avoid expensive repair costs. Detection of potential failure and the corresponding corrective maintenance are well established and accomplished, but predictive maintenance derived from a correct failure prediction is not yet a reality.

Intelligent methods for collecting and organising data (e.g. Artificial Intelligence and Data Mining) will provide new concepts of advanced maintenance addressing flexibility, easy integration in production environments and easy to interpret recommendations and results. By combining different sources of process data coming from advanced embedded information devices, the knowledge inferred from production equipment will be reinforced and reused in the maintenance learning/training process. These techniques will also provide a useful decision making support tool based on optimal planning and scheduling of maintenance operations in order to optimise the energy consumption.

Research activities should address all of the following areas:

- Developing R&M (Reliability & Maintainability) design practices/methods (including organisation) to predict and assess the availability of equipment during production already at an early design stage;

- Developing and integrating of advanced and generic embedded information devices designed to capture relevant information, with data pre-processing capabilities (sensors, ambient intelligence devices, RFID tags etc);
- Defining new algorithms and techniques based, for example, on Artificial Intelligence and Data Mining methodologies, in order to provide intelligent data processing and knowledge extraction from information gathered from production equipment and in order to integrate knowledge reuse into production.

By improving predictive maintenance, the lifetime of the system and the availability of the whole process will be increased. The detection of unforeseen decline on its operational life cycle, depending on process data and contextual information (operational time, number of stoppages, environmental conditions, etc), will be the key issue in maintenance tasks in order to provide a higher resistance of equipment, leading to improvements in future design of components involved in manufacturing processes.

In order to ensure an efficient implementation and maximum impact of SME-related activities, the leading role of SMEs with R&D capacities will be evaluated under the criteria 'Implementation' and 'Impact': the coordinator does not need to be an SME but the participating SMEs should have the decision making power in the project management; and the output should be for the benefit of the participating SMEs and the targeted SME dominated industrial communities.

Funding Scheme: SME-targeted collaborative projects.

Expected impact: Manufacturing companies in Europe are investing in new smart and agile maintenance approaches that may increase the lifetime and energy efficiency of the production equipment and reduce its maintenance costs. New tools and methodologies for the sustainable maintenance of production equipment should contribute, in particular, to energy consumption management and optimisation tools, reducing energy costs and environmental pollution by a factor of 20%. Moreover, research projects in this field should contribute to their worldwide competitiveness and to the creation of new jobs.

FoF.NMP.2012-3 Intelligent production machines and 'plug-and-produce' devices for the adaptive system integration of automation equipment, robots and other intelligent machines, peripheral devices, smart sensors and industrial IT systems

Technical content/scope: 'Plug-and-Produce' is a coveted feature for the realisation of increasingly agile manufacturing systems in a globalised industry that demands continuous change of processes, products and production volumes. This feature should allow the automatic configuration and seamless integration of heterogeneous devices in(to) a system. The so-called smart factories are meant to be production sites featuring higher levels of (cost- and time-) efficiency, productivity and re-configurability. A successful realisation of this paradigm requests the incorporation of the latest developments in automation, control, mechatronics, ICT technologies, human-machine interaction, optimisation techniques, strategic planning and smart robotics. Moreover, the further integration of any newly developed technologies into the production lines and the industrial environments requires complementary research and innovation efforts.

'Plug-and-Produce' devices allowing the adaptive connection of automation equipment would need to focus on concepts and solutions in the fields of advanced agent-oriented software and service-oriented architecture middleware that pave the way for the actualisation of smart factories compliant to the 'plug-and-produce' principles. Some instances of the outcome of the research might be results in configuration modules, communication protocols, discovery -and retrieval of abilities- and negotiation protocols and tools, end-user interfaces. The incorporation of extensions guaranteeing interoperability and harmonised cooperation among intelligent manufacturing components whilst yielding enhanced fault-tolerance and self-configuration skills at system level shall be welcome.

Future smart factories are meant to increasingly comprise, probably heterogeneous, intelligent machine-tools, automation equipment, peripheral devices, robots and actuators, smart sensors and industrial IT systems, including safety-oriented systems.

Research is needed on concepts or solutions for such manufacturing systems that guarantees interoperability. Research should focus on several of the following areas:

- Scalable extension of the system capabilities through addition of new components;
- Reconfiguration of the system functionality whenever new components are brought into it;
- Reuse of manufacturing equipments on all levels;
- Migration and transition of the manufacturing systems to modern architectures (e.g. service oriented architectures) with the objective to reduce commissioning effort or ramp-up time);
- Customisation of products by flexible manufacturing.

All these features should be enabled in a seamless and user-friendly manner such that all the intelligent, but probably heterogeneous, elements in the ensuing system can still successfully operate in a cooperative manner, which exploits the full potential of the installed components in a safe and ergonomically designed working environment.

In order to ensure an efficient implementation and maximum impact of SME-related activities, the leading role of SMEs with R&D capacities will be evaluated under the criteria 'Implementation' and 'Impact': the coordinator does not need to be an SME but the participating SMEs should have the decision making power in the project management; and the output should be for the benefit of the participating SMEs and the targeted SME dominated industrial communities.

This topic is complementary to topic FoF-ICT-2011.7.1(b), which deals with large-scale validation of advanced industrial robotics systems.

Funding Scheme: SME-targeted collaborative projects.

Expected impact: Standardisation and developments in 'Plug-and-Produce' should lessen the commissioning effort and ramp-up time whilst enhancing context-awareness, maintainability, modularity, re-usability, safety and versatility of manufacturing systems. Such capabilities explain the relevance of the subject to SMEs as in addition to the enumerated benefits, 'Plug-and-Produce' should imply big savings in terms of the expertise required for both customisation and system integration as well as in time devoted to installation and configuration of new elements. Intelligent manufacturing should help Europe to catch up on

competitiveness with respect to other major industrial players through the easy incorporation of latest technology developments to manufacturing sites. Versatile manufacturing should lead to safe production sites with a large variety of sophisticated products featuring flexible, short cycle-time manufacturing capability.

FoF.NMP.2012-4 High performance manufacturing technologies in terms of efficiency (volumes, speed, process capability etc), robustness and accuracy

Technical content/scope: The current industrial market is characterised by a turbulent and uncertain demand for highly customised products, of a complexity which is in constant increase. Compared to the past, customers require higher quality, faster delivery times, and shorter times between successive generations of products. Moreover, manufacturers nowadays need to reduce investments in production resources over time and sustainability issues impose that machines are able to efficiently and ecologically support the production of new products without being substituted. All this requires high flexibility and permanent adaptation of machines, process equipment and production systems to any changes in products and in process evolution.

The reliability and availability of machines, equipment and production systems are paramount for efficient production. The key goal is to have maximum availability of machinery, producing high-quality parts with almost zero-defects and in-specification materials at highest production rates. As an example, mechatronic strategies based on adaptronic systems or intelligent materials can compensate deviations from initial accuracy requirements detected by the continuous monitoring and control systems.

Research activities should focus on new high performance manufacturing technologies in terms of efficiency (volumes, speed, process capability), flexibility, robustness and accuracy based on new system architectures with self-adaptive machine structures and on mechatronic modules, multi-layer controls and highly redundant measurement, sensing and actuator structures. These R&D lines should lead to new equipment, lean and smart machines and production systems which are capable of taking into account tacit knowledge from operators and require less shop-floor space, by means of reduction of peripherals, reduction of system complexity, optimisation of cycles and process planning.

The aim is to allow improvements through successive investments in production equipment using flexible technologies such as modular production units. Furthermore, the new solutions should bring the integration of the necessary ICT support providing simplification and real user friendliness.

In order to ensure the industrial relevance and impact of the research effort, the active participation of industrial partners, including SMEs, represents an added value to the activities and this will be reflected in the evaluation, under the criteria Implementation and Impact.

The proposals should cover both research and demonstration activities. Prototypes and pilot implementations in real industrial settings represent a clear added-value. Whilst there is no lower or upper limit on the requested EU contribution, the target is that proposals allocate around 50% of the total eligible costs of the project (excluding management costs) to demonstration activities and this objective will be taken into account in the evaluation under the criteria S/T Excellence and Impact.

Funding Scheme: DEMO-targeted collaborative projects.

Expected impact: An increase in competitiveness and in production flexibility has become a critical aspect for the European manufacturing industries in the changing and uncertain global scenario. For most manufacturing factories, activities such as material handling, scheduling, part or process setup or changeover times still occupy too large a fraction of the total time that parts are 'in process'. In some cases, up to 90% of product manufacturing time represents non-value-added delays. Reducing this wasted throughput time is and will continue to be a major driver for improvement in productivity.

The achievement of more reliable and efficient manufacturing systems (e.g. machine tools, fixtures, cutting tools, process and peripheral equipment), integrating process modelling and part quality prediction, is expected to give rise to benefits such as:

- Reduction of the number of rejected components or products and the amount of raw material used by a factor of 20%;
- Reduction of power consumption, down time of the equipment, and effective required floor space by making it less sensitive to distortion from outside;
- Increased throughput and capability of processes, endurance, tool and equipment life and productivity maintaining repeatability and accuracy by a factor of 20%;
- Reducing volume of scrap/chips/waste and number of finishing operations with a minimal use of additional operating materials, fluids (coolants), additives and substances;
- Minimisation (or even elimination) of the use of services, e.g. air, water, coolants, by a factor of 30%.

FoF.NMP.2012-5 High precision production technologies for high quality 3D micro-parts

Technical content/scope: Production technologies are clearly advancing towards the manufacturing of topologically 3D optimised parts with complex internal structures such as conductive or cooling channels/micro reaction chambers and material gradient structures. Miniaturisation of products and production appliances and integrated compact systems design will be key issues. High quality and high performance (e.g. accuracy tolerances, repeatability) manufacturing, parts consolidation and simplification, multiple materials and the reduction of manufacturing and assembly costs must therefore be addressed. In order to ensure efficiency, reliability, robustness and high product quality, novel in-line monitoring and quality inspection systems, including non-statistical process control for maximum yield, are needed as well as equipment that can evaluate, in an automated way, the quality properties and their evolution under conditions of use.

Research activities related to the micro-parts and micro-topography should focus on some of the following areas, as appropriate:

- Novel approaches for 3D micro-parts production, including 3D micro-components using a wide range of materials (e.g. metallic alloys, composites, polymers, bio-polymers, ceramics, smart materials) and in large volume production;

- New process chains integrating different process technologies (e.g. micro-forming, machining by µEDM, Micro Powder Injection Moulding, Micromilling, Stereo Micro Lithography and printing), as well as multitasking machines integrating multi-process capabilities in one setup combining different production technologies;
- Tolerance system for micro parts and micro topography to evaluate the accuracy and/or precision which can be the base for standardisation;
- Analysis of the micro-structural behaviour of materials and its interaction with the production process, together with systems and devices for quality check of the micro-components;
- Measurement technologies and equipment (e.g. for micro-parts with high aspect ratio features, 3D-metrology), new handling, manipulation and fixture devices and systems.

Projects should also involve research activities related to the development of new micro-factory and micro-manufacturing concepts and systems capable to reduce finishing operations which should focus on the following areas, as relevant:

- Easily configurable assembly lines taking up a small space to assemble and test small parts (e.g. MEMS, devices, sensors, actuators, micro reactors);
- New generation of modular macro/meso/micro machine tools and fast, accurate and energy efficient robots with self adaptive and reconfigurable capabilities to implement a portable and easily configurable factory for manufacturing and assembly of high tech miniaturised devices;

Projects are expected to yield innovative processes and equipments for manufacturing of 3D micro-parts/systems with increased precision and accuracy to ensure small tolerances for the products, high quality standards and enhanced product reliability and to demonstrate the potential for high-throughput, cost efficient manufacturing.

In order to ensure the potential for high-throughput, cost efficient manufacturing (industrial relevance and impact of the research effort), the active participation of industrial partners, including SMEs, represents an added value to the activities and this will be reflected in the evaluation, under the criteria Implementation and Impact. The projects are expected to cover demonstration activities, including pilot implementations in industrial settings, and this will be likewise reflected in the evaluation.

Funding Scheme: Small or medium-sized collaborative projects.

Expected impact: The micro-parts manufacturing industry in Europe is becoming increasingly important in terms of production and jobs and the research addressed in this topic should contribute to its competitiveness. The production of 3D micro parts/systems and the structuring of materials at the micro-scale introduce new functionalities that will enable a new generation of products with improved features, create new market opportunities, improve competitiveness and generate new jobs. The projects are expected to enable industry to realise economically and sustainably the specific functional and technical requirements of new emerging products in sectors such as medical/surgical, micro reactors, communication and consumer products.

New processes and equipment for micro-parts production should contribute in particular to all of the following objectives:

- Improving the capacity of European manufacturing industry concerning competitive production of innovative micro-components and devices (in terms of geometric complexity, high precision, high throughput, low cost and high flexibility) that allow high mix – high volume production;
- Improving the technological base and the competitiveness of European industry, in particular of those innovation fields which show high economic potential for the use of Micro-technology (e.g. micro-tooling, bio-medical, high-precision measurement and testing, process control and automation);
- Reduction of emissions by at least 30% (e.g. chemicals, hazardous materials, dust, waste) and of the consumption of energy resources when compared with conventional micro-manufacturing processes in line with a significant cost reduction.

FoF.NMP.2012-6 Knowledge-based tools and approaches for process planning and integrated process simulation at factory level

Technical content/scope: New product varieties, and high-performance processes, machines and production systems will require new methods and tools for the design of production systems and operation monitoring. Considering the need for production systems to evolve in line with products and processes, new ways to manage initial and ongoing system configurations are needed. Knowledge-based tools supporting production planning should be developed, and simulation methodologies should be introduced in Manufacturing Execution Systems (MES) and on board in machines, integrated with process control. Using the input from sensorial supervision and monitoring and to measure the current demand compared to manufacturing capacity, it will be possible to predict the process and system behaviour and, if necessary, to compensate for deviations from required precision and accuracy or to plan future manufacturing processes. These systems must be smooth (smart and fault-tolerant) in their interaction with human workers. Research activities address some of the following areas:

- Development of platforms and tools integrated in the information and execution system of factories for non-linear process planning;
- New tools and methodologies that enable robust optimisation of process chains in the design phase in order to achieve first-time-right processes;
- New tools which will allow, by considering local production, the optimisation and monitoring of manufacturing processes seen from a factory perspective, wherever in the world these are performed;
- Design of structures to support processes of human-system interaction, system mediated human-human interaction, and human psycho-social considerations, in developing high reliability, responsive/adaptable systems, with high performance outcomes.

Projects should also include an integrated process simulation focused on one or more of the following areas, as appropriate:

- Modelling tools that will allow changes to be made at a design level to both the product and the corresponding manufacturing process in order to maximize the system efficiency.
- Modelling and system knowledge management tools working in an integrated way on different shop-floor levels (process, machine, cell, line and factory).
- Multi-level decision support management systems based on on-time simulation starting from the real current status and on the interaction between the machine and the production system.

In order to ensure the industrial relevance and impact of the research effort, the active participation of industrial partners, including SMEs, represents an added value to the activities and this will be reflected in the evaluation, under the criteria Implementation and Impact. The projects are expected to cover demonstration activities, including pilot implementations in industrial settings, and this will be likewise reflected in the evaluation.

Funding Scheme: Small or medium-sized collaborative projects.

Expected impact: With the growing importance of manufacturing SMEs within the European economy in terms of GDP and number of jobs, the research addressed in this topic should contribute to their competitiveness and production flexibility. The application of knowledge-based tools for process planning and integrated shop-floor simulation that can be adapted to SME requirements will improve scheduling, process set-up or change-over times, contributing to increased SME competitiveness.

Moreover, projects should contribute to some of the following objectives:

- Reducing consumption of resources by a factor of 40% through the use of energy- and material-efficient processes and machinery, and smart energy management;
- Higher and more stable product and customer service quality through 30% higher process robustness and accuracy;
- 30% higher productivity and reduced cycle times under more reliable and efficient manufacturing conditions.

FoF.NMP.2012-7 Innovative technologies for casting, material removing and forming processes

Technical content/scope: Manufacturing technologies shall move towards sustainable, low resource consuming, flexible and high performance processes at low cost to ensure competitiveness. The recycling aspect is also a key issue for future manufacturing processes. New process technologies are needed to support casting and forming processes, material removing and additive manufacturing technologies, considering product and process life-cycle impacts as well as the performance requirements for these processes (e.g. tolerances, accuracy, surface quality, robustness, and higher properties). New approaches are demanded for low resource consuming processes and process intensification, integrated with hybrid processes, as well as knowledge-based processes exploiting advanced modelling, simulation and optimisation techniques for processes and equipment.

In addition, the European industries are increasingly working with new materials including nano-alloys to take advantage of enhanced functionality, lower weight, lower environmental

burden and improved energy efficiency all along the production process. This is needed to achieve a sustainable manufacturing base when moving to high added value products and customised production. New materials pose new challenges for cost efficient and sustainable manufacturing. These new materials include, among others, 'carbon neutral' materials as well as materials for improved product quality, versatility, weight saving and improved behaviour and functionality.

In order to ensure the industrial relevance and impact of the research effort, the active participation of industrial partners, including SMEs, represents an added value to the activities and this will be reflected in the evaluation, under the criteria Implementation and Impact.

The proposals should cover both research and demonstration activities. Prototypes and pilot implementations in real industrial settings represent a clear added-value. Whilst there is no lower or upper limit on the requested EU contribution, the target is that proposals allocate around 50% of the total eligible costs of the project (excluding management costs) to demonstration activities and this objective will be taken into account in the evaluation under the criteria S/T Excellence and Impact.

Funding Scheme: DEMO-targeted collaborative projects.

Expected impact: Manufacturing companies are nowadays facing more and more demanding production processes, while they cannot compete with the low labour costs of emerging countries. Thus, research addressed in this topic should contribute to their competitiveness. The development of new casting, material removing and forming manufacturing technologies should contribute to some of the following objectives:

- Have a direct economic impact on innovation and research in manufacturing, for reducing process chains from raw material to finished parts being applicable across many industrial sectors;
- Facilitate the development of cost-effective, safe, capable, affordable and sustainable technology and its incorporation into an industrial environment;
- Increase the efficiency of material use including improved recyclability and of energy consumption in the range of around 20%, depending on the specific technologies;
- Performance and capability of processes with high value added materials and engineered materials for new functionalities of products.

V.1.2 "Factories of the Future (FoF)" - Topics covered by the ICT Theme

FoF-ICT-2011.7.1 Smart Factories: Energy-aware, agile manufacturing and customisation

The capability to produce large varieties of sophisticated products requires manufacturing sites to be flexible, fast and reactive. Lean and easy-to-implement ICT enables those sites to be resource efficient, safe and cost effective.

Target outcomes:

a) **Demonstration and benchmarking of novel process automation and control (for discrete, continuous or batch industries):** Systems, strategies and tools for an integrated

control and dynamic optimisation of factory assets. The challenge is to develop ICT driven approaches and scalable architectures (e.g. service-oriented architectures or other appropriate architectures) for next-generation production automation and control solutions with flexibility, autonomy, robustness and energy efficiency. Projects should address efficient aggregation of information across existing legacy systems[48] at all production levels, factory level optimisation of production processes, and include demonstrations in real industrial environments. The aim is to show the operational and economic benefits of new ICT-driven approaches in factories against today's process automation and control solutions.

b) **Large-scale validation of advanced industrial robotics systems** through user-friendly methods of interaction with, and tasking of, intelligent cooperative robotic systems (including new programming paradigms and direct physical interaction) and through robotics-enabled production processes. Research shall focus on methods that allow workers to productively and safely deploy robots without specialised training.

Cooperation between human-robot and between robot-robot should aim to provide easy to-access and personalised support for skilled or heavy duty tasks on the shop floor. Real-world validation of R&D shall demonstrate its large-scale applicability to flexible, small batch and craft manufacturing. Results should contribute to future benchmarking standards.

c) **Applications based on factory-wide networks of intelligent sensors and new metrology tools and methods**, demonstrating management of manufacturing information in real time and under harsh conditions, including planning, scheduling and dispatching. R&D should in particular address modularity, reliability/accuracy, safety and energy efficiency aspects of quality control systems and automation/handling equipment supporting discrete manufacturing down to lot sizes of 1. Results should support international standardisation.

d) **Lasers and laser systems for manufacturing and materials processing** with the following focus: i) High-brilliance active fibre and diode lasers (laser arrays) with nearly diffraction limited beam quality: simultaneous targets are multi kW continuous wave output power, efficiency of 40% or more, coupling into small diameter fibres (100µm or less for fibre lasers and 300µm or less for diode lasers); ii) New wavelengths and on-line adaptation of beam properties: novel lasers and laser systems opening-up new process windows and/or contributing to optimised process efficiencies. This includes widely tuneable lasers, ultra-short pulse lasers, versatile frequency conversion systems and photonic components enabling the on-line adaptation of essential beam parameters in order to produce stable beams of sufficient power and quality for the intended process.

Projects are expected to be industry-driven and to contain a strong validation element with quantifiable targets.

Funding schemes: Collaborative projects: a) and c): IP; b) and d): STREP

Indicative budget: EUR 40 million with a minimum of 50% to IPs and 30% to STREPs

Expected impact:

- Strengthened global position of European manufacturing industry through the introduction of advanced automation into mainstream manufacturing and contributions to international standardisation.

[48] e.g. ERP, MES, SCADA, DCS

- Larger European market for advanced technologies such as electronic devices, control systems, new assistive automation and robots.
- Intelligent management of manufacturing information for customisation and environmental friendliness.
- Reinforced European leadership and industrial competitiveness of laser component and system producers and users and substantial improvement of manufacturing processes.

FoF-ICT-2011.7.2 Manufacturing solutions for new ICT products

Organic Large Area Electronics (OLAE)[49] is based on a combination of new materials and uses large area production processes to provide completely new applications and products that are generally thin, cheap, lightweight and flexible. Key to realising the potential is developing low cost, high volume and high throughput manufacturing technologies of electrical, electronic and photonic components. This objective aims at a "from lab to fab" approach i.e. bridging the gap between research prototypes and low-cost mass production methods. Applications range from OLED lighting, organic photovoltaics and printed batteries, to signage and displays, organic and large area sensor arrays, organic and printed electronics as well as flex/foil-based integrated smart systems.

Targeted outcomes:

Feasibility demonstrators for industrial, low cost, high volume and high throughput manufacturing processes and production of organic and large area electronics and photonics products. Solutions should in particular make use of roll-to roll wet deposition, but could also address evaporation, hot-embossing, laser processing and other low-temperature processes. R&D will focus on addressing the main roadblocks such as patterning processes, resolution and registration accuracy, process stability, multilayer lamination, encapsulation, automation, in-line quality control, and architectures to cut production costs. Standardisation and end-of life/ disposal/recyclability issues should be addressed as appropriate.

Projects are expected to be industry-driven and the proposed work should include strong quality control, testing and validation elements in order to demonstrate the feasibility of the manufacturing at an industrial scale.

Funding schemes: Collaborative projects - IP

Indicative budget: EUR 20 million

Expected impact

- New market opportunities for European manufacturing industry in new low cost, high volume and high throughput manufacturing processes for OLAE products tailored to meet key societal and economic needs; and, extending the range of applications of "conventional" industries (e.g. printing and plastic), into the OLAE field.
- Availability of European-produced OLAE products tailored to meet key societal and economic needs.

[49] OLAE covers organic electronics as well as organic photonics technologies.

V.2 "Energy-efficient Buildings"- Public-Private Partnership (EeB) - Cross-thematic coordination between NMP, ICT, Energy and Environment (including Climate Change)

The construction industry accounts for more than 10 % of the EU's GDP and employs 32 million people in large, medium and small enterprises (direct and indirect employment). The construction sector is the highest contributor to the emission of Green House Gases with an average value estimated in most developed countries at close to 33%, knowing that around 40% of the total energy use corresponds to buildings, while their fossil-fuel heating represents a major share. Therefore, in the near future, the built environment in Europe needs to be designed, built and renovated with much higher energy efficiency. In order to achieve the objectives of the Energy Policy for Europe adopted early in 2007 and to contribute through Energy-efficient Buildings to the 20% reduction of energy consumption, 20% use of Renewable Energy Sources and 20% reduction of CO_2 emissions, a strong and continued effort in RTD and innovation in the short, medium and long term is needed.

The objective of the *Energy-efficient Buildings PPP Initiative* is to deliver, implement and optimise building and district concepts that have the technical, economic and societal potential to drastically reduce energy consumption and decrease CO_2 emissions, both in relation to new buildings and to the renovation of existing buildings. This new initiative should have a large payoff, as it will increase the market for energy-efficient, clean and affordable buildings. Research priority will be given to delivering new building materials and components for energy saving and energy generation, thermal energy storage systems, advance insulation systems, thermal distribution systems, lighting technologies, windows and glazing technologies, energy generation systems based on renewable sources, but also to reliable simulation and prediction tools, including assessment methods that integrate economical, social and environmental issues. To date, the construction industry has failed to effectively integrate key technologies into its operations in order to achieve sustainable, long-term competitiveness.

The aim of the activities is to identify, through the partnership with industry, the main RTD needs, and address a number of areas of clear industrial interest, such as tools, the building envelopes, systems and equipment, ICTs for energy efficiency, environmental technologies, social and behavioural aspects, standardisation and business models. Specific deliverables expected for new and refurbished buildings (including cultural heritage) are:

- Research for new design and manufacturing technologies, focussing on new building materials and components, thermal energy storage systems, advanced insulation systems, thermal distribution systems, lighting technologies, windows and glazing technologies, and assessment methods which include guidelines/methodologies for the eco-design and the Life Cycle Assessment of energy-efficient buildings.

- Research on ICT for energy efficiency in buildings, such as design and simulation tools, inter-operability/standards, building management systems, smart metering and user-awareness tools.

- Research on resource efficiency (waste and energy use) to identify best practices to help set standards and establish public policies for higher energy efficiency and reduced environmental impact.

- Research on the application of technological, design and organisational improvements at district-level with the aim of reducing the energy and resource consumption.

- Research-related activities on key demonstration topics concerning integration of innovative products and systems, grid issues and business models.

The indicative budget for the "Construction" PPP initiative is EUR 140 million in 2012, of which EUR 70 million is from the NMP Theme, EUR 30 million from the ICT Theme, EUR 35 million from the Energy Theme and EUR 5 million from the Environment Theme.

V.2.1 "Energy-efficient Buildings (EeB)" - Topics covered by the NMP Theme

EeB.NMP.2012-1 Interaction and integration between buildings, grids, heating and cooling networks, and energy storage and energy generation systems

Technical content/scope: .Innovative solutions are needed for higher energy efficiency and improved connection between storage systems, smart grids, buildings and vehicles/mobility systems, as well as methodologies for interconnectivity between smart grids and other networks (e.g. heat networks), in line with the SET Plan. The interconnection between systems in buildings (including room conditioning equipment as well as home appliances) is a key challenge in improving energy recovery, in particular through the integration of water management and ventilation systems, by developing new energy and water management strategies at community level. New methods for real-time management of energy demand and supply are required. In this framework, new technologies and approaches are needed to enable effective Building-to-Building and Building-to-Grid interactions as it should be in a real energy market. Energy-efficiency interoperability of buildings with other urban domains (transportation, energy grids, etc) has to be achieved. Methodologies and tools for reduction of CO2 emissions and improved energy efficiency, keeping at least the same comfort level as well as certification procedures at district level are required to contribute to a low carbon economy. This integrated approach requires considering simultaneously storage of energy of different types: thermal, electrical or other (e.g. chemical, hydrogen, mechanical, biogas, magnetic). Specific solutions are needed, allowing the best solution to be selected to store renewable thermal or electrical energy at district level or at another scale including seasonal, geological or geographic specificities. Storage capabilities are expected to be combined with systems and equipment for energy production and distribution at building and district level. Solutions are needed for achieving the highest coverage of built environment energy demand by renewable (heat, cool and electrical) energy production at building and district level. This has to come along with new methods of predicting well in advance the renewable energy production and use, choosing accordingly the best storage and usage strategy.

Regarding systems and equipment for energy use at building and district level, energy-conversion hub/router concepts are needed. They should enable maximum renewable energy usage from decentralised (electrical, thermal) production, by combination of storage and energy-conversion techniques at a district demand-supply scale which will be fully integrated with the smart grid systems. Projects have to address thermal and/or electrical system optimisation at building or district level. The projects should include technological demonstration and testing which will validate advanced energy-efficient infrastructure and strategies. Solutions and technologies should be validated in order to be easily replicable throughout all countries and variety of European climatic areas.

In order to ensure the industrial relevance and impact of the research effort, the active participation of industrial partners represents an added value to the activities and this will be reflected in the evaluation, under the criteria Implementation and Impact.

Appropriate industrial standards and new business models should be addressed.

Funding Scheme: Large-scale integrating collaborative projects.

Expected impact: Involvement of the construction industry and all relevant industrial, research and public stakeholders in ambitious research initiatives including technological demonstration and testing, which will validate advanced energy-efficient infrastructure and strategies at district level. For thermal systems, projects should demonstrate 20% reduction in annual primary energy demand while for electrical systems a nearly zero energy annual balance is expected for a community of buildings compared to their expected energy performance summed on an individual building basis. Projects should also demonstrate a reduction in peak load after retrofit without forgetting a 20% reduction of CO2 emissions. Clear evidence of the cost benefit will be provided and solutions should be replicable in at least two EU countries with clearly different climate conditions.

EeB.NMP.2012-2 Systemic Approach for retrofitting existing buildings, including envelope upgrading, high performance lighting systems, energy-efficient HVAC systems and renewable energy generation systems

Technical content/scope: The deep renovation of the existing buildings stock to drastically improve their energy efficiency requires a systemic approach which includes integrated concepts consisting of building and system technologies. Energy-efficient refurbishment packages are needed in order to reduce primary energy demand. Innovative systems which introduce greener solutions into the existing buildings need to be specifically analysed from the point of view of the integration issues. This systemic approach should include improved comfort and quality of the indoor environment, as well as industrialised solutions, making optimal use of local energy opportunities and boundary conditions. This approach should also consider the large diversity of the European existing building stock presenting a lot of technical specificities. The optimisation of the refurbishment of existing buildings should integrate, as appropriate, various technological solutions (envelope, systems, renewable energy sources, thermal storage, natural ventilation, etc.) which will interact with each other and with all the existing building systems to optimise overall performance. In this framework, energy-efficient 'kits' may emerge as an opportunity to retrofit buildings at affordable prices. Furthermore, proposed solutions should address issues like how targets for improving the carbon performance of a building during a refurbishment are set at the design phase and monitored while ensuring the quality of installation and commissioning. The ability of modelling the building status, during the design stage and/or during operation, can help to increase the quality of the installation, to better exploit the installed components during building operation, as well as to have a better assessment of the energy savings actually obtained after refurbishment. It is also important to develop methods to model and simulate the existing building configuration. Feedback data from deep renovation experiences, including the comfort data, should be analysed as well. The proposed solutions should include the envelope, which will benefit from new materials performances, products and components, in order to address energy-efficiency with fault tolerant procedures and building techniques.

There is a need to develop insulation systems specifically designed for the energy-efficient retrofitting of occupied buildings. In addition, we are missing nowadays high performance adapted products for external thermal insulation which keep the aesthetic aspect of buildings fabric and which are easy to install and are affordable. Multifunctional systems, including

energy production, distribution and storage technologies, shall be integrated into the envelope system. Regarding systems and equipment for energy use, breakthroughs are needed in new methodologies to integrate comfort systems, energy management systems and local energy generation. Existing technologies have high potential (e.g. heat pump, fuel cells) but still need further development to target higher performances and suitability for retrofitting buildings at affordable prices. There is a need to design reliable, scalable and cost-effective solutions for solar systems and electricity production and distribution in buildings. Energy efficiency enhancement is required, to be achieved by applying new concepts of heating and/or cooling sources. Passive systems need to be developed that will enable replacement of conventional ventilation and cooling systems, to be used both in office and residential buildings. New lighting technologies such as Solid State Lighting devices (including organic or inorganic) require large-scale demonstration actions to bring its full potential for energy efficiency into practice. The proposed solutions should be assessed based on their life-cycle energy performance and should demonstrate a genuine life-cycle improvement beyond the existing scenario.

In order to ensure the industrial relevance and impact of the research effort, the active participation of industrial partners represents an added value to the activities and this will be reflected in the evaluation, under the criteria Implementation and Impact.

Appropriate industrial standards as well as databases on buildings stock and retrofitting technologies should be taken into account.

Funding Scheme: Large-scale integrating collaborative projects.

Expected impact: Projects will develop a set of holistic solutions in the areas of buildings retrofitting, by integrating the most suitable HVAC, electricity and heat networks, lighting technologies and ICT solutions that offer clear cost benefit advantages to the building owners and operators. The holistic approach will result in cumulative annual energy savings of at least 40% measured against building performance before retrofit without forgetting a 20% reduction of CO2 emissions. Retrofitting should have a global target of 50 kWh/m²/year for energy consumption (excluding appliances) while reducing peak loads against the values measured before retrofit. The energy saving target of new lighting should be at least 50% over the average consumption of the installed base. Projects are expected to demonstrate the in-use success of integrated packages developed. This includes user acceptability and long term continued efficient operation, while leading to a pay-back of maximum 7 years compared to current state of the art.

EeB.NMP.2012-3 Development and validation of new 'processes and business models' for the next generation of performance based energy-efficient buildings integrating new services

Technical content/scope: New business models which are triggered by new emerging technologies and processes need to be developed to reach the energy efficiency targets in the vast majority of construction SMEs. Organisational and financial models which include Energy Service Companies (ESCOs), should address the marketing and the demonstration of energy saving measures and energy generation within buildings. For instance, regional flagship projects like schools or residential homes could be addressed, with the involvement of local authorities or property developers. Common energy tool sets for simulation and analysis at the EU level are needed, taking into account country or regional specific issues: energy supply and demand, best available technologies, structured information on typology,

etc of the existing building stock. Performance based contracts and the shift towards life-cycle-performance based business are needed, including risk/value distribution across the value chain. This requires an early involvement of all relevant stakeholders including clients and the introduction of the role of all value chain actors with a real focus on SMEs. Business models using collaborative value chain approach, life-cycle costing and/or total cost of ownership at building or even at district level are needed. Synergies with on-going initiatives should be established, by mapping the relationship between relevant programmes and actions at national and regional level. This applies to the elaboration of innovative business models with a high SME involvement and private and public incentive schemes, to encourage efficient and pragmatic solutions at district scale or greater.

In order to ensure an efficient implementation and maximum impact of SME-related activities, the leading role of SMEs with R&D capacities will be evaluated under the criteria 'Implementation' and 'Impact': the coordinator does not need to be an SME but the participating SMEs should have the decision making power in the project management; and the output should be for the benefit of the participating SMEs and the targeted SME dominated industrial communities.

Funding Scheme: SME-targeted collaborative projects.

Expected impact: The global market for energy-efficient or low carbon solutions is expected to increase significantly in the next decade. The projects should enable economic, organisational and social innovation solutions which will boost the transformation towards low carbon cities. New business performance-based models should clearly support market adoption of new energy-efficient solutions by increasing their market share by 10% per year measured on the basis of each technology. The business models should incentivise uptake of these energy-efficient solutions by increasing profitability and reducing risk.

EeB.NMP.2012-4 Nanotechnology based approaches to increase the performance of HVAC systems

Technical content/scope: Heating, Ventilation, and Air Conditioning (HVAC) systems represent 39% of energy use in residential buildings and 32% in commercial facilities. Although heating is today the most demanded need, cooling trends are increasing and not only in Mediterranean countries. These trends are expected to continue, because of climate change combined with increased presence of heat releasing equipment in buildings. Ventilation is also of increasing concern as energy saving efforts through air recirculation can lead to worsening air quality and increased presence of allergies. Nanotechnology could effectively contribute to a reduction of the overall energy demand. Proposals under this topic should address this potential reduction by improving HVAC systems or building components performance both for the cooling and heating mode. Different technological solutions may be considered, such as the introduction of advanced insulation for cooling/heating purposes, energy harvesting systems or improved material properties, the separation of cooling and dehumidification loads using advanced nano-structured membranes (e.g. nanoporous/hollow fibre membranes) or nano-dessicants, or the improvement of storage capabilities in energy tanks or integrated ventilation enthalpy recovery systems. Nano-fluids (e.g. fluids + iron, aluminium or boron nanoparticles or carbon nanotubes) or nano-structured surfaces could also be used to introduce more efficient heat transfer mechanisms with associated energy saving. Nanotechnology development of non-fluorocarbon refrigerants has the potential to significantly reduce the global warming effect of HVAC systems.

In order to ensure the industrial relevance and impact of the research effort, the active participation of industrial partners represents an added value to the activities and this will be reflected in the evaluation, under the criteria Implementation and Impact.

Funding Scheme: Small or medium-sized collaborative projects.

Expected impact: Nano-technology solutions will be demonstrated at industrial system level, highlighting key advantages both in terms of performances and benefits and in terms of total service life costs for owners and occupants including increased quality of the indoor environment. Optimised heat exchangers for energy efficiency are expected to reduce energy consumption by 50% relative to similar conventional systems. A shift to non-fluorocarbon refrigerants which significantly reduce impact on global warming should be included. The relevant safety issues should be addressed.

EeB.NMP.2012-5 Novel materials for smart windows conceived as affordable multifunctional systems offering enhanced energy control

Technical content/scope: Windows are critical elements to control the energy performance of a building. There is a need to develop affordable 'smart active windows', defined as multifunctional systems offering multiple properties and functions in one single construction element.

Research proposals should address materials for smart windows with measurable and enhanced energy control, namely energy saving and/or harvesting. The proposed solutions should go well beyond the state of the art, e.g. in terms of embodied energy and durability, respect sustainability principles (environmental sustainability of each developed solution should be evaluated via life cycle assessment studies carried out according to the International Reference Life Cycle Data System - ILCD Handbook); be applicable to both new built and to renovation; be applicable to both hot and cold climates; be easy to install; offer realistic solutions at a reasonable price; offer adequate luminosity, adequate light transmittance, lighter weight, glare control, increased fixed or variable thermal inertia, increased thermal comfort and noise reduction. Developments should be based on new materials for new window concepts and on the better understanding and improvement of material combinations and synergies. Additional improvements to the 'smart windows' may also be included in the research, such as e.g. the application of OLEDs for lighting, adjustable infrared radiation transmission, or sensor technologies, material analysis and modelling. Recycling/reuse of materials may also be addressed. Standardisation aspects can be considered. Proof of concept in terms of one (or more) component(s) should be delivered within the project, excluding commercially usable prototypes (2006/C323/01), but convincingly proving scalability towards industrial needs.

In order to ensure the industrial relevance and impact of the research effort, the active participation of industrial partners, including SMEs, represents an added value to the activities, and this will be reflected in the evaluation under the criteria 'Implementation and Impact'. The participation of public authorities may also be an asset for the proposals.

Funding Scheme: Small or medium-scale focused research projects.

Expected impact: Compared to presently available state-of-the-art smart windows expected improvements are: (i) Reduction of U-value down to 0.3 W/ (m^2.K); (ii) Weight reduction of

at least 50%; (iii) Cost reduction of at least 15%; (iv) improved energy efficiency in buildings; and (v) greenhouse gases reduction deriving from buildings in Europe.

EeB.NMP.2012-6 Methodologies for Knowledge transfer within the value chain and particularly to SMEs

Technical content/scope: In order to successfully transform the energy efficiency market, SMEs have a key role to play. To facilitate their critical involvement there is a need to develop viable business models that SMEs can use to reduce risk and provide clear growth areas for their businesses. To encourage the transfer of good practices, technologies and methodologies, including cross-sectoral cooperation, the set up of a communication infrastructure and the organisation of a number of coaching events are also needed. New tools which are cost effective, fast and easy to use have to be developed to overcome present barriers (e.g. cultural, linguistic, financial, etc). To achieve coordination between the EU and national/regional levels activities need to be developed and implemented, such as spreading the information, in particular with regard to public procurement, standardisation and regulation, outreach programmes, energy innovation platform, training and providing an infrastructure of experimental buildings that incorporate new technologies in the field of Energy Efficiency. Methodologies and tools to strengthen the involvement of SMEs, including in particular the role of contractors, architects, engineers and designers, within the value chain should allow later to develop and use these advanced technologies in an integrated way to enable energy saving solutions to be largely disseminated into the market.

Funding Scheme: Coordination and Support Actions (supporting actions).

Expected impact: Energy-efficient solutions and market uptake measures including easy-to-apply reliable business practice guidelines for SMEs will be provided for one homogenous climatic area. In addition we expect evidence-based recommendations in support of policy-making on public procurement rules, regulations and standards, to provide SMEs with a lean and coherent framework of definitions and of assessment, certification and verification procedures for buildings. Validated methodologies and tools that demonstrate cost and comfort benefits and reduce risk will boost effective exchange of knowledge and best practices among SMEs, allowing them to actively contribute to the promising low carbon economy. Such tools could include mechanisms to develop multi-skilled partnerships of SME businesses.

V.2.2 "Energy-efficient Buildings (EeB)" - Topics covered by the ICT Theme

EEB-ICT-2011.6.5 ICT for energy-positive neighbourhoods

Target Outcomes

Projects supported under this objective shall contribute to the European Energy-Efficient Buildings Initiative by developing management and control systems, and decision-support systems addressing the dynamics of energy supply and demand in neighbourhoods and extended urban/rural communities. These systems shall optimise the use of energy beyond the buildings (considering for instance street lighting, urban heat production, electrical vehicles), and they shall include the integration of renewable energy sources and the connection to the electricity distribution grid in order to take advantage of variable tariffs and diversity of supply.

In addition to technical developments, projects shall consider appropriate business models, how to split incentives, and engage end users and public authorities to deploying such systems.

Interoperation of these systems with other ICT-based systems (e.g. traffic management systems, Geographical Information Systems) that may be deployed in the area will be considered an asset.

In addition to systems integration, proposals shall include a substantial validation phase. During this phase, projects shall record evidence of the benefits and total cost of operation, as well as the potential for scaling up solutions, for potential users. Consortia must be compact with partners each making substantial contributions.

Funding scheme: Collaborative projects - STREP

Indicative budget: EUR 30 million

Expected Impact:

- Contribution to the opening of a market for ICT-based district/community energy management systems.
- Establishment of a collaboration framework between the ICT sector, the buildings and construction sector, and the energy sector.
- Quantifiable and significant reduction of energy consumption and CO_2 emissions achieved through ICT.

V.2.3 "Energy-efficient Buildings (EeB)" - Topics covered by the Environment Theme

EeB.ENV.2012.6.6-2 Concepts and solutions for improving energy efficiency of historic[50] buildings, in particular at urban district scale

Historic buildings form the core of many European cities and represent about 10% of the total building stock. There is an urgent need for refurbishment and renovation to bring these buildings to EU energy efficiency standards. The topic targets significant groupings of old houses/historic buildings, which at district scale often present similar architectural or historical characteristics. It covers improving architectural components, providing advanced energy efficient solutions, and controlling indoor conditions. To this end, the research should focus on new concepts, technologies and systems which fully exploit the urban district dimension. Integration of renewable energy sources, smart lighting, smart metering and smart management systems as well as multifunctional envelope retrofitting approaches which preserves aesthetics must be considered. Protocols, planning, modelling and implementation tools for rehabilitation works should respect the main features, cultural and architectural values of the historic buildings. 'On-site' technical demonstrations and testing, are required, to validate advanced energy efficient strategies at district scale, and prove their economic viability and replication potential under different climatic conditions. The participation of local authorities, agencies or associations of citizens is recommended.

[50] "historic": in the sense that this topic targets significant groupings of "old" houses built before 1945 and are representative of the period of their construction or history, being mostly not protected by legislation; they constitute in fact the vast majority of historic buildings in cities.

Funding scheme: SME-targeted Collaborative Project

Additional eligibility criterion: Projects will only be selected for funding on the condition that the estimate EU contribution going to SMEs is 35% or more of the total estimated EU contribution for the project as a whole. This will be assessed at the end of the negotiation, before signature of the grant agreement. Proposals not fulfilling this criterion will not be funded.

Indicative budget: EUR 5 000 000

Requested EU contribution per project: Maximum EUR 5 000 000, up to one proposal can be selected.

Expected impact: Increase the potential sustainable use of existing historic EU building stock**.** Provide best practices that may be applied and transferred to other EU cities. Contribute to the European Economic Recovery Plan through the widespread improvement of energy saving of historic buildings in urban areas. Contribute to the EU Energy Performance of Buildings and other relevant policy regulations especially through the required quantification of energy savings. Implement the EU Environmental Impact Assessment Directives when applied to the built heritage and contribute to improved living and social conditions, as well as cultural tourism. Proposals will fully support the Strategic Research Agenda of the European Construction Technology Platform and its Focus Area in Cultural heritage.

V.2.4 "Energy-efficient Buildings (EeB)" - Topics covered by the Energy Theme

EeB.Energy.2012.8.8.3: Demonstration of nearly Zero Energy Building Renovation for cities and districts

Contents/scope: This topic aims to demonstrate innovative technical, economical and financial solutions to significantly increase overall energy efficiency of cities and districts. The objective is to renovate a district of existing buildings, in support to the Smart Cities initiative.

Retrofitting existing individual buildings to very high performance buildings will result in excessive costs for extremely ambitious levels. Previous programmes have shown high added value and significant economies of scale to optimise a large amount of buildings in a fully integrated concept. Optimising a whole district consisting of a large number of buildings in a fully integrated way, with extension of the building energy management system to the whole district, and including efficient urban planning allows further significant savings. Mixed societies bringing together living with working, leisure, shopping, etc may result in reduced needs for transportation, but also allow for better peak management of energy (energy peaks on offices happen at different times of the day than for private homes), water, wastes, etc.

A systemic approach is expected in the measures to be taken. All elements and systems of the buildings that could contribute to a better energy efficiency and sustainability through integrated design and planning should be envisaged, including heat recovery technologies and very efficient water/waste management, enhanced systems for energy behaviour monitoring and demand response and load control systems as well as ICT tools in a district level.

Building Information Modelling and other methods of integrated project delivery should also be used.

While the proposed measures can encompass all types of buildings (residential, commercial, public) the focus should lie on retrofitting of residential buildings. The retrofitting should be as cost effective as possible. The return on investment for the energy saving measures should be calculated and presented and should be acceptable under current market standards. Priority will be given to buildings of which typology and use could be representative for large geographical areas in Europe.

Innovation should rely in the technologies to be demonstrated and in the innovative integration of the whole city/district with appropriate and cost-effective balance between energy efficiency measures and the integration of active systems for energy generation, distribution, storage and use.

For the city area to be affected, detailed information should be provided on the current and future energy use, with emphasis on the building(s): their design, their current and future energy use, the energy efficiency measures to be applied should also be described extensively. The gross floor area of the building(s) should be specified together with the targeted annual energy use per m2 (kWh/m²/year, broken down by space heating, cooling, domestic hot water heating, electricity (including lighting) consumption etc.).

In addition to the detailed description of the buildings and the measures to be taken, it is strongly suggested for participants to complete and include in the proposals the Building Energy Specification Table (BEST) summarizing this information for every type of building proposed. The template of the BEST table is made available through the relevant Guide for Applicants.

Successful proposals will be asked to follow a common monitoring data structure, using a common methodology, in order to feed the relevant Commission data bases.

Additional accompanying measures affecting the future operation of the building (e.g. behavioural changes, post occupancy evaluation, active training of the occupants, training of professionals and architects in view of the replication of the project in other European regions) should be clearly addressed. Social and economic issues should also be addressed. Buildings utilising thermal masses through their architecture while being of high aesthetic quality that people like to live and work in should be envisaged.

Funding scheme: Collaborative Project with predominant demonstration component – Scale of Units (CP-SoU)

Implementation/management: The leading role of relevant industrial partners is essential to achieve the full impact of the project. This will be evaluated under the "implementation" and "impact" evaluation criteria.

Expected impact:

- Cost effective highly energy efficient practices, devices (cooling and/or electrical) and techniques.
- Acceleration of the market uptake of the most innovative tools for efficient city energy management.
- Creation of best practice examples for the construction sector based on innovation and competitiveness, with benefits for the operators and the environment.

- Contribution to raise the performance standards and regulations on European, national and local level, in the urban design and construction sector, through the best practice examples.

The projects should have a high potential of replication contributing to large scale market deployment before 2020. It is expected that the successful project(s) will be replicated at the level of the entire city resulting in an accelerated refurbishment rate – double the EU average. An ambitious dissemination and market deployment programme should be included in the proposal. The detailed metering/monitoring programme should last at least for one year, however, longer term commitment and programmes of the building operators (e.g. in continuous monitoring and/or guarantees of performance to the tenants) would give an added value to the proposal. This will be evaluated under the "impact" evaluation criterion.

Additional information:

The evaluation of the proposals will also take into account under the "S&T excellence" criterion the degree of excellence and innovation of the technology used, the level of projects ambition and the most cost effectiveness of the practices to be demonstrated (euros/efficiency gain; euros/CO_2 reduction, kWh/m²/year saved). For this reason, the above figures should be indicated in the proposal.

The form of grant applied is based on additional energy efficiency measures in buildings. The grant will always be composed of a combination of: the typical reimbursement of eligible costs, and flat rate financing determined on the basis of scale of unit costs only for the building-related demonstration activities part of the buildings. The scale of unit cost for European Union financial contribution is fixed at EUR 100 /m² eligible costs and thus EUR 50 /m² European Union contribution. The amounts determined on the basis of the scale of unit

Costs are reimbursed by applying the upper funding limits specified in Article II.16 of the model grant agreement. Therefore, the reimbursement rate will be up to 50%, i.e. EUR 50/m². The eligible costs per m² for the building demonstrated in the project(s) are fixed costs. The total of European Union financial contribution based on scale of unit costs may not exceed EUR 15 million per project.

This action supports the implementation of the Smart Cities and Communities Initiative of the SET-Plan. The European Commission reserves its right to ask the project, during the negotiation, to establish strong links, where appropriate, with relevant R&D projects at EU, national or regional level.

V.3 'European Green Cars' Public-Private Partnership (GC) - Cross-thematic cooperation between NMP, Environment (including Climate Change), Transport (including Aeronautics) and ICT

The automotive industry is one of Europe's key industrial sectors, whose importance is largely derived from its linkages within the domestic and international economy and its complex value chain. It is estimated to account for close to 8% of total manufacturing value added (ca. EUR 120 billion, 2006) and about 6% of total manufacturing employment (over 2 million employees). The automotive industry also provides an indirect employment to 10-11 million persons and is one of the largest RTD investors in the EU with over EUR 20 billion annually (ca. 5% of its turnover)[51].

The foreseeable shortage in crude oil based energy carriers is driving fears about energy security: 73% of all oil consumed in Europe is used in transport and estimates predict a doubling of passenger cars within the next 20 years. From an environmental and energy point of view there is an urgent need to find alternatives to fossil fuels in order to secure future energy supply, to guarantee the availability of appropriate material recycling technologies, and to reduce greenhouse gas emissions and other potential environmental impacts related to the automotive industry entire life-cycle. It is thus increasingly evident that a particular emphasis should be put on the rapid development of technologies supporting the massive emergence of more efficient and sustainable road transport solutions based on alternative fuels/energy, and on the RTD efforts associated with them.

The *'European Green Cars' PPP Initiative* is a series of measures boosting research and innovation aiming at facilitating the deployment of a new generation of passenger cars, trucks and buses that will spare our environment and lives and ensure jobs, economic activity and competitive advantage to car industries in the global market. A series of different measures are proposed: support to research and innovation through FP7 funding schemes, specific EIB loans to the automotive and other transport industries and its suppliers, in particular for innovative clean road transport, and a series of legislative measures to promote the greening of road transport (circulation and registration taxes, scrapping of old cars, procurement rules, the CARS21 initiative).

Other actions that are very closely related to the 'European Green Cars' Initiative but not formally included in it are being implemented, such as the 'Fuel Cell and Hydrogen' (FCH) Joint Technology Initiative and the road transport projects funded under the FP7 Transport Theme.

The 'European Green Cars' Initiative includes three major research and development avenues within its RTD pillar:

- **Research for heavy duty vehicles based on internal combustion engines (ICE)** [Sustainable Surface Transport sub-theme (SST)]: The research will primarily concentrate on advanced ICE with emphasis on new combustion, the use of alternative fuels (e.g. bio-methane), intelligent control systems, 'mild' hybridisation (use of recuperated electricity to power the auxiliary systems) and special tyres for low rolling resistance.

- **Research on electric and hybrid vehicles**: This component will be the most essential in this package. To have a real impact on the green economy, research in this field

[51] "European industry – a sectoral overview, 2006 update, EC-DG ENTR

should no longer focus on electric vehicle technologies seen in isolation from the rest of the transport system: a massive introduction of the technology requires the availability of smart electricity grids and intelligent vehicle charging systems tailored to customers' needs.

- **Logistics and co-modality** combined with **intelligent transport system** technologies are essential to optimize the overall system efficiency and sustainability avoiding for example that empty trucks circulate on highways due to sub-optimal logistics. In this respect, smooth and co-operative interactions between the different transport modes will be essential.

The 2012 Work Programme focuses on the second research avenue: electric and hybrid vehicles and their infrastructures. Three groups of topics covering collaborative research activities as well as coordination and support actions are included:

- Materials, technologies and processes for sustainable automotive electrochemical storage applications, implemented through a call jointly implemented with other Themes.

- Research on electric and hybrid vehicles, implemented through the Sustainable Surface Transport (SST) sub-theme of the Transport Theme.

- Information and Communication Technologies for the fully electric vehicle, implemented through the ICT Theme.

The indicative budget for the "European Green Cars" PPP initiative is EUR 118 million in 2012, of which EUR 63 million is from the Transport Theme, EUR 20 million from the NMP Theme, EUR 30 million from the ICT Theme, and EUR 5 million from the Environment Theme.

V.3.1 "European Green Cars" (GC) – Topics implemented jointly by NMP, Transport (including Aeronautics) and Environment (including Climate Change) Themes.

During the last 30 years, significant measures have been taken to improve the efficiency of vehicle propulsion systems. At the same time, the weight of cars has tended to increase in order to achieve significant improvements in terms of comfort, crashworthiness and occupant safety. Indeed the weight of a typical vehicle has increased by approximately 30% within the same class. Since the mass of the vehicle has a direct impact on the traction force required and thus fuel consumption (increasing by about 0.5l/100 km for each 100 kg of extra weight), a reversal of this trend is paramount to respect a fundamental requirement for all future automobiles to achieve the highest levels of energy efficiency possible.

Moreover the range of electric vehicles, generally seen as a critical issue regarding the acceptance of such vehicles in practice, is directly related to the several factors: the efficiency of breaking energy recovery, the performance and cost of the energy storage systems, and not least the weight of the vehicle and its battery. The application of lightweight materials offers an important potential in this regard as it helps to partly compensate for some of the battery’s high mass.

Correspondingly, in addition to improving recuperation, and to making batteries less expensive, improving their rechargeability and increasing their energy density, every

opportunity for getting more kilometres out of the same amount of energy by has to be fully exploited in order to arrive at a product that the customer accepts and chooses to use.

Already a multitude of innovative concepts and materials are available and used in vehicles and transport carriers today; their further market uptake has been hindered to date by the relatively high costs associated with the development and implementation of advanced materials and production technologies. So, further research is needed to improve this situation.

Considering the large scope of potential novel materials applications, this call will focus on two issues: the development of innovative materials for batteries based on nanotechnology; and the development of new lightweight materials and respective technologies for vehicle applications.

GC.NMP.2012-1 Innovative automotive electrochemical storage applications based on nanotechnology

Technical content/scope: Volume production plans for large-capacity Li-ion rechargeable batteries are being made one after another around the globe, targeting electric vehicles (EVs) and other applications. However, most car manufacturers would agree that lithium ion technology is still not satisfactory for long distance EV use. More energy density, power density, cost and safety improvements are needed. Although the development of second generation Li-ion batteries delivering roughly double the energy density (200Wh/kg to 300Wh/kg) is in progress (with a target implementation of 2015 to 2020), post Li-ion rechargeable batteries – solid-state, Li-S, or metal-air batteries, for example – are expected to provide a long term solution to current range and cost issues.

Projects shall exclusively address the development of innovative materials and technologies for battery components, material architectures and systems for automotive electrochemical storage at cell level within a responsible, sustainable and environmental-friendly approach looking at the entire life cycle. Activities shall focus on the understanding of the phenomena which affect the battery properties at the nanoscale across a full cell, including modelling and simulation. Research shall focus on innovative technologies, architectures and chemistries and should address the following issues:

- performance, safety, recyclability and cost;
- potential for fast charging without significant life reduction;
- effect of bidirectional flow at charge stations;
- availability of constituent materials;
- eco-design and material production;
- characterisation, standardisation and synergies with other applications.

Proof of concept in terms of product and/or process (not necessarily reaching the industrial scale but convincingly proving scalability towards industrial needs with cells of automotive size) is encouraged as is participation from the manufacturing industrial sector within strong interdisciplinary consortia.

Proposals for electrochemical capacitors are excluded, as these have been extensively covered in a previous Green Cars call.

Funding Scheme: Small or medium-sized collaborative projects.

Additional Eligibility Criterion: The EU contribution must not exceed EUR 3 000 000.

Expected Impact: (i) High energy densities with respect to the state-of-the art (i.e. higher than 400 Wh/kg); (ii) Overall performance, safety, recyclability and life-cycle sustainability; (iii) A minimum lifetime of 3000 cycles in a 80% DoD window in typical automotive conditions over 10 years; (iv) Establish and maintain world-class status for the European automotive battery industry.

GC.NMP.2012-2, GC.SST.2012.1-1, GC.ENV.2012-6.6.3 Innovative advanced lightweight materials for the next generation of environmentally-friendly electric vehicles – topic implemented jointly by NMP, Transport and Environment Themes

Technical content/scope: Research proposals should focus on the development of advanced materials for cars and light-duty vehicles, contributing to an accelerated market introduction of new energy-efficient electric vehicles, while ensuring sustainability and viability by rapidly achieving the appropriate economies of scale. The research proposals should address also several of the following issues or all of them:

- Reducing the structural weight, e.g. by deploying light alloys, thermoplastics, carbon or other fibre-reinforced polymers, composites, honeycombs, foams, advanced steels and tailored, multifunctional materials into the body parts, chassis and heavier interior systems, and including e.g. optimisation of structural layouts, multi-functional design, numerical simulation, testing, prototyping and/or manufacturing processes. Standardisation issues should be considered;

- Exploiting new materials characteristics in association with the innovative structural layouts made possible by new electric vehicles, in order to improve safety by enhanced energy absorbing capability. For instance, this could allow to better deal with asymmetric crash conditions (opponent of higher size and weight) in the case of very light vehicles. Fire resistance of the proposed advanced materials should be taken into account, where appropriate;

- Addressing related production process challenges, in particular developing suitable forming and joining technologies, to guarantee reliability, robustness and safety (e.g. guaranteeing that crash performance as tested does not degrade over time), reducing the cost of assembly while permitting a wide range of vehicle variants;

- Assessing the performance of the behaviour of the advanced materials and the respective components and systems under typical operational and extreme loading conditions (e.g. with respect to durability and safety) and external environment (e.g. for corrosion resistance), including the potential for accelerated lifetime testing while ensuring reliability;

- Carrying out of an appropriate life-cycle analysis of the advanced materials and the respective components and systems, including dismantling and recycling technologies; for brand new materials, a recycling method should be outlined with appropriate lab-scale experimental part;

- Carrying out an economic analysis, including material resources availability and costs, that demonstrates the real advantages of the new materials over conventional ones. Trade-offs between the extra cost of lightweight design and possible gains from lower lifetime costs for energy consumption and emission of vehicles should also be assessed.

While the focus of the proposal should be on electric cars, the potential for synergies with other types of environmentally-friendly vehicles or the cabs of heavy-duty vehicles can also be taken into account.

In order to ensure industrial relevance and impact of the research effort, the active participation of industrial partners (including SMEs) represents added value to the activities and this will be reflected in the evaluation, under the criteria Implementation and Impact.

Proposals may (i) include research results validation and the physical demonstration of the performance achieved with the innovative advanced material(s), e.g. even via a complete body in white structure or vehicle demonstrator, or (ii) consist of focused research, limiting validation of the innovative advanced material(s) to substructure level.

Special Features: The proposed projects should not duplicate similar FP6 or FP7 projects, e.g. projects funded under the FP7 European Green Car Initiative. Coordination or ex-ante clustering with projects in topic GC.SST.2012.7.1-4 can be foreseen.

Funding Scheme: Large-scale integrating collaborative projects.

Additional Eligibility Criterion: The EU contribution per project must be at least EUR 4 000 000 and must not exceed EUR 10 000 000.

Expected Impact: (i) Considerable weight reduction: a 30% body in white weight reduction was already demonstrated in recent EU projects on conventional vehicles; a further 20% reduction (taking into account the higher acceptable cost) is to be demonstrated, with the relevant safety, energy efficiency and environmental benefits; and/or (ii) Overall reduction in time-to-market and development costs while increasing product flexibility; and (iii) Economic viability and technological feasibility of the advanced materials and the related processes with reference to real applications of industrial relevance; and/or (iv) Options for the use of globally available, recyclable or recycled, and carbon-neutral materials; and/or (v) Extended lifetime of durable components of a vehicle and lower life-cycle costs.

V.3.2 "European Green Cars" (GC) – Topics covered by the Sustainable Transport (SST) sub-theme of Transport Theme.

Area 7.2.7.1. Development of electric vehicles for road transport

To have a real impact on the green economy, research in this field should no longer focus on electric vehicle technologies seen in isolation from the rest of the transport system: a massive introduction of the technology requires the availability of smart electricity grids and intelligent vehicle charging systems tailored to customers' needs. Lightweight materials for vehicle applications (joint call) and socio-economic research are also among the issues included in this area.

GC.SST.2012.1-2. Smart infrastructures and innovative services for electric vehicles in the urban grid and road environment

Contents and scope: With the advent of new electrified vehicles (EV) for application in the urban environment, a significant need exists to drastically improve the convenience and sustainability of car-based mobility. In particular, research should focus on the development of smart infrastructures, and innovative solutions which will permit full EV integration in the urban road systems while facilitating evolution in customer acceptance.

Within this context, activities will focus on:

- Investigation into alternative, innovative solutions for recharging stationary EV minimising risks deriving from vandalism (e.g. inductive charging).
- Study of on-route charging technologies which would increase the vehicle range while reducing the size of on-board energy storage systems.
- Development of innovative location based Demand Management systems by means of intelligent systems integrated in both EV and charging stations that can communicate and manage adaptively the charging process autonomously, if necessary, or taking into account the priorities of the user-grid.
- Development of data security standards and crypto measures to ensure privacy protection.
- Intelligent coordinated systems (micro-grids) that balance the simultaneous demand of a given geographically location (multiple, slow and fast charging EV combined with other electric consumers) with policies that prioritise emergencies, security of the net, minimal autonomy for all the elements, etc., and that can also coordinate with neighbouring micro-grids and upper level electric grid control.

Projects may address these issues by technology development and demonstration from a technological perspective while focusing on business case analyses and impact studies demonstrating the feasibility and viability of the proposed solutions across a wide-range of operational situations.

The work should take into account projects running under the TEN-T programme on going research projects (e.g. ELVIRE, SmartV2G and PowerUP) and those resulting from the call 'GC-ICT-2011.6.8 ICT for fully electric vehicles dealing with vehicle to grid issues' and 'ICT- PSP-2011.1.3. Smart Connected Electro-Mobility'. It should also take into account the standards being developed by the European standardisation organisations (CEN-CENELEC and ETSI TC ITS) in this area.

This topic is complementary to the Topic Energy.2012.8.8.1: Strategic sustainable planning and screening of city plans (FP7-ENERGY-SMARTCITIES-2012), which supports the implementation of the Smart Cities and Communities Initiative[52] of the SET-Plan. In this context, the European Commission may ask the projects, during the negotiation, to establish strong links, where appropriate, with the projects funded under the topic Energy.2012.8.8.1 as well as with other relevant R&D projects at EU, national or regional level.

[52] http://setis.ec.europa.eu/about-setis/technology-roadmap/european-initiative-on-smart-cities

Funding scheme: Collaborative project – small or medium-scale focused research projects

Expected impact: The proposed solutions should demonstrate the enhanced attractiveness of electric mobility, both in terms of convenience and reduced total cost of ownership, while showing how they ensure a correct relationship with the electric supply network and its requirements as well as the economics of the needed investments.

GC.SST.2012.1-3. European strategy for rare materials and their possible substitution

Possible limitations of lithium for advanced energy storage systems have recently been discussed at length, and will be subject to research on battery cells. Mass production of electric vehicles however will also strengthen the demand for some other essential materials that are not abundant, or of limited supply, for European companies, primarily for electric and electronic components. Examples include rare earths, such as neodymium, and noble or other scarce metals. Essential for motors, neodymium-iron-boron alloys are the strongest permanent magnets available on earth. The reserves of neodymium are about 8 million tonnes. However, the world production is about 7 000 tonnes per year, 97% of which being concentrated in China. Also the demand for more common metals with appropriate conductive and electrolytic capabilities will increase: cobalt and nickel are used as electrode materials in storage cells, or gold, silver, palladium for any kind of electronic circuits, indium used in transparent electrodes of liquid crystal displays and touch screens, etc.

Content and scope: The development of new technologies for the electric vehicle needs to be complemented by developing a European strategy for rare materials and their possible substitution. The Support Action will focus on the following:

- Prediction of the long term needs of the European electric vehicle industry for strategic materials.
- Access to alternative supply.
- Alternative materials and technologies for electric traction and energy storage.
- Options to replace rare earth materials by new electro magnetic systems (motors, driver electronics, sensors, etc.).
- Recycling and reuse options.
- Economic, social and environmental risks of shortages.
- Political situation and development of solutions at a global scale.
- Assessment of the total landed cost associated with the use of new materials.
- Options for ensuring sufficient resilience for a given level of efficiency of the supply chain of new materials.

The above aspects should be covered only to the extent necessary in relation to existing EU level initiatives in order to ensure complementarity and to minimise duplication. *During negotiations, complementarity with work performed in response to topic 'NMP.2012.4.1-4. Substitution of critical raw materials: networking, specifying R&D needs and priorities' will be ensured.*

Funding scheme: Coordination and Support Action (supporting actions).

Expected impact: A small and well focussed project within the European Green Cars Initiative that includes input from all relevant stakeholders which will deliver a materials roadmap and recommendations for strategic plans to solve the specific long-term materials issues for the Electric Vehicles sector.

GC.SST.2012.1-4. Modelling and testing for improved safety of alternatively-powered vehicles

Contents and scope: Modelling tools and testing procedures have a fundamental role to play to ensure that future Electric Vehicles not only respect current and future safety requirements, but balance this with performance and reliability on one hand, and light weight, production feasibility and cost on the other.

Activities will focus on the development and experimental validation of numerical simulation and physical testing methodologies, and on the application of such tools in order to:

- Investigate solutions for improving the crashworthiness and performance of future generation alternatively-powered vehicles and their constituent components and sub-systems which may be critical from a safety and reliability perspective (e.g. batteries and high-pressure storage tanks). In particular, to improve pedestrian protection and vehicle-to-vehicle compatibility in case of crash with larger and heavier opponents and keep into account slightly different angles of impact to validate performance beyond EURO-NCAP tests.
- Develop evaluation criteria with regard to injury prevention of occupants of electrical and lightweight vehicles.
- Analyse the weight saving potentials of new safety oriented structural designs.
- Verify technological feasibility and economic viability of the solutions proposed.

Implementation and management: To achieve practical demonstration and validation, coordination or ex-ante clustering with projects in topic GC.SST.2012.1-1 (Innovative advanced lightweight materials for the next generation of environmentally-friendly electric vehicles) would be preferred.

Funding scheme: Collaborative project – small or medium-scale focused research projects

Expected impact: Projects should demonstrate that the advanced modelling and testing tools can be used to ensure improved performance in terms of combined injury prevention, safety in asymmetric crashes (in terms of height and weight) and low environmental impact of next generation alternatively-powered vehicles at an acceptable cost, while fostering the constitution of interdisciplinary consortia (academia, research and testing centres, supply industry, vehicle manufacturers, SMEs, etc.).

GC.SST.2012.1-5. Integration and optimization of range extenders on Electric Vehicles

Although Electric Vehicles are able to cover almost 80% of average travel needs, the residual need of many vehicle users for occasional longer distance travel means that range-extended

electrified vehicles provide an important path towards increasing the market penetration and customer acceptance of electrified vehicles by relieving the so-called "range anxiety".

Contents and scope: The focus of the research will be on developing and optimizing the concept of the fully-integrated, range-extended, electrified light duty vehicle which will offer both significantly reduced impact on the environment and long range capability. The aim is to optimise the integration and control of the electrified vehicles equipped with a range-extender while ensuring that the range in pure-electric mode, typically charged using the grid, is sufficient to cover average daily mileage.

The activities should address the following issues:

- Optimisation of the ICE used as the range extender and of its after treatment system.
- Impact on optimal battery capacity.
- Advanced control strategies.
- Modularisation.
- Performance, safety, recyclability and cost.
- Characterisation, standardisation and synergies with other applications.

The activities should not focus on the development of the range-extender engine itself, nor of electric machines, which were already addressed in previous calls.

Funding scheme: Collaborative project – small or medium-scale focused research projects

Expected impact: With respect to the 2020 Emission Regulation targets for urban cars and low cost Near Zero Emission Vehicle, the expected impact has to be motivated in terms of:

- Overall performance, particularly in terms of the expected CO_2 emissions reduction of the range-extended EV.
- Safety, recyclability and life-cycle sustainability.
- Helping European automotive industry to maintain world-class status.

GC.SST.2012.1-6. Advanced energy simulation and testing for Fully Electric Vehicles (FEV)

Contents and scope: Advanced modelling tools and testing procedures (from one-dimension to three dimensional approaches) have a fundamental role to play in optimising during the earliest project phases both the energy dimensioning of FEVs and their “energy management strategies”. They reduce project development lead-time and are used to build-up requirements for subsystems and their related control units. Research will focus on the development and validation of numerical simulation, virtual prototyping and physical testing and on the application and standardisation of such tools in order to:

- Investigate solutions for improving the efficiency and performance of future generation EV and their constituent components and sub-systems that may be critical from the energy efficiency point of view. The development of these systems is however excluded.

- Assess the effect of different subsystems, solutions in terms of energy efficiency and related increase of autonomy, on different specific real life driving cycles, that will take into account traffic constraints, road slope evolution, etc.
- Verify the technological feasibility and economic viability of the advanced solutions proposed.

Implementation and management: Projects should have interdisciplinary consortia (academia, research and testing centres, supply industry, vehicle manufacturers, SMEs, etc.), and work should be complementary to projects funded under previous calls of the EGCI, national or ERANET+ schemes.

Funding scheme: Collaborative project – small or medium-scale focused research projects

Expected impact:

- Projects should demonstrate that the advanced modelling and testing tools can be used to ensure improved energy efficiency and performances of the next generation EV and HEV by taking into account all the real constraints, at an acceptable and assessed cost.
- Reduction of testing time for life cycle testing up to 50% using new test methodologies.
- New test methods for identification of second life applications together with battery qualification & testing for these applications.
- Real world testing of batteries on the test bench instead of field testing: combination of mechanical, thermal and electrical load.
- Reduced development time and improvement loops for battery systems by combined testing and simulation methods.
- Increased reliability and durability as well as reduced validation time.

GC.SST.2012.1-7. Demonstration of Urban freight Electric Vehicles for clean city logistics

Content and scope: The objective of the project is to demonstrate logistic solutions with electric vehicle applications to optimise urban logistics efficiency to improve transport flow management and reduce environmental impact in urban areas. Fleets are expected to include autonomous road vehicles with differing drive-train technologies, provided that electricity for the electric drive can be taken from the grid. The project time-frame should consider latest technological developments in EU-funded or national and regional programs. Fuel cell electric vehicles are not included here, as they are covered by the Fuel Cells and Hydrogen JTI. The project will address the following issues:

- Assessment of the state of the art of city freight movements and development of new governance models, based on real, and close, co-operation between public bodies, retailers and distributors. These can be used in order to deploy sustainable policies able to assure environmental improvements with economical sustainability.
- Demonstration of urban and logistics solutions with electric vehicle fleets with the aim to validate the feasibility of logistics solutions on the basis of electric vehicle applications.

- Demonstration of required ICT for final users and fleet managers.
- Assessment of public acceptance of demonstrated new delivery systems.
- Assessment of the impact on urban transport and delivery market such as size of deliveries, frequencies and vehicle types.
- Assessment of the impact on energy, environment, overall efficiency and cost.

Implementation and management: A typical consortium will include cities, logistics fleet operators, vehicles and equipment manufacturers, utilities, research centres and universities. The project should have a predominant demonstration component. The marginal cost associated with the innovation element compared to state-of-the-art vehicles will be considered as eligible cost. This demonstration project should take into account the first results of projects under topic GC.SST.2011.7-5. (Urban – interurban shipments).

Funding scheme: Collaborative project

Expected impact:

- Optimisation of urban logistics efficiency to improve transport flow management and reduce environmental impacts (noise, CO_2 emissions and pollutants) as well as typical congestion in urban areas.
- Contribute to the clarification of the safety, economic and technical viability of electrical vehicles for clean city logistics applications.
- Input for further deployment of clean logistics systems technologies through the European Investment Bank instruments.

Area 7.2.7.2. Research for heavy duty vehicles for medium and long distance road transport

Research will primarily concentrate on increasing the efficiency of vehicles by energy management, aerodynamics and low rolling resistance, as well as on eco-driving and innovative truck designs. A demonstration action on heavy duty vehicles running with liquefied methane is also included.

GC.SST.2012.2-1. Extreme low rolling resistance tyres

Contents and scope: The objective of research is to develop an innovative tyre concept that will reduce the rolling resistance without compromising performance, not; safety and cost (e.g. wet/low temperature performance, mileage, reliability, noise) for both steering and trailer tyres. Load capacity should be maintained or improved. Interaction with the road surface should be considered and appropriate parameters for maximum effectiveness (rolling resistance, braking and road holding, abrasion of tyre and surface, etc.) and robustness of the designed tyre for good performance on the widest possible variety of EU pavements should be defined in cooperation with infrastructure stakeholders.

The activities will address the following aspects:

- Design of new tread pattern for reduced rolling resistance.

- Modification of chemical composition of the tyres. Show the potential of nano-technologies.
- Smart solutions for tyre pressure, temperature and condition monitoring/adaptation systems.

Implementation and management: Strong interdisciplinary consortia should ensure cooperation involving both tyre and road experts to define the above mentioned optimal design parameters for both tyre and road surface.

Funding scheme: Collaborative project – small or medium-scale focused research projects

Expected impact: The project should demonstrate the maximum potential for low rolling resistance tyres.

GC.SST.2012.2-2. Complete vehicle energy management

Content and scope: The overall aim for the research is to develop and assess technologies for efficient vehicle energy management. Auxiliaries today consume about 6-7 KW for a typical long-distance application. Different driver types have significant (10-15%) influence on energy consumption. New drive line technologies such as stop and go, mild hybrid and full hybridisation, combined with energy scavenging concepts, will make energy available from several different sources. This will give rise to complex inter-relationships between the different auxiliaries and their use within the different truck applications but they also provide possibilities to balance the power demand.

All subsystems and configurations should be considered, both energy consumers and producers/converters. Driver demand should be interpreted and influenced through a driver coaching system, taking into account the current mission and available pre-view information like e-horizon, V2V and V2I information (development of those applications is however excluded). Energy losses (electrical, friction and aerodynamics) at subsystem level should be reduced or harvested. This should be achieved without compromising overall performance or safety. Research will address the following aspects:

- Optimised power management and distribution including energy balancing with respect to efficient electrical power generation, conversion, distribution and buffering to different systems.
- Optimised control of electrified auxiliaries and synergies for cooling performance including the optimization of all configurable vehicle parameters with respect to transport mission and pre-view information, so that real-time power balancing can be achieved.
- Advanced vehicle aerodynamics through the application of best practice and standardised methodologies for aerodynamic simulation and analysis to optimise the aerodynamics of the whole vehicle combination without compromising the operational efficiency of cargo handling. The potential for improvements through platooning or convoying (vehicle-to-vehicle control and communication) while assessing issues related to safety, dedicated new infrastructure requirements and costs, taking into account results of previous projects.

- Reduced friction between moving parts in all vehicle sub-systems, including the application of new roller bearing concepts, novel lubricants and development of simulation techniques for further reduction of energy losses;

- Energy recovering/scavenging/harvesting and optimisation of external energy supply , e.g. quick energy charging stations;

- Driver Support (eco-driving/driver-coaching): Integrate the results from ongoing research activities (e.g. eCoMove and FREILOT) so the driver is taken into account in the vehicle energy optimisation strategy.

- Creating an energy efficient work environment for the driver including the design of the cab, its interior systems and materials. Aspects such as weight reduction, insulation materials, reflective coatings for glass, new thermally reflective paint technologies and other intelligent materials, should be considered.

Implementation and management: Complementarity with work already underway on the mentioned topics at national or EU level should be demonstrated.

Funding scheme: Collaborative project – large scale integrating projects

Expected impact: The project should demonstrate the potential for improved energy efficiency and the economic viability of advanced complete vehicle energy management concepts.

GC.SST.2012.2-3. Demonstration of heavy duty vehicles running with liquefied methane

Content and scope: The overall objective is to perform a large-scale demonstration in order to facilitate a broad market development for heavy duty trucks running with liquefied methane. The specific objectives for the project should be:

- To optimise the complete powertrain and storage system of LNG heavy duty vehicles with respect to energy efficiency and pollutant emission, by fully utilising the technical potential of liquefied methane in an optimised fuel-engine system. The project should take into account the work of complementing projects such as GREEN, INGAS and any other developing similar technologies and should address all the key components of LNG powertrain including:

  - High performance heavy duty natural gas engine including injection systems, aiming at efficiency close to that of current diesel engines.

  - Low temperature after-treatment systems for heavy duty natural gas engines, to abate in particular NO_x and unburned methane emissions, to comply with post-Euro VI requirements.

  - Liquefied natural gas tank systems including boil-off treatment or high volumetric efficiency solid state compressed natural gas storage systems.

- To analyse data from current pre-commercial demonstrations, and to perform additional demonstrations in different environments, in order to facilitate a market development for heavy duty vehicles running medium and long distances with LNG.

- To carry out benchmarking and assessment of the different vehicles technologies, where needed by coordinating with existing projects at EU and national level, including full safety assessment.
- To evaluate energy efficiency, costs, performance, environmental benefits and durability of heavy duty vehicles running on LNG under different climatic, geographic and traffic conditions.
- To provide recommendations for the development of relevant standards, in particular for the homologation of LNG heavy duty vehicles and refuelling stations.
- To demonstrate a LNG distribution system by road tankers as a means of distribution of LNG to refuelling stations available in different parts of Europe.
- To provide recommendations for cost-efficient and safe distribution network and refuelling stations for liquefied methane.

Implementation and management: The project should involve cooperation between heavy duty vehicle manufacturers, fuel suppliers, fuel distributors and fleet operators, including trucks and buses. The heavy duty vehicles demonstration should be carried out in at least three Member States, and should be complementary to existing demonstrations running at national level. The project should include a first definition of European LNG Blue Corridors, with strategic LNG refuelling points which would help to guarantee LNG availability for road transport in a simple and cost effective way. The demonstration part of the project should help to improve the knowledge and general awareness of LNG as alternative fuel for medium and long distance road transport. The project should also serve to remove the existing barriers for heavy duty vehicles running on LNG.

Funding scheme: Collaborative project

Expected impact:

- Oil substitution through the use of alternative fuels, namely liquefied methane (LNG).
- Reduction of GHG emission from transport using liquefied methane as fuel in heavy duty vehicles.
- Market development for heavy duty vehicles running with liquefied methane.
- Increase of energy efficiency of heavy duty natural gas engines to the level of the current diesel heavy duty vehicle engines.
- Achievement of EUROVI standard for LNG heavy duty vehicles.

Area 7.2.7.3. Logistics and co-modality

Logistics and co-modality combined with intelligent transport system technologies are essential to optimise the overall system efficiency and sustainability, avoiding, for example, that empty trucks circulate on highways due to sub-optimal logistics. In this respect, smooth and co-operative interactions between the different transport modes will be essential. In order to enhance coordination and create synergies, research proposals addressing this area should be aware of research activities resulting from ‘Objective ICT-2011.6.6 Low carbon multi-

modal mobility and freight transport' of 'Theme 3 ICT – Information and Communication Technologies'.

GC.SST.2012.3-1. Towards sustainable interconnected logistics - development of standardised and modular solutions for freight transport vehicles, loading units and transhipment equipment

Content and scope: Efficient load units are absolutely key in improving transport of goods, their storage and handling across the consumer driven supply chain process. Manufacturers, retailers and transporters can benefit from committing themselves to a set of driving principles and must address the physical component of seamless interconnected logistics, focusing on the development of standardised and modular solutions for freight transport vehicles, load units storage, handling and transhipment equipment. Research will specify, demonstrate and recommend a standardised set of load unit sizes and functionalities along with the associated information and protocols to route them through the logistics networks across the EU and the world. It will impact fields such as logistics networks, transportation, material handling, supply chain, production, sourcing and distribution strategies. Solutions should follow the "well-to-wheel" approach looking at all elements of the logistics chain, i.e. the transport, storage, warehousing from the early stages of the production process till the last transport and distribution activity. Research will evaluate the impact of a new standardised iso-modular units approach for logistics down to the last km on the revenues and business models for the various stakeholders. It is possible and encouraged to build relationships with research programmes from other continents to help build the international framework required to promote a worldwide solution.

Funding scheme: Collaborative project – small or medium-scale focused research projects

Expected impact:

- A multiscale standard set of logistic units will lead to breakthrough asset utilisation with a dramatic decrease in cost and carbon footprint of supply chains (by a factor 4 or 5).
- Facilitate the integration of today's independent supply chains, overcoming current physical barriers to collaboration.
- Enable a completely new interconnected logistics organisation to be achieved. This new organisation, similar to the Internet, with its standardised and shared resources, will itself be an enabler for improving services, increasing productivity, reducing the environment footprint of logistics by better use of transport means and encouraging a shift to cleaner ones, improving quality of life in urban areas, as well as the quality of logistics jobs, and providing a stimulant for breakthroughs in logistics innovation.

GC.SST.2012.3-2. Improve capturing and sharing of transport data in support of innovative freight transport schemes

Contents and scope: Better information on freight flows and the performance of freight transport systems is needed, in order to improve the performance of the European transport system and to support business and policy decisions. The focus of research is on generating and sharing information among shippers, transporters and logistic service providers and other

stakeholders which allow them to make more rational decisions on the use of vehicles. This can improve the load factor of vehicles and hence reduce the number of freight movements.

Research will consider:

- The development and demonstration of an innovative data gathering methodology.
- Opportunities for improvements in interfacing between data collection and company transport IT systems.
- Cross-fertilisation of best practice in freight data collection between countries.
- Correction of current statistical anomalies and filling in data gaps.

Implementation and management: Results of previous EU projects, such as WORLDNET, FREILOT, EURIDICE and TRANSTOOLS will have to be taken into account.

Funding scheme: Collaborative project – small or medium-scale focused research projects

Expected impact:

- Authorities and companies will have access to more accurate and timely information, allowing the demonstration of the feasibility of new policies and business strategies, with the aim to increase a more efficient use of the transport infrastructure and transport means**.**
- Better knowledge about the seamless freight transport system to help benchmark market size, structure and trends.
- Adoption of statistical surveying systems and new data acquisition methodologies and estimation techniques at European level covering urban, regional, national and international freight transport.
- Development and testing of simulation tools for implementing new and efficient transport schemes.

GC.SST.2012.3-3. Platform for continuous intermodal freight transport strategic research and innovation

Content and scope: The objective of this coordination action is to stimulate discussion and consensus-building amongst main public stakeholders, market players and researchers in the intermodal and freight logistics domain to turn knowledge and research into investment in innovation. The coordination action will address the following:

- Raising the profile and understanding of new intermodal and freight logistics technologies and business processes.
- Identifying policies, regulatory measures, financial mechanisms and socio-economic aspects that are required in support of their market penetration.
- Encouraging greater involvement in and acceptance of innovations in the public as well as private sector.

Implementation and management: Related initiatives in the area, such as the Intelligent Cargo Forum and Logistics4Life will have to be taken into account.

Funding scheme: Coordination and Support Action (Coordinating actions).

Expected impact:

- Assessment and consensus building amongst, and between, industry and authorities on intermodal logistics market developments.
- Identification of standardisation, harmonisation and innovation requirements.
- Accelerated exploitation of research results and innovations in the domain of intermodal and freight logistics.

GC.SST.2012.3-4. Green hubs enabling co-modal network design

Content and scope: An efficient and seamless European transport system depends on efficient hubs or nodes that enable multimodal interconnections. The focus of the research will be on co-modal network design and supply chain visibility. Activities will address the conditions and drivers for integrated terminal networks and quality standards, taking into account the potential of innovative control and coordination mechanisms for co-modal transport. In particular, research will address the following:

- The integration of terminal networks within the supply chain, across borders of Member States and with continental transport networks, removing administrative bottlenecks for the enhancement of co-modal transport links.
- The conditions and requirements for inland terminals to participate in seaport hinterland terminal networks.
- Definition of critical Key Performance Indicators (KPI) for integrated terminal networks and their supply chains.
- Definition of innovative value added services at intermodal terminals within or across various intermodal terminals, facilitating cooperation amongst terminal service providers and between terminal services providers and their clients, increasing overall supply chain visibility.
- An analysis of the most effective forms of governance of the network from the EU or regional policy perspective as well as that of business venture.
- An agreed methodology to assess the economic and environmental impact on a wider European network scale of individual nodes.

Funding scheme: Collaborative project – small or medium-scale focused research projects

Expected impact: Improved interconnectivity and interoperability in co-modal networks will lead to:

- Increased productivity of the European industry, including transport operations, terminals and logistics services.

- Reduced congestion, as freight assignment will be more flexible depending on the situation at hand in the different modal networks.
- Enhanced environmental performance of the integrated networks.
- Quality standards and increased performance of the freight system towards the end consumer, making supply chains more responsive, customisable and robust.

V.3.3 "European Green Cars" (GC) – Topics covered by the ICT Theme.

GC-ICT-2011.6.8 ICT for fully electric vehicles

Full electric vehicles (FEV) means electrically propelled vehicles that provide significant driving range on pure battery based power. It includes vehicles having an on-board fuel based electrical generator (Range Extender based on Internal Combustion Engine or fuel cells).

Projects supported under this objective should advance the research, development and integration of major building blocks of the FEV, and integrate the FEV with infrastructures.

Target outcomes:

a) **Energy/Power Storage Systems**[53]

Targeting control system solutions for batteries only as well as batteries and super-capacitors integrated either at a pack-to-pack or at cell-to-cell level. Electronic architectures have to manage optimal charging and discharging rates of the cells in relation to their typology and operating temperatures. Sensors and networking capabilities should be developed for monitoring and controlling the energy/power storage system's efficiency, lifetime, reliability and safety, including monitoring and early warning of fault conditions environmental monitoring, temperature conditioning and shock protection/spark avoidance. Furthermore, high voltage switches and interconnects and system interfaces need to be developed. Electro-chemical material developments are excluded.

b) **Architectures for Energy, Communication and Thermal Management***10*

Energy optimised systems are an essential element to ensure maximum FEV range. With a multiple voltage system, an optimised distribution of functions is necessary:: power-train, bilateral grid connection, on-board energy harvesting, heating and cooling conditioning systems, vehicle stability and comfort, lighting, driving assistance sensors, on board information and entertainment and other auxiliaries. Each layer requires its own optimisation and operated by real-time and fail-safe standard communication to assure the best compromise between safety, driving and comfort.

c) **Vehicle-to-grid Interface (V2G)** *10*

Focus is on connection of the vehicle to the grid by enabling controlled flow of energy and power through safe, secure, energy efficient and convenient transfer of electricity and data. Related issues to consider include E/M compatibility, robustness, reliability, safety, security and impact on health and grid stability. Solutions should be independent of a specific

[53] This "Target Outcome" was part of ICT WP 2011 and is not opened in 2012. See ICT Work Programme for details.

platform, be based on pan-European consensus and conform to interface standards for Smart Grids.

d) **Vehicle Stability Control**[10]

Focus is on control architectures with 2, 3 or 4 electrical motors for stability of the electric power train thus providing safety, comfort and fun-to-drive. Vehicle dynamics simulation and robust E/M compatibility have also to be addressed as well as generic and standardized, safe and redundant bus-based solutions for communication and control. Regenerative breaking, system faults like maximum torque / oscillating torque at a single wheel /two wheels and issues like controlled shut down procedures in case of a crash should be taken into account.

e) **Electric Drive and Electronic Components**

Partitioned and highly efficient power electronics devices, converter and inverter and electrical interconnects that simplify packaging and cooling, EMI-EMC designs, the management of high voltages, currents and temperatures and hardware-in-the-loop technology for algorithm and component testing. Projects should target the level of integration between the drive and the motor while maximising the efficiency of the drive over a wide range of operation of the motor as well as in relation to temperature excursions and voltage variability and fail safe tested components.

f) **Integration of the FEV in the cooperative transport infrastructure**

ICT-based interaction between the driver, the vehicle and the transport and energy infrastructures, for FEV trip planning and optimization including energy use and charging. In order to compensate for the limited autonomy range, gains in energy efficiency, charging strategies and route optimisation by using of traffic information are needed to turn the FEV into a mass market product. Adaptive strategies, algorithms and operation modes are needed for the charge and discharge management of the FEV's that balance, predict the range and adapt to the energy needs of the user in respect of the properties of vehicle’s battery and the grid. Research should also address opportunities for improving energy efficiency provided by automated driving and driver training.

g) **Functional Safety and Durability of the FEV**

Electrical and electronic components affect vehicle dynamics, safety and durability. Fail-safe concepts are an essential element of the system. Requirements and standards related to electromagnetic compatibility and health impacts of electromagnetic fields should be developed. Continuous improvements are expected against low frequency electromagnetic fields as well as on local sensing of currents and electromagnetic fields, on safe and robust components and subsystems. Research will also address adaptation and improvement of in-vehicle active safety for FEVs, integrated driver-vehicle – infrastructure safety, protection of vulnerable road users, and FEV emergency handling procedures. Moreover, test methods will be required.

h) **Coordination and Support Action “FEV made in Europe”**

One action for the coordination of a FEV Strategic Research Agenda for ICT, components and systems, for the clustering of R&D projects in the field, and for training, education and dissemination activities. The agenda should also investigate new usages for the FEV (e.g. last mile delivery and mobility for the elderly and disabled); it should cover standardisation measures; it should propose measures for harmonisation of national research policy measures

and programmes, and also propose actions for international collaboration. The action should involve relevant electrical vehicle stakeholders.

Funding Schemes: Collaborative projects (STREP) for targeted outcomes e), f), g); Coordinating and Support Action (Supporting Action) for targeted outcome h).

Indicative budget: e),f),g) EUR 29 million; h) EUR 1 million

Expected impacts:

- Improved energy efficiency and extended driving range of the FEV
- Reduced costs of the electronic components and the overall FEV at increased performance
- Mitigated constrains for the user of the FEV versus the Internal Combustion Engine vehicle
- The FEV seamlessly implemented in the smart grids and existing infrastructure
- Significant improvement of FEV's safety, comfort and new information and comfort services for FEV users.
- Strengthened global competitiveness of the European automobile, ICT and battery sectors. Market penetration of key components of FEVs.

Calls for proposals - Public-Private Partnerships

Public-Private Partnership "Factories of the Future" - **Cross-Thematic call implemented between NMP and ICT**

Call title: **FP7-2012-** "Factories of the Future" - 2012

- Call identifier: FP7-2012-NMP-ICT-FoF
- Date of publication: 20 July 2011[54]
- Deadline: 1 December 2011[55] at 17.00.00 (Brussels local time).
- Indicative budget[56] [57]: EUR 160 million from the 2012 budget of which:

  - EUR 100 million from Theme 4 – Nanosciences, Nanotechnologies, Materials and New Production Technologies

  - EUR 60 million from Theme 3 – Information and Communication Technologies (ICT)

- **Topics called:**

Activity/ Area	**Topics called**	**Funding Schemes**	**Budget (Million EUR)**
NMP – Nanosciences, nanotechnologies, Materials and new Production			
FoF.NMP.2012-1	Adaptive production systems and measurement and control equipment for optimal energy consumption and near-to-zero emissions in manufacturing processes	Collaborative Projects (Large-scale projects)	**100**
FoF.NMP.2012-2	Methodologies and tools for the sustainable, predictive maintenance of production equipment	SME-targeted collaborative projects.	
FoF.NMP.2012-3	Intelligent production machines and 'plug-and-produce' devices for the adaptive system integration of automation equipment, robots and other	SME-targeted collaborative projects.	

[54] The Director-General responsible for the call may publish it up to one month prior to or after the envisaged date of publication

[55] The Director-General responsible may delay this deadline by up to two months

[56] The budget for this call is indicative. The final budget awarded to actions implemented through calls for proposals may vary:

- the final budget of the call may vary by up to 10% of the total value of the indicated budget for the call; and
- any repartition of the call budget may also vary by up to 10% of the total value of the indicated budget for the call

[57] Under the condition that the draft budget for 2012 is adopted without modification by the budgetary authority

	intelligent machines, peripheral devices, smart sensors and industrial IT systems		
FoF.NMP.2012-4	High -performance manufacturing technologies in terms of efficiency (volumes, speed, process capability etc), robustness and accuracy	Collaborative Projects (DEMO-targeted project)	
FoF.NMP.2012-5	High precision production technologies for high quality 3D micro-parts	Collaborative Projects (Small or medium-scale focused research project)	
FoF.NMP.2012-6	Knowledge-based tools and approaches for process planning and integrated process simulation at factory level	Collaborative Projects (Small or medium-scale focused research project)	
FoF.NMP.2012-7	Innovative technologies for casting, material removing and forming processes	Collaborative Projects (DEMO-targeted project)	
ICT – Information and Communication Technologies			
FoF-ICT-2011.7.1	Smart Factories: Energy-aware, agile manufacturing and customisation	Collaborative Projects (IP and STREP)	40
FoF-ICT-2011.7.2	Manufacturing solutions for new ICT products	Collaborative projects (IP)	20

- **Eligibility conditions:**

The general eligibility criteria are set out in Annex 2 to this work programme, and in the guide for applicants. Please note that the completeness criterion also includes that part B of the proposal shall be readable, accessible and printable.

Only information provided in part A of the proposal will be used to determine whether the proposal is eligible with respect to budget thresholds and/or minimum number of eligible participants.

The minimum number of participating entities required, for all funding schemes, is set out in the Rules for Participation: For Collaborative projects, the minimum condition shall be the participation of 3 independent legal entities, each of which is established in a Member State or Associated Country and no two of which are established in the same Member State or Associated Country.

- **Additional eligibility criteria**

In addition to the general eligibility criteria, which are given in Annex 2 of the work programme, for Large scale integrating projects in topic FoF.NMP.2012-1, the minimum EU

funding requested must be greater than EUR 4 million and for small or medium-scale focused research projects in topics FoF.NMP.2012-5 and FoF.NMP.2012-6, the maximum EC funding requested must not exceed EUR 4 million.

For topics FoF.NMP.2012-4 and FoF.NMP.2012-7, DEMO-targeted project collaborative projects will only be selected for funding on the condition that at least 50% of the total eligible costs (excluding management costs) to the project is allocated to demonstration activities. This will be assessed during the evaluation and at the end of the negotiation, before signature of the Grant Agreement. Proposals not fulfilling this criterion will not be funded.

For the ICT topics, each proposal must indicate the type of funding scheme used (IP or STREP for Collaborative Projects where applicable; See Appendix 2 to the ICT chapter of the Cooperation work programme for further details.

Please note that the financial resources mobilised within a project will be assessed during the evaluation against the real work to be carried out in the project.

- **Evaluation procedure:**

A one-stage submission procedure will be followed.

Proposals will be evaluated in a single-step procedure. Proposals could be evaluated remotely with the consensus sessions being held in Brussels.

Each Theme will remain responsible for its own budget and for the implementation of the respective call topics. This includes drawing up ranking lists per Theme and subsequent negotiation and follow-up of the grant agreements resulting from proposals selected under the respective call topics.

For this call the following criteria and thresholds are applied: **1. S/T quality; 2. Implementation; 3. Impact.** For each criterion marks from 0 to 5 will be given, with the possibility of half-point scores. Successful proposals must pass the minimum thresholds as follows:

	Minimum threshold
S/T quality	**3/5**
Implementation	**3/5**
Impact	**3/5**
Overall threshold required	**10/15**

Further information on elements to be taken into account in the evaluation is given under the respective topic descriptions.

See also Annex 2: Eligibility, Evaluation criteria for proposals and priority order for proposals with the same score[58].

[58] For the NMP Programme, and in contrast with Annex 2, at Panel stage, the priority order of the proposals with equal overall scores will be established in accordance with their scores for the S/T Quality criterion. If they are still tied, they will be prioritised according to their scores for the Impact criterion. If proposals are still tied, they will be prioritised on the basis of the work programme coverage.

Applicants must ensure that proposals conform to the page limits and layout given in the Guide for Applicants, and in the proposal part B template available through the EPSS.

- **Indicative evaluation and contractual timetable**:

Evaluation of proposals: January 2012. It is expected that the grant agreement negotiations for the shortlisted proposals will start as of March 2012.

- **Consortium agreements**

Participants are required to conclude a consortium agreement.

- **Particular requirements for participation, evaluation and implementation:**

As a result of the evaluation, a ranked list of proposals retained for funding will be drawn up by each Theme as well as a reserve list of proposals that may be funded in case budget becomes available during negotiations.

- **The forms of grant and maximum reimbursement rates** which will be offered are specified in Annex 3 to the Cooperation work programme.

- **Use of flat rates for subsistence costs**

For topics FoF.NMP.2012-1 to 7, and in accordance with Annex 3 of this work programme, this call provides for the possibility to use flat rates to cover subsistence costs incurred by beneficiaries during travel carried out within grants for indirect actions. For further information, see the relevant Guides for Applicants for this call. The applicable flat rates are available at the following website: http://cordis.europa.eu/fp7/find-doc_en.html under 'Guidance documents/Flat rates for daily allowances'.

Public-Private Partnership "Energy-efficient Buildings" – Cross-Thematic call implemented between NMP, ICT, ENERGY, and ENVIRONMENT (including Climate Change)

Call title: FP7-2012- "Energy-efficient Buildings" - 2012

- Call identifier: FP7-2012-NMP-ENV-ENERGY-ICT-EeB
- Date of publication: 20 July 2011[59]
- Deadline: 1 December 2011[60] at 17.00.00 (Brussels local time).
- Indicative budget[61] [62]: EUR 140 million from the 2012 budget of which:

  - EUR 70 million from Theme 4 – Nanosciences, Nanotechnologies, Materials & New Production Technologies

  - EUR 30 million from Theme 3 – Information and Communication Technologies (ICT)

  - EUR 35million from Theme 5 – Energy

  - EUR 5 million from Theme 6 – Environment (including Climate Change)

- **Topics called:**

Activity/ Area	**Topics called**	**Funding Schemes**	**Budget (Million EUR)**
NMP – Nanosciences, nanotechnologies, Materials and new Production			
EeB.NMP.2012-1	Interaction and integration between buildings, grids, heating and cooling networks, and energy storage and energy generation systems	Collaborative Projects (Large-scale projects)	70
EeB.NMP.2012-2	Systemic Approach for retrofitting existing buildings, including envelope upgrading, high performance lighting systems, energy-efficient		

[59] The Director-General responsible for the call may publish it up to one month prior to or after the envisaged date of publication

[60] The Director-General responsible may delay this deadline by up to two months

[61] The budget for this call is indicative. The final budget awarded to actions implemented through calls for proposals may vary:

- the final budget of the call may vary by up to 10% of the total value of the indicated budget for the call; and
- any repartition of the call budget may also vary by up to 10% of the total value of the indicated budget for the call.

[62] Under the condition that the draft budget for 2012 is adopted without modification by the budgetary authority

	HVAC systems and renewable energy generation systems		
EeB.NMP.2012-3	Development and validation of new 'processes and business models' for the next generation of performance based energy-efficient buildings integrating new services	SME-targeted collaborative projects.	
EeB.NMP.2012-4	Nanotechnology based approaches to increase the performance of HVAC systems	Collaborative Projects (Small or medium-scale focused research project)	
EeB.NMP.2012-5	Novel materials for smart windows conceived as affordable multifunctional systems offering enhanced energy control	Collaborative Projects (Small or medium-scale focused research project)	
EeB.NMP.2012-6	Methodologies for Knowledge transfer within the value chain and particularly to SMEs	Coordination and Support Actions (CSA)	
Environment (including Climate Change)			
EeB.ENV.2012.6.6-2	Concepts and solutions for improving energy efficiency of historic[63] buildings, in particular at urban district scale	SME-targeted Collaborative Project	5
Energy			
EeB.Energy.2012.8.8.3:	Demonstration of nearly Zero Energy Building Renovation for cities and districts	Collaborative Projects – Scale of Units (CP-SoU),	35
ICT – Information and Communication Technologies			

[63] "historic": in the sense that this topic targets significant groupings of "old" houses built before 1945 and are representative of the period of their construction or history, being mostly not protected by legislation; they constitute in fact the vast majority of historic buildings in cities.

EEB-ICT-2011.6.5	ICT for energy-positive neighbourhoods	Collaborative projects (STREP)	30

- **Eligibility conditions:**

The general eligibility criteria are set out in Annex 2 to this work programme, and in the guide for applicants. Please note that the completeness criterion also includes that part B of the proposal shall be readable, accessible and printable.

Only information provided in part A of the proposal will be used to determine whether the proposal is eligible with respect to budget thresholds and/or minimum number of eligible participants.

The minimum number of participating entities required, for all funding schemes, is set out in the Rules for Participation: For Collaborative projects, the minimum condition shall be the participation of 3 independent legal entities, each of which is established in a Member State or Associated Country and no two of which are established in the same Member State or Associated Country.

For Coordination and Support Actions, the minimum conditions shall be:

- Coordination and Support Actions – coordinating actions: at least 3 independent legal entities, each of which is established in a Member State or Associated Country, and no 2 of which are established in the same Member State or Associated Country.

- Coordination and Support Actions – supporting actions: at least 1 independent legal entity.

- **Additional eligibility criteria**

In addition to the general eligibility criteria, which are given in Annex 2 of the work programme, for Large scale integrating projects in topics EeB.NMP.2012-1, EeB.NMP.2012-2 and the minimum EU funding requested must be greater than EUR 4 million and for Small or medium-scale focused research projects in topics EeB.NMP.2012-4 and EeB.NMP.2012-5, the maximum EC funding requested must not exceed EUR 4 million.

For topics EeB.NMP.2012-3 and EeB.Env.2012.6.6-2, SME-targeted Collaborative Projects will only be selected for funding on the condition that the requested EC contribution going to SME(s) is 35% or more of the total requested EC contribution. *This will be assessed at the end of the negotiation, before signature of the grant agreement. Proposals not fulfilling this criterion will not be funded.*

For the ICT topics, each proposal must indicate the type of funding scheme used (IP or STREP for Collaborative Projects where applicable; See Appendix 2 to the ICT chapter of the Cooperation work programme for further details.

Please note that the financial resources mobilised within a project will be assessed during the evaluation against the real work to be carried out in the project.

- **Evaluation procedure:**

A one-stage submission procedure will be followed.

Proposals will be evaluated in a single-step procedure. Proposals could be evaluated remotely with the consensus sessions being held in Brussels.

Each Theme will remain responsible for its own budget and for the implementation of the respective call topics. This includes drawing up ranking lists per Theme and subsequent negotiation and follow-up of the grant agreements resulting from proposals selected under the respective call topics.

For this call the following criteria and thresholds are applied: **1. S/T quality; 2. Implementation; 3. Impact.** For each criterion marks from 0 to 5 will be given, with the possibility of half-point scores. Successful proposals must pass the minimum thresholds as follows:

	Minimum threshold
S/T quality	**3/5**
Implementation	**3/5**
Impact	**3/5**
Overall threshold required	**10/15**

Further information on elements to be taken into account in the evaluation is given under the respective topic descriptions.

See also Annex 2: Eligibility, Evaluation criteria for proposals and priority order for proposals with the same score[64].

Applicants must ensure that proposals conform to the page limits and layout given in the Guide for Applicants, and in the proposal part B template available through the EPSS.

- **Indicative evaluation and contractual timetable**:

Evaluation of proposals: January 2012. It is expected that the grant agreement negotiations for the shortlisted proposals will start as of March 2012.

- **Consortium agreements**

Participants are required to conclude a consortium agreement.

- **Particular requirements for participation, evaluation and implementation:**

As a result of the evaluation, a ranked list of proposals retained for funding will be drawn up by each Theme as well as a reserve list of proposals that may be funded in case budget becomes available during negotiations.

- **The forms of grant and maximum reimbursement rates** which will be offered are specified in Annex 3 to the Cooperation work programme.

[64] For the NMP Programme, and in contrast with Annex 2, at Panel stage, the priority order of the proposals with equal overall scores will be established in accordance with their scores for the S/T Quality criterion. If they are still tied, they will be prioritised according to their scores for the Impact criterion. If proposals are still tied, they will be prioritised on the basis of the work programme coverage.

- **Use of flat rates for subsistence costs**

For topics EeB.NMP.2012-1 to 6, EeB.ENV.2012.6.6-2 and EeB.Energy.2012-8.8.3 and in accordance with Annex 3 of this work programme, this call provides for the possibility to use flat rates to cover subsistence costs incurred by beneficiaries during travel carried out within grants for indirect actions. For further information, see the relevant Guides for Applicants for this call. The applicable flat rates are available at the following website: http://cordis.europa.eu/fp7/find-doc_en.html under 'Guidance documents/Flat rates for daily allowances'.

Public-Private Partnership "Green Cars": Cross-Thematic call jointly implemented between NMP, ENVIRONMENT (including Climate Change), and TRANSPORT (including Aeronautics)

Call title: FP7-2012- MATERIALS FOR GREEN CARS

Call identifier: *FP7-2012-GC-MATERIALS*

Date of publication: 20 July 2011[65]

Deadline: 1 December 2011[66] at 17.00.00 (Brussels local time).

Indicative budget [67] [68]**:** EUR 35 million from the 2012 budget of which:

- EUR 20 million from Theme 4 – Nanosciences, nanotechnologies, materials and new production technologies (NMP)
- EUR 5 million from Theme 6 – Environment (including Climate Change)
- EUR 10 million from Theme 7 – Transport (including Aeronautics).

The budget for this call is indicative. The final budget of the call may vary by up to 10% of the total value of the indicated budget for the call.

In case the budget can not be consumed (totally or partially), the remaining budget will be returned to each FP7 theme according to its respective contribution.

Topics called

The topic on **Innovative advanced lightweight materials for the next generation of environmentally-friendly electric vehicles** is identical in each theme. Hence, each proposal must be submitted only **once** either to topic GC.NMP.2012-2 or to topic GC.ENV.2012-6.6.3 or topic GC.SST.2012.1-1, **but not to all.**

Activity/ Area	Topics called	Funding Schemes	Budget Million EUR
GC.NMP.2012-1	Innovative automotive electrochemical storage applications based on nanotechnology	Collaborative Projects (Small or medium-scale focused research project)	10
GC.NMP.2012-2	Innovative advanced lightweight materials for the next generation of	Collaborative Projects (Large-	25

[65] The Director-General responsible for the call may publish it up to one month prior to or after the envisaged date of publication.
[66] The Director-General responsible may delay this deadline by up to two months.
[67] A single reserve list will be constituted if there are a sufficient number of good quality proposals. It will be used if extra budget becomes available.
[68] Under the condition that the draft budget for 2012 is adopted without modification by the budgetary authority.

GC.SST.2012.1-1	environmentally-friendly electric vehicles	scale projects)	
GC.ENV.2012-6.6.3			

- **Eligibility conditions:**

The general eligibility criteria are set out in Annex 2 to this work programme, and in the guide for applicants. Please note that the completeness criterion also includes that part B of the proposal shall be readable, accessible and printable.

Only information provided in part A of the proposal will be used to determine whether the proposal is eligible with respect to budget thresholds and/or minimum number of eligible participants.

The minimum number of participating entities required, for all funding schemes, is set out in the Rules for Participation: For Collaborative projects, the minimum condition shall be the participation of 3 independent legal entities, each of which is established in a Member State or Associated Country and no two of which are established in the same Member State or Associated Country

- **Additional eligibility criterion:**

- GC.NMP.2012-1 Innovative automotive electrochemical storage applications based on nanotechnology: the EU contribution must not exceed EUR 3 000 000.

- GC.NMP.2012-2, GC.SST.2012.1-1 and GC.ENV.2012-6.6.3, Innovative advanced lightweight materials for the next generation of environmentally-friendly electric vehicles, the EU contribution must be at least EUR 4 000 000 and must not exceed EUR 10 000 000.

- **Evaluation procedure:**

A one-stage submission procedure will be followed.

Proposals will be evaluated in a single-step procedure. Proposals could be evaluated remotely with the consensus sessions being held in Brussels.

For this call the following criteria and thresholds are applied: **1. S/T quality; 2. Implementation; 3. Impact.** For each criterion marks from 0 to 5 will be given, with the possibility of half-point scores. Successful proposals must pass the minimum thresholds as follows:

	Minimum threshold
S/T quality	**3/5**
Implementation	**3/5**
Impact	**3/5**
Overall threshold required	**10/15**

Further information on elements to be taken into account in the evaluation is given under the respective topic descriptions.

Applicants must ensure that proposals conform to the page limits and layout given in the Guide for Applicants, and in the proposal part B template available through the EPSS.

- **Indicative evaluation and contractual timetable**:

Evaluation of proposals: January 2012. It is expected that the grant agreement negotiations for the shortlisted proposals will start as of March 2012.

- **Consortium agreements**

Participants are required to conclude a consortium agreement.

- **Particular requirements for participation, evaluation and implementation:**

As a result of the evaluation, a ranked list of proposals retained for funding will be drawn up as well as a reserve list of proposals that may be funded in case budget becomes available during negotiations.

- **The forms of grant and maximum reimbursement rates** which will be offered are specified in Annex 3 to the Cooperation work programme.

- **Use of flat rates for subsistence costs**

In accordance with Annex 3 of this work programme, this call provides for the possibility to use flat rates to cover subsistence costs incurred by beneficiaries during travel carried out within grants for indirect actions. For further information, see the relevant Guides for Applicants for this call. The applicable flat rates are available at the following website: http://cordis.europa.eu/fp7/find-doc_en.html under 'Guidance documents/Flat rates for daily allowances'.