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HORIZON 2020 TRANSPORT CHALLENGE

WORK PROGRAMME 2014-2015

(DRAFT 24/06/2013)

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CALL ‘MOBILITY FOR GROWTH’

The specific objective of the Transport Challenge ‘Smart, green and integrated transport’ is “to achieve a European transport system that is resource-efficient, climate- and environmentally-friendly, safe and seamless for the benefit of all citizens, the economy and society”. The Specific Programme is structured in four broad lines of activities aiming at:

- a) Resource efficient transport that respects the environment and public health
- b) Better mobility and accessibility, less congestion, more safety and security
- c) Global leadership for the European transport industry
- d) Socio-economic and behavioural research and forward looking activities for policy making

As indicated in the Specific Programme, these “activities will be organised in such a way as to allow for an integrated and mode-specific approach as appropriate”. Therefore, the contents of the “Mobility for Growth” call has been organised as follows:

Areas addressing mode-specific challenges

1. Aviation
2. Rail
3. Road
4. Waterborne

Areas addressing transport integration specific challenges

5. Urban
6. Logistics
7. Intelligent Transport Systems
8. Infrastructures

Areas addressing cross-cutting issues

9. Socio-economic and behavioural research and forward looking activities for policy making
10. Small business innovation research
11. Inducement prize

Transport is on the brink of a new era of "smart mobility" where infrastructure, transport means, travellers and goods will be increasingly interconnected to achieve optimised door-to-door mobility, higher safety, less environmental impact and lower operations costs. In order to achieve efficiency at system-level, targeted efforts are needed to develop and validate new solutions that can be rapidly deployed, notably on corridors and in urban areas. They will address transport means and infrastructure and integrate them into a user friendly European transport system of smart connected mobility and logistics. Research and innovation on equipment and systems for vehicles, aircraft and vessels will make them smarter, more automated, cleaner and quieter, while reducing the use of fossil fuels. Research and innovation on smart infrastructure solutions is necessary to deploy innovative traffic

management and information systems, advanced traveller services, efficient logistics, construction and maintenance technologies.

A thorough and mature research and innovation agenda for this call has been defined taking into account the other calls and initiatives where the Transport Challenges is concerned, i.e. the calls on 'Clean Vehicles', 'Blue Growth', and 'Smart Cities and Communities', and the 'Clean Sky 2', 'SESAR 2' and 'Fuel Cells and Hydrogen 2' joint undertakings. It is intended to create synergies with all these initiatives as well as with other parts of Horizon 2020, namely Information and Communication Technologies (ICT), Energy and Space. Special attention is dedicated to innovation aspects not covered in the other parts of the Transport Challenge, as well as to SMEs.

1. AVIATION

1.1. Enhancing environmental performance of aviation

Specific challenge: Aviation has an important impact on the environment and EU citizens due to emissions such as greenhouse gas (CO₂), pollutants (NO_x), particulate matter (e.g. black carbon), contrails, cirrus cloud and noise, some of them potentially affecting the health of the exposed population. Aircraft manufacturing also makes use of a variety of materials and chemicals. If no actions would be undertaken, the impact of aviation on our environment in Europe would significantly grow due to the rapid increase of air transport traffic by 5% every year. Moreover, today, the understanding of the different impacts is nor exhaustive, nor accurate. Therefore, R&I actions should be undertaken that contribute to increase the environmental performance of aviation and to better understand its impact.

Scope: The proposed R&I actions can target the reduction of emissions and noise at the source, i.e. accelerating the development of green technologies for the aircraft and its engines, including the use alternative energy sources which are more sustainable than those currently used. The activities can also target measurements or science based modelling systems for emissions and noise at the airport or during flight in order to provide environmental research with the adequate data.

R&I can also target new approaches to an environmentally friendly overall aircraft lifecycle which require the insertion of the environmental impact concern for all components of the aircraft and in all the following successive phases: design, production, assembly, maintenance, repair, overhaul, retrofit, recycling and disposal.

Finally, R&I can target greener ground operations, optimised servicing procedures for the aircraft at the apron and technologies and procedures which could allow the integration of larger quantities of sustainable fuels in aircraft operations.

The proposed actions should not overlap with those carried out in Clean Sky and SESAR.

Expected impact: Actions should demonstrate their potential to mature the Technology Readiness Level (TRL) of technologies and concepts that can make a significant contribution towards one or several of the following goals:

- to reduce CO₂ by 75%, NO_x by 90% (per passenger and per kilometre), perceived noise by 65% in 2050 (baseline year 2000), to reduce the emission of local atmospheric pollutants.
- to contribute to the Single European Sky objective to reduce the impact of Europe's air transport operations on the environment by 10% by 2020 compared to 2005 levels and to the ATAG aspirational goal to reduce net CO₂ emissions from aviation by 50% by 2050 compared to 2005 levels.
- to produce by 2050 air vehicles that are designed and manufactured in a resource efficient way and are recyclable.
- to contribute to better understand and quantify with improved accuracy the effect of aviation on the environment and the wider impacts on the climate.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2014

1.2. Seamless air mobility meeting capacity demand

Specific challenge: The European air transport system plays an essential role in creating links between people and exchanges for business, leisure and culture within Europe and worldwide. In 2010, it was capable of transporting over 750 million passengers within the EU airspace relying on 450 airports. It carried also around 22% of EU trade with the rest of the world by value. Today, the typical duration of intra-European flights is short, but the overall time spent in travelling from door to door could be significantly shortened and the accessibility could be improved. In the case of disruption, the response of the air transport system is not yet satisfactory. With the predicted growth for passenger transport in Europe in the coming years up to 5% per year (i.e. a doubling every 15 years), the capacity of the European air transport system risks to face severe capacity / congestion problems. The challenge is to enhance the time efficiency, seamlessness, robustness and accessibility of the European air transport system and to meet the capacity demand.

Scope: The proposed R&I actions can target services which can minimise the duration of the travel of air passengers and provide them with information so as to make informed decisions in selecting, modifying or reconfiguring their travel. R&I actions can also target improved accessibility to airports and aircraft as well as methods and systems to be put in place in case of major disruption, allowing an organised and efficient re-routing of passengers.

R&I can also target optimised aircraft turnover time, enhanced predictability, to minimise the time needed for aircraft operations at the airport and maximise freight fluxes. R&I can also address technologies and systems which have the potential to enhance the number of take-offs and landings under normal conditions and under all weather conditions (e.g. reduced separation) and technologies that can ensure enhanced visual approaches even under limited visibility conditions, without compromising safety.

The proposed actions should not overlap with those carried out in Clean Sky and SESAR regarding for example the capacity of the Air Traffic Management System or airport ATM dependent processes, including for intermodality purposes.

Expected impact: Actions should demonstrate their potential to mature the Technology Readiness Level (TRL) of technologies and concepts that can make a significant contribution towards one or several of the following goals by 2050:

- 90% of the travels involving air transport within Europe can be completed in 4 hours door to door.
- passengers can make informed decisions.
- air transport is well connected to other modes.
- the European air transport system is capable of handling at least 25 million flights per year for all type of vehicles with flights arriving within 1 minute of the planned arrival time under normal operations.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2015

1.3. A Joint Research Initiative targeting the highest levels of safety for European aviation

Specific challenge: Safety is embedded in aircraft design and operations making air transport the safest transport mode. In Europe, accident rates involving passenger fatalities are of the order of 1.6 accidents per million flights (EASA, 2011). Nevertheless, new risks, e.g. arising from the integration of new technologies, must be mitigated and continuous efforts are necessary to maintain the excellent records Europe has achieved over the last 60 years. Furthermore, the aviation community pursues a further decrease of accident rates by one order of magnitude and further significant progress will be achieved only if safety is addressed at system level. Therefore actions are needed using an integrated approach to safety.

Scope: Proposals will encompass R&I actions in targeted areas of aviation safety. The proposed R&I actions should be part of a broader safety roadmap established at system level, identifying and prioritising practical actions to be undertaken in the next seven years. It should be consistent with broader roadmaps (e.g. EASA European Aviation Safety Plan, SRIA, ACARE WG4, OPTICS Coordination Action on safety and security research, etc.). Coordination with key European organisations which have a mandate in aviation safety (e.g. EASA, EUROCONTROL) should be ensured.

The proposal should also demonstrate that the R&I actions will be part of a broader set of R&I actions carried out by the proposal partners with at least an equivalent magnitude in terms of estimated resources (e.g. cumulated effort in person-months). A methodology should be put forward to evaluate this leverage effect during the project and at its end. The proposal should describe how links will be established with the other R&I actions from the partners and how the project will contribute to coordinate these.

The composition of the consortium should reflect openness and the fact that the partners have been selected in the light of the nature of the proposed R&I actions. The overall management of the initiative could be designed for a longer term than the duration of the project with a potential to be extended to other activities after a first review of the concept. The proposed actions should not overlap with these carried out in the SESAR and Clean Sky programmes.

Expected impact: The proposed R&I actions will target the maturation of technologies and concepts which can contribute to reach by 2050 less than one accident per 10 million departures commercial aircraft flights and a -80% reduction of accident rate compared to 2000 for specific operations, where weather hazards are evaluated and mitigated, in a system which includes all types of air vehicles, manned and unmanned, while preserving cost and time efficiency. It is also expected that the proposal will gather critical mass on a pan-European scale, overcoming gaps, duplication and fragmentation, create a leverage effect, enhance coherence and efficiency of aviation safety research in Europe and underpin the development of future safety regulations, operations and technology.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2014

1.4. Competitiveness of European Aviation through cost efficiency and innovation

Specific challenge: The aviation sector contributes 2% to the EU GDP. It is also an important source of jobs creating directly 1.7 million jobs (among which 480 000 skilled jobs in aeronautics) and supporting another 2 million indirect jobs. The aeronautics sector alone generates a turnover of €70 billion and exports 60% of its production. With 12% of its turnover invested in R&D, aeronautics is one of the most research intensive sectors and is one of the world leaders in terms of production, employment and exports. In order to preserve its leadership and jobs, the European aviation industry must have the capacity to deliver the best products and services in a time and cost efficient manner and to offer new and innovative products, vehicles and services.

Scope: Regarding aircraft, R&I actions can target technologies which have the potential to save costs and time across the manufacturing cycle of the aircraft (design, production, inspection, maintenance, repair, overhaul), including for certification aspects. R&I actions can also target the integration of additional functions (e.g. sensing, actuating) in structural components of the aircraft, the increased use of automation and artificial intelligence in control systems allowing versatility and new capabilities or to provide passenger with additional services on-board of the aircraft or at the airport.

Regarding air transport operations, R&I actions can target cost and time efficiency of ground operations (e.g. servicing operations to the aircraft when at the airport, operations related to the turnaround process); proposal addressing landside (i.e. before the apron) Collaborative Decision Making Systems should include demonstration of their concept in an airport or airport like environment. R&I can also target innovative approaches which can reduce the needs or accelerate the pace of the training of personnel.

The proposed R&I actions should not overlap with Clean Sky and SESAR, which addresses all airport and ATM aspects beyond the apron and ATM dependent processes, including for intermodality purposes before the apron.

Expected impact: Actions should demonstrate their potential to mature the Technology Readiness Level (TRL) of technologies and concepts that can make a significant contribution towards one or several of the following goals by 2050:

- Europe retains leading edge design, manufacturing and system integration capabilities and associated jobs thanks to significantly decreased development costs (including a reduction of costs of certification by 50%) and that the whole European aviation industry is strongly competitive.
- European aviation industry delivers the best products and services on the world-wide market with a global share of more than 40 %.

When evaluating the impact of the proposals, particular consideration will be given to:

- proposals following product/service innovation approach i.e. pursuing a well-defined product and/or service and where an important progress along the Technology Readiness Level scale can be achieved (typically 3 levels or more) during the project life,
- proposals with a strong participation of SMEs, contributing to the goal of dedicating at least 20% of EU funds to SMEs in Horizon 2020.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2015

1.5. Breakthrough innovation for European Aviation

Specific challenge: A number of very ambitious goals have been set by the sector at horizon 2050 in the Advisory Council for Aviation Research and Innovation in Europe (ACARE) Strategic Research and Innovation Agenda (SRIA). Many of these goals will not be reached through an evolutionary approach only. Breakthrough innovations are needed i.e. solutions which rely on a disruption with respect to current approaches.

Scope: The proposed R&I actions can address the vehicles as well as the air transport system. Regarding vehicles, R&I actions can target new technologies and concepts that are not currently used in aeronautics or that have not yet being put in combination in the aviation sector. This could be for example, radical new approaches to propulsion, to the use of energy, new types of vehicles, etc.

Regarding the air transport system, the proposed R&I actions can address radical new concepts for the way vehicle and passenger are handled in airports, the way airports are organised and connected to other modes, the way information is shared, used, and handled on the landside part of the airport.

The proposals will aim at demonstrating the validity of the technologies and concept(s) following a sound technical and scientific approach. The performance will be assessed preferably quantitatively against the relevant criteria such as for example economic viability, time efficiency, safety, environmental friendliness, energy sustainability, potential to cope with evolutions of regulations, passenger friendliness, social acceptance etc. The actions should also assess at the end of the project the potential of the technologies to be developed at further technology readiness levels and barriers that could prevent such developments.

The proposed actions should not overlap with these carried out in the SESAR (e.g. long term ATM research).

Expected impact: Actions should demonstrate their potential to mature the Technology Readiness Level (TRL) in the range 1-2, to prepare the ground for future highly innovative

breakthrough products and services for European Aviation which will contribute to decrease the environmental impact, enhance the competitiveness, the mobility and the levels of safety.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2015

1.6. Improving skills and knowledge base in European Aviation

Specific challenge: European aviation sector should have access to highly skilled workforce which can rely on a strong scientific knowledge base to be able address properly the environmental and competitiveness challenges facing the sector. Two areas have been identified where action is urgently needed:

- to analyse and define the evolving skill needs of the sector and propose changes to the curricula of aviation engineers accordingly, and
- to reduce the fragmentation in the dissemination of scientific and technical knowledge in Europe and enhance its global impact.

Scope:

- Regarding the curricula of aviation engineers in Europe, the scope of the action is to identify the skill needs in the sector, propose improvements and further contribute to the harmonisation of the content of the curricula for aviation engineers towards the creation of a Europe wide system. The initiative should build on existing mechanisms and associations. The consortium should include representatives of aviation industry, research establishments and education institutions so that the proposed solutions can acquire recognition from these different stakeholders.
- Regarding the dissemination of scientific and technical knowledge, the scope of the action is to create a Europe wide coordination mechanism gathering a representative group of associations active in the field of aviation to harmonise and rationalise conferences, events and publications. The action will contribute to enhance the impact and accessibility of publications relevant to European aviation, in particular those issued from EU funded projects. The actions should aim at being self-supported after the end of the project.

Expected impact:

- Regarding the curricula of aviation engineers in Europe, the proposed actions should demonstrate their capacity to contribute to the emergence of a Europe wide system for the improved curricula of aviation engineers which will get a broad endorsement of the aviation community and increase the quality, coherence and relevance of the curricula, enhance teaching methods and the profile of engineers matching the evolving needs of the sector.
- Regarding the dissemination of scientific knowledge in the field of aviation in Europe, the proposed action should contribute to raise the impact and visibility of European conferences and events , enhance the impact factor of scientific publications, their availability and access, in particular for those created in EU funded projects.

Form of funding: Coordination and Support Action – Single stage

Year: 2014

1.7. Support to European Aviation Research Policy and Innovation

Specific challenge: Support to policy and innovation is urgently needed in three areas:

- to set the conceptual foundations for a seamless travel door-door involving air transport.
- to support European aviation policy in the negotiation of international environmental standards.
- to investigate new approaches for a faster and cheaper certification process.

Scope:

- Regarding seamless door to door travel involving air transport, the proposed actions should investigate the profile of customers and better understand their expectations by having a look at the air transport system and its connections from a user's perspective. The current effectiveness of traffic flows should be assessed and metrics developed in order to identify the main areas to be improved (information to passengers, luggage handling, predictability, etc.). On this basis, the action should then develop a concept for a system that is capable providing a door-to-door service to the customers, establish the broad lines of the architecture of this system and assess the feasibility and economic viability of the concept (cost-benefit analysis).
- Regarding support to the assessment of new EU policy and international environmental standards (e.g. as discussed at ICAO), the proposed actions should build on EU existing models and data and contribute to develop an open environmental model suite, create new knowledge (e.g. measurement of particulate matters from engines) and associated databases. The action requires the involvement of the key stakeholders in EU environmental modelling (e.g. EASA).
- Regarding certification, the proposed actions should aim to review the current existing approaches (i.e. including outside of Europe) and identify which new tools and new methods could be used to accelerate the certification process (e.g. alternative means of compliance), lower its costs while ensuring the requested level of safety. The action requires the involvement of the key stakeholders of the certification process, notably EASA.

Expected impact: The proposed action should contribute to one of the following goals for the 2050 horizon:

- 90% of the travellers within Europe are able to complete their journey within 4 hours door to door.
- Europe leads in the establishment of global environmental standards.
- accelerate the speed of the certification process, lowering its costs by 50% while ensuring the required levels of safety and gaining global acceptance.

Form of funding: 1) Coordination and Support Action – Single stage; 2) PCP

Year: 1) 2014, 2) 2014, 3) 2015

1.8. International cooperation in aeronautics

Specific challenge: European aeronautics sector needs to identify topics of common interest and mutual benefit with other regions of the world in order to leverage resources, mitigate risks and establish long term relationships, in particular where these address societal challenges such as a worldwide safe air transport system, common standards and win-win situations for technological development. Aeronautics has inherently and increasingly an international dimension because almost all aircraft programmes involve stakeholders from a number of countries. Relations with a number of countries have already been initiated with different levels of maturity and experience, calling for ad-hoc approaches which respect the different situations. The challenges are therefore in two areas:

- To establish or deepen links with countries, building on previously established cooperation where relevant, with the aim to identify subjects of common interest and mutual benefit.
- To perform jointly research and innovation actions on topics of common interest, involving the appropriate funding from both sides.

Scope:

- Set up platform of communication between EU and Japan including R&I stakeholders (industry, research establishments, academia) and aviation R&I funding authorities to maintain a common R&I roadmap. This could include organization of workshops and short term studies to identify preferred areas of common interest and win-win situations, barriers and solutions for improved cooperation in research and technology development, and recommendations for future actions. Proposals should demonstrate good knowledge of research mechanisms in the EU and Japan and take into account past (e.g. SUNJET) and ongoing cooperation initiatives.
- The proposed R&I actions should address the topics of common interest between Europe and the international partner (Canada, China or Japan). This may include joint development of technologies which can reduce the impact of aviation on the environment (e.g. innovative aircraft configuration, drag reduction, environmentally friendly aero engines, understanding the impact of aviation on the environment and the climate change), materials and manufacturing processes for aeronautics components and structures (e.g. composite materials) and numerical and experimental tools for aircraft design (e.g. advanced measurement techniques, use of supercomputing for large scale multidisciplinary applications, modelling of flow physics).

Expected impact:

- Actions should contribute to deepen and widen cooperation with Japan and maintain a common R&I roadmap.
- Actions should demonstrate their potential to mature the level of readiness (TRL) of technologies and concepts, identify how the project results will be of mutual benefit and evaluate the leverage effect resulting from the coordinating R&I funding of EU and international partner (Canada, China or Japan).

Form of funding: Collaborative Project (100%) – Two stage; 2) Coordination and Support Action – Single stage

Year: 2014 for CSA, 2015 for CP

DRAFT

2. RAIL

2.1. I²I – Intelligent Infrastructure

Specific challenge: Taking into account the expected growth in transport demand and the ever-rising customer expectations in terms of quality of service there will be a need to step-increase the productivity of the legacy infrastructure assets. This requires the latter to be managed in a more holistic and intelligent way, using lean operational practices and smart technologies that can eventually conduce, to bettering the reliability and responsiveness of customer service and whole economics of rail transportation.

Scope: The research will evolve within four complementary work streams as follows:

- *Smart, cost-efficient, high-capacity rail infrastructure:* research should pursue a top-down systematic approach to tackle those key infrastructure-related issues that mostly contribute towards investment and recurring operational costs, reliability and availability of rail operations.
- *Smart infrastructure delivery:* the work will address the development of whole-system planning environments, based on virtual design concepts, to support the delivery of rail projects from concept through to deployment. This should include capabilities for the definition of project requirements based on well-reasoned and evidence-based valuation approaches, for overall system optimisation on multi-criteria basis (e.g. performance, reliability, etc.), for quantitative risk analysis and risk management providing the complete set of elements necessary for seeking planning permission and support tendering and procurement activities.
- *I²M – Intelligent mobility management:* proposals should focus on the development of a next-generation of advanced intelligent and automated rail traffic management systems supporting an integrated approach to the optimisation of rail operations at network, route and individual train level. These should reconcile business and operational requirements (viz. customer service, capacity, speed, timekeeping, energy, asset management) with real-time field and asset condition monitoring for delivering normal or near-normal services during all but the most exceptional circumstances. Particular emphasis should be given to real-time data collection and analytics from trains and infrastructure for purposes of goal-oriented predictive and adaptive control of the traffic and to minimise disturbances with a view to ensuring a minimum impact on services delivered.
- *Energy management:* the work should address innovative approaches for improving the efficiency of energy usage in rail systems, embracing vehicles, infrastructure and operation within a whole-system perspective. This will imply notably the development of smart concepts in intelligent design and management of energy systems for rail applications which should be pursued from a whole-of-life perspective - from concept to implementation through the design, procurement, manufacturing, construction, operations and maintenance phases.

Expected impact: Research is expected to concur to an indicative surge in the utilisation of capacity within a range 70-90% as well as in a reduction in the recurrent costs of rail

operations within a range 25-45%. Part of the latter will evolve from reductions in the power supply operational and maintenance costs (~25%), reductions in transmission and distribution losses (~20%) and increases in reliability of operation (~20%). This is to be considered, in parallel, with potential savings in investment costs for the delivery of major infrastructure projects and related systems through the adoption of lean design and implementation strategies that may amount up to 30% of total costs.

Form of funding: Collaborative Project (100%) – Two stage

Year : 2014

2.2. Smart Rail Services

Specific challenge: There are two main specific challenges concerning seamless travel and logistic services.

Seamless travel: The challenge is to enhance the rail traveller experience centred on solutions that respond to customer needs to support an anytime, anywhere door-to-door journeys encompassing distinct modes of transportation - cf. travel planning, one-stop-shop ticketing and booking transactions, en-route travel companion.

Logistic services: The challenge is two-fold: 1) to acquire a new service-oriented profile for rail based on excellence in on-time delivery at competitive prices, the interwoven of its operations with those of its clientele and of other transport modes and the incorporation of innovative value-added services; 2) to increase productivity, by addressing current operational and system weaknesses and limitations and finding cost-effective solutions to these problems. Fostering technology transfer from more advanced sectors into rail freight will be crucial for these innovation strategies to be put in place.

Scope:

Seamless Travel: the research should aim at conceiving and prototyping an on-line retail facility providing a whole new traveller experience throughout his journey – viz. delivering the possibility to book a bespoke trip tailored to the preferences of individual customers in terms price, rapidity, comfort, optimal combination of intermodal transportation services, value-added services or specific needs of persons with reduced mobility. The whole process should be further supported by the necessary business analytics providing the relevant feedback of traveller data towards ensuring more robust and responsive transport operations. Developments should evolve on the basis of robust business models capable of guaranteeing the economics of these e-services in the long-term.

Logistic Services: proposals should aim at addressing the key challenges of freight through a systematic "top-down" approach that backtrack from the performance indicators to be achieved – either in a geographical reach perspective (i.e. applicability of the solutions on a European scale) or in market segmentation (e.g. trainload/intermodal/wagonload or commodity-based segments) - and define the optimal combination of business, operational and technological solutions that are required for their delivery. In view of the significant financial fragility of the sector, priority should be given to those aspects that maximize potential returns in the short-term and require only moderate investment.

Expected impact:

Seamless Travel: Research should develop a new service profile for rail focused on the customer by providing him with an integrated solution for his travel needs – from transaction support to en-route assistance.

Logistic Services: Research should eventually be aimed at reaching a 98% level in terms of on-time delivery, placing rail amongst the "best-in-class" of the logistic operators. This latter over-arching goal will imply reaching significant gains from a diversification of the freight business, a re-engineering of the production processes towards a leaner and service-focused stance capable of delivering significantly higher levels of productivity – e.g. a doubling of both the revenue per employee and the annual load-runs per wagon, reduction of up to 50% in dwell times and a two-fold increase in the load factor for trains/wagons.

Form of funding: Collaborative Project (100%) – Two stage

Year 2014

2.3. New generation of rail vehicles

Specific challenge: The ever-evolving requirements and the growing expectations regarding the quality of service from rail customers, the mounting costs of energy and the increasing stress on the economics of rail operation is generating a new wave of challenges to rail vehicle development – notably imposing the delivery of enhanced functionality, comfort and operational performance - viz. in terms of reliability, flexibility of operation, safety and security- with a reduced level of life cycle costs. A particular challenge for the design of future rail vehicles is to ensure the Electro-Magnetic Compatibility (EMC) between vehicles equipped with electrical traction systems and the electrical installations of the network that would lead to safer operations on the railway. Reconciling such requirements will imply a departure from traditional and incremental vehicle development approaches towards adopting a whole new thinking on product development.

Scope: The research should aim at developing innovative system approaches leading in the longer-term to the development and demonstration of a new-generation of railway vehicles and passenger trains – characterised by step-improvements in terms of product reliability, cost-effectiveness, manufacturability and interoperability. This will require not only the development and integration of higher-performance technologies for critical structural, traction, command-control and cabin environment applications – e.g. new materials, smart power and wireless technologies - but also the consideration, in-parallel, of the design and production solutions – e.g. modular, "commercial off-the-shelf" or adaptive concepts - that best contribute to the lean manufacturing and lean operation of such vehicles. Particular attention should be earmarked to the development of innovative solutions with the potential to reduce the extended lifetime of the vehicles or otherwise simplify retrofitting through e.g. in-built adaptability of major vehicle components and sub-systems.

In the latter context, attention should be paid to the development of innovative, modular and customisable solutions for comfortable and attractive train interiors as an integral part of the whole passenger train concept. In particular, these should focus on delivering a unique traveller experience, facilitating accessibility, notably for persons with reduced mobility, fast boarding for commuters, as well as other on-board value-added services – e.g. access to real-time information, internet connectivity, on-board entertainment, luggage handling – that are relevant for the distinct service segments – viz. long-distance high speed, regional or urban/suburban services.

Proposals can also develop innovative solutions to improve the Electro-Magnetic Compatibility (EMC) between the railway vehicles equipped with electrical traction systems and the electrical installations of the network focussing on solutions with low impact on existing equipment.

Expected impact: The key goal will be to deliver a reduction up to a magnitude of 40% in the life cycle costs of rolling stock products – notably by means of a 30% reduction of energy consumption, an increase in passenger train capacity up to 15%, reductions of downtime by increased reliability (~+50%) - whilst delivering superior performance in terms of overall service quality, safety and customer experience in rail transport.

Form of funding: Collaborative Project (100%) – Two stage

DRAFT

3. ROAD

3.1. Power train technologies for low CO₂ and polluting emissions

Specific challenge: growing road transport traffic in Europe entails detrimental effects on the environment and public health to a level that is becoming unsustainable, while generating a large contribution to climate change. The challenge is therefore to support industries and researchers developing a new generation of products and technologies able to reach post Euro 6 limits in real life and comply with new CO₂ legislation while reducing energy consumption and noise. At the same time, with the progressive reduction of particles emissions due to the introduction of particle filters, the contribution of brake components wear to air quality deterioration is relatively increasing, and it is important to deepen the understanding of the health risk that this constitutes and find ways of reducing these emissions in parallel to engine ones.

Scope: Proposals should address research and development in order to make the existing innovation technologies and product concepts less polluting and more energy efficient. The scope includes:

- Future clean and energy efficient spark-ignited engines for gasoline and bio-based liquid fuels for cars and vans focussing on the combination of existing engine and aftertreatment technology and of modelling, sensing and testing to improve the design and control capability.
- Future clean diesel engines for cars and vans also focussing on the combination of the most appropriate engine and aftertreatment technologies and on modelling, sensing and testing to improve the overall design and control capability.
- New knowledge for the development of low environmental impact brakes to reduce micro and nano particles emissions and their effects.

Expected impact: cleaner and more efficient road transport activities through advances in power trains and vehicle concepts, strengthening the leading role of European industries in the sector. Technological demonstration vehicles must prove, by independent testing, real driving emissions below expected future EU legislation while providing a 15% improvement in fuel consumption for gasoline and 10% for diesel in comparison to the best vehicles on the market in 2013. For brakes, where no current legislation is applicable, at least a 50% reduction of particles emissions should be demonstrated.

Form of funding: Collaborative Project (70%) – Two stage

Year: 2014

3.2. Advanced vehicle concepts for buses for increased efficiency

Specific challenge: The challenge is to increase the modal share of public passenger transport, in particular by bus, and also promote co-modality. In addition, the economic situation today is highlighting the importance to study solutions for all segments of the urban bus market, capable to improve the attractiveness through innovative solutions for increased efficiency of

the system. In particular energy consumption of auxiliaries in a bus represents a significant part of the overall consumption, heavily impacting bus performances.

Scope: Key innovative solutions will be developed and tested in real operational scenarios with the joint collaboration of industries and authorities/operators. By adopting a system approach, the scope will be on research and demonstration activities for the vehicle and its interfaces with the transport system addressing the following activities:

- Test on buses of strategies for energy and thermal management. Attention should be given to auxiliaries, in particular climate systems for city hybrid and electric buses.
- Specific vehicle technologies (drive assistance mode; modularity and capacity).
- Driving style (fuel savings together with passenger comfort).
- Support from IT standard solutions (e.g. for predictive maintenance).
- Interface with the system: bus intelligent garage/maintenance; infrastructure (e.g. bus stop and urban elements).

The main outcomes should be the following:

- State-of-art and common practices for improving attractiveness through innovation and efficiency in urban bus system.
- Development and test in real operational scenarios of key innovative solutions with the highest potential of fast adoption through bus demonstrators and/or test-bench.
- Recommendations and guidelines for efficient operation and management of urban bus service.
- Proposal for standards that would improve the efficiency of the system.

A stronger involvement of the supply chain, in particular SMEs is highly suitable.

Expected impact: Improvement of Public Transport in Europe through more attractive buses that Contribution to strengthen the leading role of European industries in the sector, in particular through the development of standard components by the bus manufacturers and by the demonstration of at least a 30% reduction of energy needed for climate control.

Form of funding: Collaborative Project (70%) – Two stage

Year: 2015

3.3. Service innovation and global supply chain management

Specific challenge: The market environment for the European automotive sector is characterised by weak economic growth, limited investments and declining sales of new vehicles for the mature markets. Further the switch to more and more electrified vehicles puts an additional challenge to the European automotive industry and in particular to its related supply chain. As a consequence it has to be transformed into a mix of new products combined with innovative services which is able to respond in a flexible way to customer needs. In the area of electric vehicles this requires specific designs and the introduction in manufacturing chains of new technologies and innovative services for vehicles (e.g. electric batteries and components,) which must be matched by innovative production methods and processes in order to make them affordable and competitive against conventional cars.

Scope:

- Present service innovation as a means of increasing flexibility and reducing costs.
- New business opportunities within the current supply chain and beyond.
- Concepts for innovative multi-powertrain platforms.
- Flexible methods and processes for assembly lines, particularly in view of multimaterial, low weight platforms.
- Optimise supply chain logistics.

Expected impact: Customer needs become the main driver and lead to significantly improved services in the supply chain. Production lines and logistics capable of adapting to multiple versions of vehicles and powertrain while maintaining high efficiency both in the short to medium term characterised by the co-existence of a variety of options (e.g. ICE, PHEV, FEV etc.) for which flexibility and reactivity of the production base is essential and in the long term when massive introduction of electric vehicles is foreseen.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2015

3.4. Integrated approach towards safety of Vulnerable Road Users

Specific challenge: Powered-two-wheelers (PTWs) and non-motorised forms of transport, used alone or in combination with public transport, present a range of economic, environmental and societal opportunities. They are very well placed to address Europe's challenges related to climate change and rising congestion, by providing affordable access to mobility, especially given increasing costs of car ownership, traffic charges, and the limited number of parking spaces in urban areas.

At the same time, pedestrians, cyclists, motorbike and moped riders also represent a serious safety concern, since they account for a disproportionately high percentage of the total number of road fatalities and serious injuries. The challenge is therefore to improve the safety of these Vulnerable Road Users (VRUs) by addressing their needs related to behaviour, interaction with other road users, influence of the road environment and vehicles, together with socio-political dimensions.

In the context of the changing demographics, particularly the ageing European population, the specific needs of elderly and disabled people should be given special consideration to assure their active and safe mobility.

Scope: Proposals could address the following categories of Vulnerable Road Users:

- Riders of PTWs
- Cyclists
- Pedestrians
- The elderly and Persons of Reduced Mobility (PRMs)

Research should focus on measures to reduce the number and severity of accidents involving VRUs by exploring ways to, for example, make the road environment more forgiving and intuitive, make motor vehicles safer by means of Advanced Driver/Rider Assistance Systems, improve VRU perceptibility and detection systems for safe mobility management, enhance the performance of protective equipment and conceive more effective specific preventive measures such as improvements in training and licensing schemes. It should address, wherever suitable, the current lack of behavioural knowledge, including better understanding of pre-crash situations, accident causation factors and identification of risk scenarios. All proposals should include assessment of the effectiveness, and demonstration of relevant technologies, in real-life conditions.

In the case of PTWs, the special requirements of novice/returning riders should be considered in view of their particular exposure to high risk together with those of female riders.

A gender-specific, pan-European approach is recommended in order to take into account the gender/cultural differences and country-specific topographical/weather conditions. As regards PTWs and bicycles, various equipment types, usage patterns and user profiles should be considered in order to guarantee the highest reliability and trustworthiness of the results. Potential needs for regulatory actions should be identified. International cooperation is strongly encouraged.

Expected impact: Research is expected to develop a set of user-centric solutions for VRU accident avoidance/mitigation with increased user acceptance, comfort and affordability.

Significant improvements in safety will make PTWs and non-motorised modes a more sustainable transport option and will reduce the overall economic burden of accidents to society. Technological and management innovations will improve accessibility to the European transport system by the ageing population and for PRMs.

Overall, research in this area will contribute to the achievement of the European policy objective of halving road deaths by 2020, and, in the longer term, to the Transport White Paper's "Vision Zero" ambition.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2014

3.5. Traffic safety analysis

Specific challenge: Despite the improvement in road safety in recent years, road accidents and their consequences remain a serious social problem – on average 75 people lose their lives every day on European roads and 750 are seriously injured. At the same time measures aimed at reducing the number of road accidents and mitigating their consequences often imply significant economic cost and their potential in terms of improving the general safety level will become more incremental over time.

Recent developments that include demographic and life-style changes, increasing urbanisation, emergence of both new vehicle concepts and mobility patterns and ever growing connectivity result in changing accident typology. In order to better address road safety related challenges, it is therefore necessary to improve and update existing knowledge of accident causation in the European Union. This also requires that the tools to assess the

societal benefits of improved road safety are precise and accurate, and take into account all costs related to road accidents.

Scope: This sub-challenge will focus on:

- in-depth understanding of road accident causation, covering all aspects of road safety (vehicle, driver and infrastructure) on the basis of both a solid methodology and building upon previous research results; identification of specific risk factors across Europe together with appropriate actions for their prevention and mitigation; methods of risk analysis and accident outcome prediction etc. Research should fill the knowledge gaps at both European and national levels, and take into account regional differences.
- development and improvement of methods for conducting a comprehensive and systematic cost-benefit analysis of safety countermeasures at a transport system level, including methodologies and tools for the assessment of socio-economic costs related to road accidents, addressing not only costs of fatalities but also those of injuries and their long-term consequences as well as secondary costs related to, for example, congestion, material damage, vehicle uptime etc.

All proposals should include a comprehensive dissemination strategy to key stakeholders in order to ensure wide access to project results. International collaboration is strongly encouraged in order to ensure data harmonisation, interconnection of databases and knowledge transfer.

Expected impact: Research in this area will contribute to delivering fundamental knowledge for the design and implementation of an efficient strategy to make European road users, vehicles and infrastructure safer, and thus to the development of the European Road Safety Observatory.

The aim is to improve accident data quality while making accident investigations more cost-effective. In-depth knowledge of accident causation should constitute a solid basis to assess the safety potential of measures and feed the process of selecting and implementing those options that offer the best cost-benefit ratios.

Ultimately, projects will contribute to reaching the European ambition of "Vision Zero", where no people are killed or seriously injured in the road traffic by 2050.

Form of funding: 1) Collaborative Project (100%) – Two stage; 2) Coordination and Support Action – Single stage

Year: 2014

4. WATERBORNE

4.1. Towards the energy efficient and emission free vessel

Specific challenge: The challenge is to support developments that make new and existing new vessels in maritime transport and inland navigation significantly more efficient and less polluting through solutions addressing 3 ship sub-systems: engine; propulsion and energy sources and management.

Waterborne transport still offers an enormous potential for energy efficiency gains and the reduction of pollutant and greenhouse gas emissions, particularly in the category of small to mid-size vessels which provide a large share of intra-European waterborne transport, as well as in inland navigation.

Since vessels have a long life expectancy, developing retrofit solutions is a key aspect of the challenge.

Scope: In order to make new and existing vessels in maritime transport and inland navigation significantly more efficient and less polluting through retrofitting and new concepts, respectively, the following areas should be addressed:

- The optimisation of conventional ship engines (diesel engines), including fuel flexibility, new materials, lifetime performance and near zero emissions engines.
- The development of low-maintenance, low-cost off-the-shelf retrofit solutions for emission reductions of existing engines used in inland navigation.
- The development of LNG/dual fuel powered engines for small and mid-size ships, including the specific aspects of storage, safety and classification, and solutions to address the risks of methane slip.
- The design and demonstration of new and improved propulsion means and vessel configurations that include the entire drive train and the propeller and hull optimization for vessels, including applied research in Computational Fluid Dynamics (CFD).
- New energy sources including renewables, alternative fuels and electric solutions with the aim to demonstrate the feasibility of the zero emissions vessel.

Expected impact: Achieve efficiency gains and emission reductions that go significantly beyond the normal technological progress and the benchmarks of the existing regulatory regimes.

Fuel efficiency gains of at least 10% for retrofitting per type of solution (engine or propulsion) and at least 20% per type of solution for new concepts.

25% decrease in greenhouse gas emissions compared to the best available techniques, on average 80% air pollution reduction compared to BAT.

Solutions should be demonstrated. They should be sufficiently close to market take-up so that ship owners will consider these concepts in their future investment plans. This applies in

particular to the existing fleet and retrofitting solutions which must give a reasonably short return on investment.

RDI efforts should allow pilot applications for new engines, new propulsion lines and alternative fuels solutions to enter the market by the end of the research period.

Form of funding: Collaborative Project (70%) – Two stage

Year: 2014

4.2. Safer and more efficient waterborne operations through new technologies and smart traffic control

Specific challenge: Ensuring and enhancing the safety of waterborne operations is of high importance for the EU since past and recent maritime disasters and accidents in inland navigation have shown that accidents come with high costs in terms of losses of lives, environmental damages, economic impacts, and the overall image and public perception of the waterborne sector. Whilst safe operations of cargo vessels remain a challenge to be addressed, the significant and continuing growth in the size of cruise ships and the expansion of their operating areas to remote regions and particularly difficult environments such as the Arctic has created a new and increasing risk of situations that can no longer be controlled by traditional means with regard to outside assistance, evacuation, fire prevention and control, or the resilience of systems. More research is needed to develop and demonstrate innovative solutions for ship design and waterborne operations in order to avoid and mitigate passenger risks, whilst at the same time preserving the increased passenger expectations of comfort and on board amenities.

Scope:

- Safer shipping through innovative conceptual (hull, general arrangement) and detail designs (exterior and interior) of vessels and systems and through a new approach to emergency response.
- New safety devices and their demonstration, including new technologies for the evacuation of large passenger ships, for black-out mitigation, for fire proofing and for establishing the salvage friendly ships.
- New and improved systems for the surveillance, monitoring and safe management of waterborne transport and other activities (commercial and non-commercial), including systems that are based on GNSS technologies and derived services.

Extension, integration and optimisation of traffic information and communication systems with the aim of contributing to building a comprehensive "e-maritime" environment (including e-navigation components) which covers the shipping lanes, the port approaches and the ports, and which is internet enabled. This environment should also provide the foundation for the deployment of autonomous and actively guided ships. Inputs to EU and international regulatory regimes, standardisation and international research co-operation are expected for the above areas. Maritime traffic management solutions must also serve the overall objective of building the European Maritime Transport Space without Barriers which should foster free maritime movement in and around Europe, allowing waterborne transport (including inland navigation) to be used to the full potential of the integrated intermodal logistic chain.

Expected impact: Significant improvements in terms of navigational safety and efficiency and the decrease of administrative burdens.

Transfer of new safety concepts from passenger shipping to other areas of maritime operations.

Statistically relevant decrease of number of fatalities caused by maritime accidents, number of ship losses, and number of specific incidents such as fires or black-outs. This should be accompanied by other empirical evidence showing the impact of the RDI efforts in the actual operational environment, based for example on feedback from passengers, seafarers/crew and insurance companies.

Upgrading of international maritime safety regimes through relevant inputs.

Form of funding: Collaborative Project (70%) – Two stage

Year: 2014

4.3. System modelling and life-cycle cost optimisation for waterborne assets

Specific challenge: The European maritime technologies industry is facing fierce global competition on price in its traditional markets which forces it to shift the focus to profitable (existing and new) niche markets where technical excellence and smart custom-made solutions are the key to market success. In order to develop these niche markets and exploit them successfully, RDI efforts are required that introduce new design and production processes with the aim to have minimal total costs over the useful economic life of the product which is particularly long (20-50 years) for waterborne assets (vessels and maritime structures)

Scope:

- New design and mathematical modelling tools supporting the full understanding of operational practices and situations covering the entire useful economic life of a vessel or maritime structure ("from cradle to grave").
- A comprehensive approach to system integration and optimisation for vessels which multi-objective driven, based on virtual product (digital mock-up) methodologies (with virtual reality capabilities). The resulting model must include all technical systems and sub-systems and must cover all operational conditions of the complete system. It should be tested in a demonstrating environment. The modelling should cover the majority of ship types produced in Europe.
- Large scale virtual demonstrator for smart, adaptive and multi-material complex ships and structures, based on the tools and concepts for minimised life-cycle costs and using the complete product model.

Expected impact: Measurable cost reductions in design, production and lifetime maritime assets management.

Shorter time for assessment and integration of sub-systems on board vessels and better integration of complex systems, in particular in relation with energy issues and efficient operations. This should lead to efficiency gains of 20% in terms of energy consumption and of 10% in terms of other operational costs.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2015

4.4. New technologies, materials and vessel concepts for the maritime industry

Specific challenge: There is insufficient research on future technologies, advanced concepts and alternative materials in the maritime/waterborne industry.

In addition, the waterborne sector is rather reluctant and slow to implement innovative solutions. The production of waterborne assets is still limited to a few conventional materials (steel, aluminium). Advanced materials such as composites or alternative building processes such as chemical bonding are not used in this industry.

Finally new waterborne activities are requiring new and innovative vessel concepts and their realisation.

Scope: In order to provide innovative solutions and accelerate their take-up in the waterborne sector the following areas should be addressed:

- Provide ground-breaking ideas, tools and solutions for the sustainable competitiveness of the maritime technologies industry, including unmanned and autonomous operations in shipping, Arctic shipping, entirely new vessel and cargo handling concepts (also in inland navigation), and new seaborne industrial applications. Develop bionics solutions for waterborne technology applications.
- Develop suitable new materials for waterborne assets (vessels and structures) that show a significant increase in terms of technical performance, cost efficiency and environmental benefits. Demonstrate their industrial production up to the level where integration into the current production processes is feasible and can be undertaken on a prototype or pilot scale.
- Develop concepts for new vessels supporting future marine and maritime activities such as the exploitation of offshore resources, fishing, tourism or inland waterway transport. Testing, validation and demonstration of the concepts should be conducted.

Expected impact: New technologies (including those based on bionics) and materials will emerge and will be taken up by industry in first selected cases thanks to proven economic and environmental benefits.

New concepts and applications in maritime transport and other waterborne-related activities will be defined and developed to a level close to deployment.

Form of funding: Collaborative Project (100%) – Two stage

Total amount: EUR 20 Mio

Year: 2015

4.5. Promoting innovation in the Inland Waterways Transport (IWT) sector

Specific challenge: The maritime and inland waterways sectors have different dynamics as regards policy developments and policy-making cycles. The IWT sector, with its much smaller scale, cannot benefit from the same economies of scale as the maritime sector, also because it is largely dominated by SMEs which need to be introduced to the RDI agenda. The global dimension is much less pronounced; the sector has a stronger regional focus, is more driven by EU legislation and is more integrated into the internal market.

With the adoption of the NAIADES II programme, new priorities for inland navigation policy have emerged which require RDI support as a key building block for exploiting synergies, resulting in an integrated inland waterway sector contributing to a comprehensive, sustainable waterborne transport system. This will facilitate the competitive position of IWT by introducing advanced technological solutions aimed at better environmental performance, by realising higher energy efficiency and by establishing the mode firmly as part of the Single European Transport Area.

Scope: Proposals should address RDI and support actions that lead to an improvement of the quality and performance of inland navigation operations and services.

Particular attention will be paid to the following issues:

- Define and develop the framework conditions for accompanying a massive introduction of alternative energy concepts in IWT, including gaseous fuels and electricity. Safety considerations, also linked to passenger transport, are to be addressed. New technological solutions aiming at achieving emission levels in IWT which reflect the state of the art and are at least similar to those of road transport are to be developed. RDI efforts should focus on new concepts that are tested through real-life pilot deployments which are accompanied by a thorough assessment of operational and environmental performance, including cost-efficiency.
- Establishment of a testing and monitoring regime for the application of strict emission limits to various categories of existing vessels/engines, including certification, type approval of retrofit solutions, appropriate test cycles and procedures for compliance monitoring.

Assessing the adequacy of manning and training/qualification requirements in the EU taking into account the technological progress with regard to vessels and cargo handling systems. Identifying the further evolution of vessel technologies and appraising their impact on manning and training/qualification requirements. Expected impact: Major progress is expected regarding the definition of policy frameworks which are so far missing and which will allow the IWT sector to significantly increase its environmental performance and its energy efficiency, to improve its image and to become more competitive as part of the Single European Transport Area.

New qualifications will allow for a more mobile and up-skilled work force.

As inland navigation in Europa also affects non-EU and non-EEA countries international co-operation aspects in research and deployment will be addressed.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2015

5. URBAN MOBILITY

5.1. Transforming the use of conventionally fuelled vehicles in cities

Specific challenge: Significantly reducing the use of fossil fuels in urban mobility whilst increasing the accessibility and attractiveness of urban areas will, in addition to advances in vehicle technology, require new, cost effective policy measures and tools. In particular an increased use of non-conventionally fuelled vehicles and a reduced the use of conventionally fuelled vehicles in urban areas are key challenges in this context.

Scope: This topic addresses the following themes:

- Comparing innovative policies, measures and tools that will, inter alia, halve the use of conventionally fuelled vehicles in cities, while increasing accessibility of urban areas and improve air quality and road safety (year 2014). This may include:
 - Assessing the role of regulatory measures, demand side measures and the promotion of alternative modes as part of wider package of technologies, policy-based, and soft measures and with a strong potential for replication. The related consensus building, information and communication activities should be fully integrated in the work. Attention should be paid to issues related to vulnerable groups of citizens and gender issues.
 - Exploring how a change in mobility behaviour, individual choices, and social norms can be catalysed, accelerated and guided towards in modal shift, changing vehicle use or ownership, reducing the need for travel, or other options and/or their combination. Relevant drivers and barriers could be identified. The research should gather, evaluate and disseminate techniques that can be employed, including approaches that use social media.
- Exploring policy frameworks and measures to ensure the uptake of alternative fuelled vehicle fleets in urban areas (year 2015). This may include:
 - Demonstration of the opportunities for large scale deployment of alternative fuel distribution infrastructure, including for electric vehicle recharging. This should include a comparative assessment of deployment approaches combined with the adequate vehicles. Partnerships, business models and planning/rollout approaches could be addressed. Standardisation aspects could form part of the work. Pre-commercial procurement initiatives could be facilitated. A typical consortium could include local or regional authorities, automotive and equipment manufacturers, utilities, research centres and universities. Clear commitments from participants towards ambitious rollout during and following the project(s) are expected.
 - Analysing the potentials for and preparing broadly shared recommendations for the upgrading and regeneration of electric public transport systems (i.e. trolleybus, tram and metro systems), in line with the trend towards electromobility in urban areas. This could include the evaluation of costs and benefits of development schemes as well as knowledge transfer, exchange of experience and policy recommendations. This theme could include activities to demonstrate and test

innovative solutions. The work should focus on non-technological aspects, complementing topic of this work programme.

Expected impact: The project(s) should result in a clear understanding of cost effective strategies, policies and approaches to halve the use of conventionally fuelled cars by 2030 in different types of cities through a variety of approaches. In particular, this addresses the potential impacts of regulatory measures, demand side measures and the promotion of alternative modes and the potential of behavioural change. It should lead to increased knowledge and awareness on deployment approaches for alternative fuel distribution infrastructure and vehicles. This should result, through increased acceptance by users, operators and policy makers, in their accelerated rollout.

Form of funding:

- In 2014: Collaborative Project (100%) – Two stage
- In 2015: Collaborative Project (70%) – Two stage

Year: 2014, 2015

5.2. Reducing impacts and costs of freight and service trips in urban areas

Specific challenge: In addition to advances in vehicle technology, achieving essentially CO₂-free city logistics will require significant improvements in the efficiency of goods, waste and service trips in urban areas to reduce costs and impacts. This will require redesigning existing and developing new logistics processes (given new technological means) and infrastructure (e.g. freight consolidation schemes and centres); a sound information infrastructure for retailers, consumers and utility service providers; and increased collaboration along distribution chain.

Scope: This topic addresses the following themes and complements the work under topic ... of this work programme:

- Assessing new policies and dedicated solutions to ensure a better use of infrastructure (e.g. delivery spaces, off peak deliveries, non-road modes) and vehicles (types, load factors), improve network management, address demand side measures, new ways of stakeholder collaboration, and provide policy frameworks that allow sustainable business models for urban logistics solutions. Together these measures will reduce the costs and emissions from city logistics operations.
- Reviewing the state of the art in consolidation and distribution centres in cities for efficient last-mile distribution, including design (e.g. cross-docking); business models for the consolidation schemes (including fleet and freight sharing and pooling and adequate collaboration frameworks); integration of direct and reverse logistics; tools to identify and measure consolidation opportunities; and governance models.
- Improving knowledge on freight distribution and service trips in urban areas. This could address research on indicators and data collection (e.g. delivery characteristics, operators, movements, and impacts); economic and behavioural modelling; effects of logistics sprawl (e.g. impact of decentralisation of logistics facilities on transport movements); freight mitigation strategies; effectiveness of partnerships and stakeholder engagement; and comparative analyses and evaluation of policies and experiments. For this theme, opportunities for international cooperation may exist.

Expected impact: The project(s) should result in a clear understanding of cost effective (non-vehicle technology based) strategies, measures and tools to achieve essentially zero emission city logistics in urban centres by 2030. Particular attention should be paid to significantly increased load factors and reduced vehicle movements/kilometres resulting in costs and emission benefits. Practical, wide-spread guidance will result in a better integration of city logistics in urban mobility policies, on consolidation and distribution centres and on the role that demand side measures can play.

Form of project: Collaborative Project (100%) – Two stage

Year: 2014

5.3. Tackling urban road congestion and increasing financial sustainability of urban transport

Specific challenge: Reducing urban road congestion and improving the financial sustainability of urban transport will have major positive impacts on the economy, the attractiveness of cities and on their citizens' wellbeing. This requires an improved understanding of measures to reduce urban road congestion whilst increasing urban accessibility for passengers and freight and contribute to the achievement of broader sustainable urban transport policy objectives. It also requires new thinking and innovative business models and service concepts for public transport, adapted to increasingly limited public budgets.

Scope: This topic focusses on an integrated approach ensuring overall optimisation of private and public financial resources and addresses the following themes:

- Analysing measures and tools to understand and secure the long term reduction in urban road congestion. In particular the links with other aspects of urban mobility e.g. public transport services, mobility management, parking policy and road user charging schemes. This theme could include pilot actions.
- Assessing urban policies and measures required to achieve an increased long term financial sustainability of urban mobility systems, taking into account demographic, economic, technological and environmental trends. Particular attention should be paid to public policies that provide a sustainable framework for private investment in the transformation of urban mobility.
- Explore what favourable environment can be created for a significant growth in public transport at low extra costs. The research should provide a comprehensive overview and analysis of innovative approaches and current practices in areas such as fares, taxes and levies; infrastructure investment; land value capture; customer orientation; rolling-stock upgrading/renewal; operations and service concepts; demand management; and regulatory frameworks. Recommendations, tools and guidance material could be developed and tested at the local level to support operators and authorities in developing sustainable business models that match their needs and circumstances. The work should be accompanied by a platform with stakeholders from different organisational, economic and social contexts.

Expected impact: The project(s) should result in improved understanding and measurement of urban road congestion and the linkages with urban accessibility and mobility. In particular it should produce new insights in proven policy measures and tools to successfully manage and

reduce congestion whilst increasing accessibility in urban areas and contributing to broader sustainable urban mobility objectives, including financial sustainability. The project(s) should also produce insights on new public transport business models with long term financial sustainability.

Form of project: Collaborative Project (100%) – Two stage

Year: 2014

5.4. Promoting uptake of innovation and strengthening the knowledge and capacities of local authorities

Specific challenge: Achieving sustainable urban mobility requires specific tools, harmonised data and information and insights in major trends. Without strengthening of authorities' competences and knowledge the transformation of urban mobility towards the White Paper targets will not be achieved.

Scope: This topic addresses the following themes:

- Replicating the innovative concept of Sustainable Urban Mobility Plans. Proposals from large networked groups of local authorities should include instruments, mechanisms and information exchange to assist them in preparing and implementing Sustainable Urban Mobility Plans. The plans should build on the Commission's guidance and include quantified impacts targets. Options for incorporating emerging technologies, policy-based, and soft measures should be integrated. Proposals should ensure that plans comprise a long-term strategic vision, build on interdepartmental consultation and coordination, include the monitoring and evaluation of targets, and strategies consider the widest possible range of measures and financing options.
- Designing and building up a European Urban Mobility and Transport data and statistics database for local authorities. A set of harmonised and aggregated indicators on urban mobility and transport should be defined which capture the performance of an urban area's transport system with regard to the three dimensions of sustainability: economic, social, and environmental. This should build on relevant research and study work undertaken in recent years. Recommendations for standards and actions to promote take up could be made. The feasibility of establishing a long term instrument for monitoring cities' progress should be assessed.
- Analysing and understanding urban mobility trends, to be considered in their political and societal contexts. This should include collecting and analysing data and proving recommendations to urban policymakers and technology developers. The indicators should cover the economic, environmental and social dimensions of sustainability. Gender issues and the needs of vulnerable groups should be fully incorporated. Activities on identifying, assessing and validating new tools to facilitate the collection, analysis and interpretation of 'open' data and statistics by local authorities, service providers, and other relevant stakeholders.

Expected impact: The project(s) should develop new insights on trends and policy pathways, and produce the necessary analytical instruments and support tools, to achieve sustainable urban mobility and different types of cities. Increased understanding, skills and networking among big groups of local authorities. Project(s) on Sustainable Urban Mobility Plans should

include a strong commitment on the preparation and implementation of the plans. They should demonstrate a high leverage factor, especially towards regions where the take up of innovation so far is low.

Form of project: Coordination and Support Action – Single stage

Year: 2014

5.5. Demonstrating and testing innovative solutions for cleaner and better urban transport and mobility

Specific challenge: Many of Europe's urban areas are struggling to meet the transport-related challenges they are facing. Although new technologies and innovative urban mobility concepts are emerging which offer great potential for increasing quality and efficiency of urban mobility and transport, and for reducing transports' negative impacts, they are not taken up at a large scale. Cities are hesitating to implement innovative measures because little information is available on their effectiveness and barriers to their successful implementation.

Scope: The on-going CIVITAS Initiative, which supports local stakeholder partnerships in implementing and testing new approaches for better and more sustainable urban mobility under real-life conditions. Participating cities work together and exchange their experiences while they undertake a process evaluation and impact evaluation on the implemented measures and investigate the transferability of the tested solutions to different settings. This results in a developing knowledge-base, technical capacity and support for successful up-scaling and transfer which is available to participating and third cities.

This topic addresses city-led consortia, composed of a small group (4 to 5) cities with a clear commitment to establish living laboratories where innovative approaches to transform the use of conventionally fuelled vehicles; reduce impacts and costs of freight distribution and service trips; tackle urban road congestion and measures to increase financial sustainability of urban transport can be demonstrated and tested. The participating cities should prove their common interests and have a clear vision on how they will ensure a meaningful and close cooperation on a small number of themes relevant to achieve this commitment. The proposals should present how the work will support cities' efforts to develop along a sustainable path.

The participating cities should follow an integrated approach by implementing a set of complementary and mutually supporting measures and by investigating their effect on the transport system. Implemented measures should be newly-emerging technologies, policy-based, and soft measures and with a strong potential for replication. They should cover and integrate several of the CIVITAS measure categories: (1) clean fuels and vehicles; (2) collective passenger transport; (3) demand management strategies; (4) mobility management; (5) safety and security; (6) car-independent lifestyles; (7) urban freight logistics; and (8) transport telematics.

In all cities, a baseline shall be established and a plan for impact and process evaluation shall be designed before the innovative measures are put in place. Proposals may include suggestions for preparatory actions, horizontal research activities, take up and replication actions, and for tools to support policy making, planning, management and operation of urban transport systems in the participating as well as in third cities. Activities may be included that support local planning and policy making processes and contribute to the development or updating Sustainable Urban Mobility Plans.

By demonstrating and testing the measures under real-life conditions and conducting a thorough impact and process evaluation, projects will:

- deliver quantitative and qualitative results needed for assessing the impacts of the measures analysed.
- validate the effectiveness of the investigated measures with regard to the declared policy objectives.
- identify possible barriers to a successful implementation and broad deployment of the investigated measures and provide guidance on how to overcome them.
- actively support the dissemination of results and experiences.

Building on this input, a support action will undertake common activities on project and measure evaluation, dissemination, coordination and networking, as well as training and other support actions across the activities, cities and stakeholders involved in CIVITAS 2020. It should coordinate activities to avoid duplication and realise synergies. To ensure a high visibility and impact of the CIVITAS 2020 results, a comprehensive communication and dissemination plan should be developed. The action should ensure continuity, for example for the CIVITAS secretariat. It should further elaborate the CIVITAS Process and Impact Evaluation Framework and support its implementation. Actions to promote uptake of innovative solutions could be launched. Local knowledge for improved policy making, planning and operations could be extended through training, staff exchange, study tours, etc.

Expected impact: The project(s) should produce new insights on impacts and barriers towards sustainable urban mobility, which can act as inputs to the developing European knowledge base. They should encourage progress in policy in the most advanced and follower cities. In the participating cities, projects will strengthen the mechanisms for urban transport policy making and planning and well as the technical capacity of the relevant actors. The participating cities should establish an effective platform for close cooperation and information exchange, ensuring that each city can benefit in full from relevant experience and know-how in the other participant cities. A strong commitment to actively support the dissemination of results and experiences to cities across the EU and beyond is expected.

Form of funding: 1) Collaborative Project (70%) – Two stage; 2) Coordination and Support Action – Single stage

Year: 2015

6. LOGISTICS

6.1. Transport advantages and implications of mutualisation of the supply chain and e.commerce

Specific challenge: The global challenge here is to find the right business models for seemingly mutually exclusive objectives namely, decoupling the growth of urban and inter-urban freight transport demand from its consequences on traffic and the environment by finding solutions that link the retail, distribution, logistics, traffic management and users in a more intelligent chain. The topic has three mutually compatible challenges:

- how to redesign logistics processes with a particular emphasis on the last mile component of the logistics chain. It requires a sound information infrastructure for retailers, consumers and utility service providers and collaboration of authorities, shippers and logistics service providers along delivery chains.
- addressing e.commerce developments with the subsequent need for personalised, secure and efficient order fulfilment and delivery; by establishing collaborative and mutualized business cases.
- addressing the transition from the current independent supply networks to open global networks where resources are compatible, accessible and easily interconnected.

The challenge is to develop and implement example cases of mutually compatible horizontal collaboration in inter-urban and urban transport.

Scope: The work will establish and demonstrate mechanisms to reduce traffic flows through:

- Improved collaboration and concerted actions between local authorities, shippers, retailers and logistics service providers for door-to-door transport.
- Co-operative Intelligent Transport Systems (C-ITS) and cloud based services, integrated into an on-line planning platform that offers new means of communication amongst vehicles, between delivery vehicles & traffic management and to end users.
- New concepts for the design, development and application of consolidation and distribution centres in cities for last-mile distribution and reverse logistics.
- The design and delivery of a proof of concept model for e-commerce logistics execution.
- Develop tools and test cases for the mutualisation of truck use in long distance transport by different shippers.

Participation of SMEs with proven experience in horizontal collaboration will be considered an asset.

Ethical aspects referring to the transport of livestock should be duly considered where appropriate. The work should assess the social, especially the effect on employment and economic effects of the work.

Expected impact: The horizontal collaboration will result in implementing mechanisms that:

- Reduce the number of delivery vehicles that otherwise would be and hence limit congestion, pollution and GHG emissions.
- Improve truck load factors (+ 50% in test cases and overall, stop the decrease in load factor).
- Mutualized use of containers.
- Increased utilization of container space in backhaul transports.
- Serve as an inspirational example for future market collaboration.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2014

6.2. De-stressing the supply chain: the potential for slow steaming and synchronomodality to improve business efficiency and sustainability

Specific challenge: The challenge for industry is to overcome the stress caused through the dealing with the increasing length, complexity and vulnerability of supply chains while enhancing the performance, quality and knowledge needed to plan seamless transports of goods. To this challenge the technological and operational opportunities that 'slow steaming' and synchronomodal operations can offer needs greater understanding.

Scope: The research should demonstrate the technical, economic, political, social (inc. the effect on employment and safety) and organisational aspects of the whole transport and logistics chain (both inland and overseas, long and short haul) regarding:

- The impact of slow steaming on supply chains, production processes and trade lanes including opportunities that exist to de-stress other transport modes and make slow steaming and de-stressing a positive economic as well as environmental success.
- Information systems including e-freight tools, infrastructures, smart coordination mechanisms, policies, and legal possibilities to be able to use different transportation modes flexibly to deliver maximum value to the shipper or end customer.
- Development of a transnational Logistics Information Platform and a well-defined core network of hinterland connections.
- Demonstrate through implementation, the added value of synchronomodality in networks and services.

The research will build on previous relevant EU and national funded projects.

Expected impact: Both synchronomodality and 'slow steaming' will enable logistics to operate more sustainably, at lower costs and at higher quality. This will bring benefit to freight intermodal transport by significantly improving freight transfer efficiency and hence help replace road only transport by incorporating other modes with less external negative effects, as well as improving the utilisation of existing infrastructures in order to meet expected increased demand.

The research should deliver specifications for both 'slow steaming' and synchronomodal vehicles/vessels and technologies to fulfil logistics paradigms and new business models, including collaboration regimes. A profound benefit to sustainability is expected, which can

be evaluated by specific accompanying actions such as measurement campaigns based on commonly acknowledged data sets.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2014

6.3. European Logistics Information Sharing Architecture

Specific challenge: Today, new international and intermodal repositories and data pipelines are being created, management systems are deployed and new data mining capabilities are being developed to deal with the data flood needed for logistics decision making. The sensory and self-organizational capacity of the transport system is being improved by digitisation of transport documentation and automation of decision processes. Unfortunately, these data uses involve different information systems, different user requirements, different business models and different deployment trajectories. A complex task lies ahead of developing architectures for information sharing and valorisation so that the rich source of transport data can be exploited by a multitude of parties on a basis of trusted business agreements.

Scope: The work will develop an architecture that facilitates real time information exchange and co-operation between agents in the network and give good confidence that a significant number of cases of horizontal shipper collaboration can be established within the horizon of the project and have a high expectation of continuance after the project ends. The work should include technical and organizational guidelines for data and information system governance, technical aspects of IT solutions, business models and processes. A deployment roadmap will define the long term vision; key will be how best to establish decentralised and autonomous systems for interconnected supply chain planning and execution.

Fundamental will be the development of:

- Mobile communications for secured information exchange among actors (users, service providers, operators, communities).
- Secure, resilient and trusted communications and information storage and processing including a data pipeline for future customs, other controlling authorities and international transport & trade.
- Provision of position and spatial information regarding goods on the move through GNSS applications.
- Web-based open and platform to enable information exchange across suppliers, manufacturers, logistics providers and retailers without necessitating costly interfaces.
- Deployment roadmaps for the application of collaborative systems and services—the legality of such collaborations will be fully assessed and recommendations made.
- Operational and business models that include the participation of SMEs in the voluntary sharing of data and participation in collaborative business services.

Expected impact: Cloud-based data and services infrastructure, underpinned by common information models, will give all logistic stakeholders opportunities to collaborate on both an operational and strategic level. The creation of an architecture for logistics information

sharing and valorisation will speed up the formation of a single logistics information space in Europe, that is accessible for the transport sector, its users and, in addition, government. It will allow the European co-modal freight transport system to work as one connected network and will strengthen EU competitiveness and substantially reduce congestion and environmental impact as freight transport will be more flexible depending on the situation at hand in the different modal networks.

The work will facilitate the transition from the current independent supply networks, where transport and logistics resources cannot be shared or accessed by different cargoes and shippers, to open global networks where resources are compatible, accessible and easily interconnected. It is expected to reduce energy consumption and thus greenhouse gas emissions of the supported supply chains by at least 30% compared to the situation before horizontal collaboration.

Form of funding: Collaborative Project (100%) – Two stage

7. INTELLIGENT TRANSPORT SYSTEMS

7.1. Optimal use of transport data as a basis for smart mobility services

Specific challenge: The complexity of the travel experience for individuals, including the difficulties associated with analysing and negotiating multiple available options/services, accessing the right information at the right time, and tackling the different logistics has increased significantly over the past years; becoming ever more challenging and stressful.

The challenge is to come up with new, efficient, affordable and accessible solutions taking advantage of the ever growing connectivity of people and objects, the advances in cloud computing, big, linked and open data and the propagation of Internet and social media, that will help solve the mobility problems European citizens and businesses are facing today.

Scope: The work could focus on:

- measures to improve and maximize the availability and (cross-border/cross-system) interoperability of transport data, fostering open data policy, definition and monitoring of data quality, while considering data security and integrity related challenges.
- real-time information exchange; highly accurate, dynamically updated maps and positioning systems; new generation forecasting models to deliver high-quality traffic and travel information; solutions for linking traffic and travel information.
- green driving support systems; and a wide range of innovative customized and accessible services for various end-users, etc.

Research should extend well beyond a purely technology-driven perspective and needs to include a comprehensive understanding of the relevant market structures and business segmentation, including the identification of the key drivers and barriers that shape technology development. Stakeholders from all sectors along the value chain have to be involved. The proposed solutions should be tested in real life conditions to prove the concepts' validity and business case.

Recommendations for actions leading to the establishment of the right regulatory/legal framework as well as standardisation/harmonisation activities should also be addressed as appropriate. International cooperation and strong participation of SMEs are encouraged.

Expected impact: Research will contribute to unlocking the potential of vast amounts of transport data and solving problems related to interoperability, storage, processing and security. The resulting open co-modal, integrated transport information, communication and payment services will help to anticipate transport related problems, predict the amount of traffic, optimize investments and capacity use of the existing networks, develop optimal routes and schedules, alleviate congestion and reduce both emergency-response times and pollution levels.

Integrated ICT based services will offer new environmentally-friendly mobility options for European citizens and improve transport system's accessibility. At the same time, the possibility of remaining connected to the working environment and social networks will decrease the disutility of travel time, providing for additional consumer benefit.

Form of funding: 1) Collaborative Project (100%) – Two stage; 2) Collaborative Project (70%) – Two stage

Year: 2015

7.2. Safe and connected automation in road transport

Specific challenge: Automated and progressively autonomous applications in road transport, actively interacting with intelligent environment could provide an answer to the EU objective of reconciling growing mobility needs with improved transport fluidity while drastically reducing the occurrence of accidents.

Human errors in attention and vigilance are among the most common causes of road accidents and near-crashes. Somnolence and fatigue have severe effects on situational awareness and driving performance. This is why particular effort should be devoted to technologies that improve road safety by pre-empting or compensating for human error, and even taking over the vehicle control in case of imminent collision.

Although the current technology for highly automated driving is quite mature, it is very much restricted to controlled environments, its performance is often limited and it poses considerable problems in terms of affordability. There is also an urgent need to define the fault tolerance of automated systems, their performance indicators and progressively standardised validation criteria.

Scope: Proposals should develop and demonstrate fault-tolerant, resilient technologies and applications that will allow highly automated driving through smart environments, meeting the requirements of complex real-life situations. Research in this domain could also explore:

- novel transport services and mobility concepts enabled by automated driving.
- Advanced Driver/Rider Assistance Systems (ADAS/ARAS) to effectively support drivers in accident avoidance and to mitigate the consequences of collisions, including tools to detect and measure undesirable or unusual driver condition and warn, control and correct that behaviour at different levels.
- Optimised Human Machine Interface (HMI), capable of tailoring and balancing the amount of the information the driver is capable of processing in continuously changing conditions.

All proposals should include an assessment of the effectiveness of the relevant technologies in real life conditions. Aspects related to liability and standardisation will also form an important part of the research work. Policy and regulatory framework recommendations should be formulated as appropriate. International cooperation is strongly encouraged.

There is potential for international cooperation and SMEs participation.

Expected impact: Research should result in enhanced robustness and predictive capacity of current applications as well as in optimised HMI and advice strategies, thus enabling gradually increasing levels of automation to be introduced in road transport. This should, in turn, lead to improved traffic flow, better exploitation of the existing infrastructure capacity and enhanced traffic safety (which would support the Transport White Paper's "Vision Zero").

Results of the work should contribute to the reduction of the components' development costs and thus increase their penetration rate in lower-cost vehicle segments. At the same time,

progress in this domain is critical for the competitiveness of the European industry in developing breakthrough technological solutions, and supports the goals for growth and jobs.

Form of funding: 1) Collaborative Project (100%) – Two stage; 2) Collaborative Project (70%) – Two stage

Year: 2014

7.3. Cooperative ITS for safe, congestion-free and sustainable mobility

Specific challenge: The European road transport system is currently facing a multitude of challenges: the congestion is growing and results in an enormous waste of fuel and productivity traffic crashes are serious in consequences and transport is one of Europe's biggest polluters in terms of GHG emissions.

Europe would be closer to solving all these problems if people, vehicles, infrastructure and businesses were connected into one cooperative ecosystem combining integrated traffic and transport management with new elements of ubiquitous data collection and system self-management, able to deliver a range of benefits for the society. Significant technological progress in this area has been made in the past years; however, large scale deployment is not taking place. Research is needed to improve and demonstrate at a European scale the effectiveness of smart mobility solutions based on human-vehicle-infrastructure communication.

Scope: Research could focus, for example, on development of:

- open in-vehicle platform architecture for the provision of real-time ITS services and mechanisms for interoperability and secure flow of information across stakeholders.
- measures facilitating market up-take of advanced cooperative systems, including integration of currently separated services, such as new advanced sensing tools and big data analytics in order to create real-time traffic flow models.
- innovative solutions for cooperative network management, multimodal transport services, safety applications, hazard warnings and flexible road user charging.
- tailor-made innovative solutions for heavy duty vehicles, integrating as much as possible tachograph, tolling, inspection and (dynamic) route guidance functions, etc.

All proposed solutions should be demonstrated in real-life conditions, based on which the assessment of their effectiveness (including cost/benefit analysis) and their respective deployment requirements should be carried out. All location-based and traffic related services have to propose robust built-in data privacy and security measures.

The scope of the work should extend towards full-scale early deployment, and should address issues related to suitability for public procurement, identification of (multi-stakeholder) business cases and value-added scenarios, users' acceptance and willingness to pay as well as Europe-wide interoperability of the proposed solutions. Links with GNSS system should be established to serve different ITS applications.

Expected impact: The establishment of an integrated transport "info-structure", relying on vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) communications, but also on the availability of open and quality transport data, will improve transport efficiency, flexibility and sustainability whilst smart, dynamic pricing strategies could induce people to switch to

more fuel efficient cars, to public and non-motorised transport or change their driving schedule and itinerary. The ensuing technologies can not only reduce transport's operational costs but also enable a wide range of added-value user services and innovative business models, thus enhancing the competitiveness of the sector.

Form of funding: 1) Collaborative Project (100%) – Two stage; 2) Collaborative Project (70%) – Two stage

Year: 2015

7.4. Towards seamless travel – Overcoming fragmentation in multimodal travel information, planning and ticketing

Specific challenge: Although the application of technology has been the primary means of reducing the environmental impacts of transport in the last two decades, technical solutions alone cannot solve all the economic, environmental and societal problems Europe is currently facing. In this context, cost-effective demand optimisation will become increasingly important.

Multimodal integrated travel information, planning and ticketing services could play a significant role in improving modal integration, thus increasing the attractiveness of collective mobility and transport modes alternative to road. However, the current fragmentation of the landscape in this field does not allow the user to easily organise a door-to-door pan-European intermodal trip. Lack of cooperation between various stakeholders involved in the provision of services related to multimodal travel may also lead to failure in developing and enacting truly comprehensive and cohesive strategy responding to travellers' needs.

Scope: Research could focus on:

- Interoperability and linking of the existing services, including necessary interfaces, in order to achieve the widest possible geographical and modal coverage. The scope of the work should extend towards full-scale early deployment and the developed solutions should be tested on large scale. The work should also address issues related to users' travel behaviour, acceptance and their willingness to pay as well as data security.
- Exploring more effective and more efficient cooperation and decision making mechanisms between stakeholders, including coordination of the existing European, national and regional initiatives. This should encompass setting up a cooperation platform to foster EU-wide consolidation and deployment of high-quality integrated multimodal travel information, planning and ticketing services. Such a platform should be representative of all sectors along the value chain.

All sectors along the value chain are to be represented in the consortia, with strong participation of SMEs.

Expected Impact: Interoperable multimodal travel information and planning services and integrated ticketing will support:

- better modal integration by providing the traveller with information about various options to travel from A to B according to his/her needs, thus improving European citizens' mobility in general.
- more efficient use of the existing transport infrastructure.

- more inclusive transport services across Europe by better responding to the special needs of the elderly and disabled travellers.

Form of funding: 1) Collaborative Project (100%) – Two stage; 2) Coordination and Support Action – Single stage

Year: 2014

DRAFT

INFRASTRUCTURES

8.1. Smarter design, construction and maintenance

Specific challenge: Key to improving capacity and availability of the existing transport infrastructure network are innovative systems and processes for construction and maintenance that will lead towards zero intrusion from inspection, construction and maintenance (fewer, faster and better planned interventions with maximum safety for the workers). New material technologies for preservation, maintenance and upgrading of existing infrastructure, in particular, innovative self-healing and self-cleaning materials (e.g. application of nanotechnology to coatings or asphalt), would also reduce the need of such interventions. Innovative design and construction methods that are fast, cost-efficient, using long-lasting materials and are flexible enough to accommodate increasing/changing demand are needed. In particular, this should be achieved by the implementation of advanced construction concepts and processes for corridors and hubs, i.e. flexible design and modular concepts, use of long-lasting materials, advanced predictive models.

Scope: Proposals could address, for example:

- quick, cost-effective design, manufacturing, construction, maintenance, rehabilitation and retrofitting systems/techniques.
- low energy construction, reuse and recycling systems/methods.
- self-monitoring, non-intrusive inspection and testing systems/methods.

Research in this domain should aim at validation of innovative solution, targeting specific European geographical areas where either new construction for the completion of an efficient transport network is needed, or advanced maintenance systems are necessary to improve and extend the capacity of the existing network.

International cooperation with third countries is encouraged, both with international partners willing to share advanced know-how, and with third parties (in particular neighbouring countries) needing technology transfer.

SME active participation is strongly encouraged.

Expected impact: Proposals are expected to deliver the following result

- monitoring and management systems increasing infrastructure capacity.
- new construction techniques that enhance the performance and reliability of infrastructure.
- extending the life span of ageing transport infrastructure.
- development and application of effective and efficient materials, technologies and tools to meet cost-effectiveness and sustainability goals.

Overall, research in this area will contribute to the achievement of the Transport White Paper goal of an efficient and modern European transport infrastructure, boosting its productivity, and enhance construction industry practises to raise the productivity, quality and timeliness of

transport infrastructure projects. Products, processes and services need to be re-engineered to keep up pace with political, economic and social trends.

Effective integration of SMEs in the value chain is a requisite to foster open innovation.

The expected results can be achieved either by further advancements in knowledge – through Collaborative Projects - where technological progress is still needed, or by applying innovative technologies to pilot projects, via e.g. Public Procurements.

The need to network operators in view to enhance the effectiveness of the sector could be approached through appropriate Coordination schemes.

Form of funding: 1) Collaborative Project (100%) – Two stage; 2) Coordination and Support Action – Single stage; 3) PCP/PPI

Year 2014

8.2. Next generation transport infrastructure: resource efficient, smarter and safer

Specific challenge: In order to accommodate increasing demands, the 21st century transport infrastructure needs to be resource efficient, smarter and safer and requires a range of intelligent traffic management strategies, low-carbon construction and energy-harvesting solutions. Interoperability information, ontology, automatic sensing and data analysis have to be developed to ensure timely and effective infrastructure management. A better integration of infrastructure in its natural habitat together with a reduced intrusion of noise, air pollution and vibration should be achieved. Active infrastructure contributing to increased safety needs to be considered.

Scope: Research could address:

- solutions to facilitate seamless integrated transport through enhanced cross-modal inter-connectivity, capable of providing optimal response to changes in conditions of the network (e.g. weather, works, incidents).
- innovative infrastructure specific systems and services in order to enable appropriate decision making by the operator, manager and owner of the transport infrastructure on the basis of comprehensive, consistent and dependable, real time cross-modal information.
- Innovative concepts and development methods for alternative fuels infrastructure (in particular for roads and ports) to facilitate their deployment in Europe.
- energy harvesting infrastructure.
- infrastructure-based pro-active safety systems, including advanced predictive models and simulations.
- methods for preventing disruption of critical infrastructure from malicious acts.

Expected impact: Research is expected to contribute to the achievement of the Transport White Paper goal of intelligent infrastructure to ensure maximum monitoring and interoperability of the different forms of transport – and communication between infrastructure

and vehicles facilitating smart mobility services. It should also support the Clean Power for Transport package in deploying alternative fuels infrastructure.

Effective integration of SMEs in the value chain is a requisite to foster open innovation.

The expected results can be achieved either by further advancements in knowledge – through Collaborative Projects - where technological progress is still needed, or by applying innovative technologies to pilot projects, via e.g. Public Procurements. The need to network operators in view to enhance the effectiveness of the sector could be approached through appropriate Coordination schemes.

Form of funding: 1) Collaborative Project (100%) – Two stage; 2) Coordination and Support Action – Single stage; 3) PCP/PPI

Year 2014

8.3. Smart governance, network resilience and streamlined delivery of infrastructure innovation

Specific challenge: Infrastructure owners, managers and operators need to ensure the best possible return from increasingly limited transport infrastructure investment funds. To ensure compatibility across the modes and across Europe, the development of a common framework of governance, management and finance and their associated methods and models is required. The objective is to enable transparent, risk-based optimisation of investments within and across the modes, in which the value created by enhanced multi-modal accessibility of transport infrastructure is captured. This includes issues such as resilience against climate change and other disturbances from infrastructures intrinsic quality.

Scope: Research could address:

- Solutions for optimal cost-effectiveness, including network resilience and mapping of climate risk hot-spots as the basis for future research on climate resilience.
- Sophisticated and innovative procurement process, accompanied by adequate monitoring systems, contracting and tendering methods; management tools to provide help in innovation delivery.
- Solutions for advanced infrastructure capacity planning.
- Solutions for advanced asset management systems, advanced investment strategies and innovation governance.

SME active participation is strongly encouraged.

Expected impact: Reinforcing public-private partnerships would provide the opportunity to coordinate the early establishment of a standards and regulatory framework to enhance deployment activities, for example through coordinated/shared (pre-competitive) innovation procurement procedures. In addition it would enable coordination between the relevant European funding schemes and the relevant national investment and innovation cycles on the basis of clear, cross-border innovation deployment business cases, that are supported by industry, and that steer towards the research and deployment of those advancements that bring highest European Added Value. Competence building in the infrastructure management sector would also be a benefit of this research activity.

The expected results can be achieved either by further advancements in knowledge – through Collaborative Projects - where technological progress is still needed, or by applying innovative technologies to pilot projects, via e.g. Public Procurements. The need to network operators in view to enhance the effectiveness of the sector could be approached through appropriate Coordination schemes.

Form of funding: 1) Collaborative Project (100%) – Two stage; 2) Coordination and Support Action – Single stage; 3) PCP/PPI

Year: 2015

DRAFT

SOCIO-ECONOMIC AND BEHAVIOURAL RESEARCH AND FORWARD LOOKING ACTIVITIES FOR POLICY MAKING

9.1. Understanding the role of future and emerging technologies for transport

Specific challenge: Transport's continued efficiency and effectiveness depends upon the application of future radically new technologies. Research is needed beyond what is known, accepted or widely adopted today that fosters novel and visionary thinking that can open promising paths towards powerful new technologies, some of which could develop into leading technological and intellectual paradigms for the decades ahead. This approach is driven by excellence and extends to exploring pre-competitive ideas for shaping the future of technology, enabling transport and society as a whole to benefit from multi-disciplinary research collaboration.

Scope: Proposals are sought for collaborative research projects with the following characteristics:

- Long-term vision: the research proposed must address new, original or radical long-term vision of technology-enabled possibilities that are far beyond the state of the art and currently not anticipated by technology roadmaps.
- High-risk: the technological directions proposed are complex in the sense that their potential depends on a range of factors that cannot be apprehended from a single disciplinary viewpoint. Thus, this high-risk is countered by novel concepts and ideas, and by a strongly interdisciplinary research approach, where needed expanding beyond the strictly technological realm.
- Novelty: the research proposed finds its plausibility in new ideas and concepts, rather than in the application or incremental refinement of existing ones.
- Interdisciplinary: the proposed collaborations are interdisciplinary in the sense that they go beyond current mainstream collaboration configurations in advanced science and technology research, and that they aim to advance different scientific and technological disciplines together and in synergy towards a breakthrough.

Within this interdisciplinary setting, the proposed research will have a crucial Information and Communication, Science and Technology component.

Expected impact: The outcome of this collaborative research will allow the early assessment of proof of principles of new technological possibilities, either unique to transport or, more likely from technology transfer from another application. It will also assess the feasibility and potential for a new technological direction, in order to generate interest amongst key stakeholders and develop scenarios for progress towards market take up and understand implications for transport and innovation policy.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2015

9.2. Living lab on future transport paradigms

Specific challenge: The challenge is to dispose of reliable and continuously updated information on the European transport system, including the availability of the labour factor and human capital, and on socio-economic developments that affect transport and trade, to integrate these in alternative scenarios for the next 50 years.

Scope: Proposals may address activities such as:

- Innovation watch in relation to the European transport system.
- Integrated Scenario-development.
- Definition of the data needed, analyse of the data available, either from private or public sources, and identification of the gaps in the data collection.
- Development of quality control procedure of data in relation to the model used.
- Description of a widely accessible and sustainable business model allowing the collection, acquisition and exchange of quality data.
- Design of Innovative transport technology and mobility concepts, including concepts for spatial development.
- Design and demonstration of a living lab for transport system prediction modelling.
- Generate an experimental environment, which could be compared to the concept of experimental learning, where policymakers, public sector, private sector and technology developers immerse themselves in a creative process for designing and experimenting the future.
- Business model and juridical framework for governing, maintaining and exploiting the living lab on a continuous basis.

Expected impact: It is expected to contribute to assessing the (self)financing and performance of the transport system in a changing global context.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2014

9.3. Monitoring user behaviour, mobility patterns and social acceptance in the context of new social trends and future demand

Specific challenge: Understanding, analysing and mapping of new social patterns of behaviour (aging, individualising, use of social media), its impact on the transport system and how this can guide the provision of new products and services (e.g. car sharing as integrated part of real estate development).

Scope: Proposals may address activities such as:

- Analysis and mapping of new social patterns of behaviour (aging, individualisation, use of social mobile media, etc.).

- Analysis and mapping of user behaviour in transport.
- Analysis of the impact of social patterns of behaviour on the transport system.
- Delineation of dominant trends in mobility patterns.
- Roadmaps to translate these dominant trends into new products and services.
- Roadmaps for developing accompanying policies and business models to provide integrated and customer-oriented solutions.
- Demonstrate the social acceptability of new products and services.

Expected impact: Service , product and policy developments responding to changing mobility/behaviour patterns.

Form of funding: Coordination and Support Action – Single stage

Year: 2014

9.4. Transport societal drivers

Specific challenge: The transport system is confronted with a dramatic increase and diversification of the demand for mobility, both for passengers and freight. At the same time, it has to face an overexploitation of its capacity, stricter environmental requirements while maintaining high its levels of quality, reliability and competitiveness.

The introduction of advanced technologies, new players in the sector and changing societal behaviours and needs offer the transport sector with new opportunities, the potential for business models and the different modes to provide integrated and customer-oriented solutions.

Transitioning the transport sector to a societal-friendly mobility and offering innovative sustainable alternatives will require investments in research and innovation and transport infrastructure.

A sound understanding of behavioural and societal factors that influence transport demand and supply is needed to ensure that, in shaping transport policies and research and innovation activities, the values, needs and expectations of the society are met.

This can lay the foundation for job creation and growth.

Scope: A Mobilisation and Mutual Learning (MML) action plan in this area should aim at improving the effectiveness of the EU endeavours for transport R&I. To this end, it should create a platform for communication, collaboration, relationship-building and co-construction of social impact and social value. The MML should provide the framework for developing productive multi-stakeholder interactions via trans-disciplinary approaches, which pave the way to identifying action-oriented innovative solution/options to advance the agenda of both the transport sector as a whole and the society at large.

To address this challenge, a network of stakeholders, from within and outside the sector, should be set up, with the involvement of: policy makers, civil society organisations, end-customers, industry including suppliers (vehicles and components – all modes) and transport service providers and financial institutions, academia and research organisations. Links and

synergies with transport-related European Technology Platforms (ETPs) would add significant value to proposals.

The MML action plan should focus on understanding mobility choices, aspirations and behaviours to shape innovative solutions and prevent concerns.

It should provide decision-makers with analysis of societal resistance to/acceptance of emerging transport technologies and services.

Finally, it should establish a consensus-building and public-engagement platform steering innovative transport and mobility models and disseminating good practices.

Links with education to foster awareness and engagement of the young generations should be set up, in order to enable them to be responsible and innovative as regards their mobility behaviours.

Expected impact: The societal actors, by being engaged in this collaborative and knowledge-mobilisation process, will be continually learning to explore together and in real-time solutions to the societal challenge, thereby enhancing the understanding and shaping of behavioural changes in place, and the effectiveness of solutions addressing the problems at stake. The setting up of a participatory framework is expected to:

- enhance and better target transport policies and research and innovation priority setting.
- identify the nature of transport infrastructure and service development/improvement needed.
- address the mobility demand of specific groups and communities (accessibility; affordability, inclusiveness, safety, ageing population, etc).
- promote innovative/alternative business models and social innovation.
- enhance corporate social responsibility.

Form of funding: Coordination and Support Action – Single stage

In view of an appropriate potential impact, the Commission will positively evaluate projects having a minimum duration of three years, partners coming from at least 10 different countries and from all the above-mentioned types of organisations. The maximum EC contribution cannot exceed 3 - (4) MEURO.

Year: 2015 or 2016 (# tbd)

9.5. Internalisation of the externalities from transport across modes

Specific challenge: Designing business models for the internalisation of externalities in transport and developing comparative methodological solutions for external cost calculations.

Scope: Proposals should be aimed at setting-up a monitoring body, which may involve activities such as:

- Liaison with standardisation organisations with a view to giving EN 16258 (either current or an enhanced version) a global status.
- Liaison with global shippers, transport companies and trade organisations with respect to the harmonisation of the carbon footprint of freight transport.

- Updating methodology specifications and guidance notes as considered appropriate by a management group.
- Designing and implementing training sessions on carbon footprint of freight transport according to EN 16258.
- Coordinating and evaluating real world testing of carbon footprint calculations according to current guidance.
- Development of quality control procedures of data to allow for certification of global shippers, transport companies and trade organisations.
- Publicity and networking.

Expected impact: It is expected to better understand the actual impact of transport externalities on the economy through more precise cost calculations in order to develop a more efficient transport system: greener transport with less congestion and accidents, fair competition and transparency of cost calculations for products and transport services.

Form of funding: Coordination and Support Action – Single stage

Year: 2014

9.6. Strengthening the participation of SME's in the innovation cycle

Specific challenge: How to bring more efficiently and quicker innovative products and services developed by SMEs to the market. Studies show that only a small percentage of SMEs (~1%) currently acquire novel technologies through their own research or contract research.

Scope: This action should focus on the innovation process in SMEs for the transport sector. The action should analyse how SMEs in general acquire new technologies and identify the bottlenecks along the innovation pathway. Proposals may involve activities such as:

- Mapping the EU-27 landscape and trends in industrial research in the transport sector, with the aim of describing the role, weight and profile(s) of innovative SMEs in Europe;
- Assessing research-funding instruments available to SMEs and identifying innovative economic and financial instruments;
- Analysing the role of regional, national and European initiatives in this field;
- Making research and innovation more attractive to SMEs, taking into account the socio-economic context;
- Analysing drivers and barriers to market uptake of transport research results and opportunity costs for innovative SMEs in Europe, in the light of a dynamic context.

Expected impact: It is expected to overcome difficulties faced by SMEs, by proposing specific solutions and recommendations to improve their innovation capacity.

Form of funding: Coordination and Support Action – Single stage

Year: 2014

9.7. Strengthening the research and innovation strategies of the transport industries in Europe

Specific challenge: The specific challenge is to strengthening the effectiveness of research and innovation capacities of the transport industries in Europe by improving cooperation between stakeholders and decision-makers, and by focusing on strategic research and innovation needs.

Scope: Proposals may address activities such as:

- Updating of research agendas and roadmaps, including multi-modal research and innovation areas, which will be elaborated in cooperation with other transport modes.
- The establishment of thematic technological groups on the most relevant technologies to ensure innovative advances by pooling together leading European experts in selected fields, in particular those involved in EU and national research projects and programmes.
- Monitoring of transport research projects from relevant programmes (such as FP7, ENT, JU, etc.), and organisation of workshops to foster innovation aspects.
- Defining implementation plans, including innovation roadmaps and business implementation, based on the research agendas and roadmaps, as well as on the monitoring and assessing of these roadmaps and agenda's.
- Developing links and coordination strategies between the transport-related ETPs and technology platforms existing at national level in MS/AS, in order to avoid duplication of efforts.
- Increasing visibility of research and innovation activities, and contributing to the dissemination of results, through large conferences, thematic events, show cases, databases, website support, newsletters and other publications, including coordination with other large transport events, such as TRA, and cooperation with the Transport Research and Innovation Portal (TRIP) and relevant ERA-NETs.

The action will assist the transport-related European technology platforms (ETP), the European Commission (EC) and Member States and Associated States (MS/AS) in defining research needs for their strategies and programmes in order to realise the objectives of the Europe-2020 strategy and further on the vision of the White Paper 2011 for a competitive and resource-efficient future transport system.

Three support actions are expected to be funded, focusing on logistics ... [# to be completed] respectively. Strong and focused consortia must be made-up of leading European experts for transport technologies from both industry and research providers. The implementation of this action requires close collaboration with the ETPs dealing with transport research and innovation (particularly ERTRAC, ERRAC and Waterborne TP), as well as with other related initiatives and entities. Cooperation with EU services will be an essential element.

Expected impact: It is expected to optimise the research and innovation capacities of Europe in the Transport sector, to improve communication, dissemination and use of results, and to help defining relevant transport policies.

Form of funding: Coordination and Support Action – Single stage

Year: 2014

9.8. Supporting specific activities such as student or innovation awards in the context of TRA 2016

Specific challenge: To promote the interest of students and researchers on research and innovation in the Transport sector.

Scope: The objective of this action is to organise two competitions for transport research awards to be announced at the Transport Research Arena (TRA) conference in 2016:

- A research student competition with the goal of stimulating the interest among young researchers/students in the field of sustainable surface transport.
- A competition for senior researchers in the field of innovative surface transport concepts based on results only from EU-funded projects.

Both competitions will cover all surface transport modes (road, rail and waterborne) and cross-cutting issues in line with the EU policy objectives for smart, green and integrated transport. The organisation of these awards should ensure high-quality competition and very good media coverage before, during and after the TRA conference.

Expected impact: It is expected to stimulate students and researcher to work on research and innovation in the Surface Transport sector, and to encourage partners from EU-funded projects to further develop innovative ideas from their projects. The TRA conference is the first Transport research event in Europe. It is expected that it will efficiently disseminate knowledge and results of European and national research projects in the area of Sustainable Surface Transport and thus improve the coordination of research, technology development and innovation in the Surface Transport sector in Europe.

Form of funding: Coordination and Support Action – Single stage

Year: 2014

10. SMALL BUSINESS INNOVATION RESEARCH

10.1. Small business innovation research for Transport

Specific challenge: Transport... [# To be completed].

Scope: The SME instrument consist of three phases and a mentoring scheme for beneficiaries as per the description of the SME instrument [# Link to the annex on the description of the SME instrument – three phases + mentoring scheme for beneficiaries]

Participants can apply to phase 1 in order to apply afterwards to phase 2 (if desired) or directly to phase 2 as stated below for each phase.

All types of innovations can be supported provided they address a well-defined private or public user need and/or a new business idea within the scope of the specific challenge(s).

In phase 1, a feasibility study should be developed verifying the technological/practical as well as economic viability of an innovation idea. The activities could, for example, comprise risk assessment, market study, user involvement, IP management, innovation strategy development, partner search, feasibility of concept and the like to establish a solid high-potential innovation project aligned to the enterprise strategy and with a European dimension.

In phase 2, innovation projects will be supported that address the specific challenge and that demonstrate high potential in terms of company competitiveness and growth underpinned by a strategic business plan. Activities should focus on innovation activities such as demonstration, testing, prototyping, piloting, scaling-up, miniaturisation, design, market replication, etc aiming to bring an innovation idea (product, process, service etc) close to deployment and market introduction, but may also include some research. For technological innovation a Technology Readiness Levels of 6 or above (or similar for non-technological innovations) are envisaged.

Further information on the mentoring scheme for successful beneficiaries is available at this link [# Link to the mentoring scheme activity]

Expected impact: Development and growth of participating SMEs by combining and transferring new and existing knowledge into competitive solution seizing European and global business opportunities. Market uptake and distribution of innovations tackling the specific challenge(s) in a sustainable way. Increase of private investment in innovation, notably leverage of private co-investor and/or follow-up investments. The expected impact should be clearly described in qualitative and quantitative terms (e.g. on turnover, employment, market size, IP management)

Form of funding: SME instrument (SBIR)

11. INDUCEMENT PRIZE

11.1. The cleanest engine

Scope: One of the major targets of EU transport policy – in line with the other EU policy goals in the field of energy efficiency, environmental protection and climate change mitigation – is to achieve compliance with air quality regulations, where internal combustion engines have a major role in producing noxious emissions, while continuing support for other policies such as the reduction of CO₂ emissions from transport, which should deliver virtually carbon free cities, by 2050. This target calls for an ambitious mix of innovative policy measures and significant technological breakthroughs, notably for the engines. The transport challenge of the H2020 proposal is designed in a way as to help pursue both.

An inducement prize setting "at the horizon" targets for the lowest attainable real life noxious emissions from internal combustion engines would help accelerate the current slow improvements in air quality, and thus substantially improve the prospect of achieving the ambitious EU policy goals, while at the same time strengthening the competitive advantages of the European automotive industry which will be able to propose these technologies in emerging countries even more affected by quality problems. This activity would complement effectively the work foreseen under the future "European Green Vehicle Initiative" which will strongly focus on CO₂ emissions reductions.

Placeholder: subject to the outcome of a study aimed at demonstrating extra-low real-life emissions in automobile engines, thus achieving substantial air quality improvements recently launched at RTD level 2015 [# to be checked if a revision of the WP is needed/possible as the "prize" may not be ready by early 2014].

Year: 2015

CALL ‘CLEAN VEHICLES’

This call of the Transport Challenge represents an essential component of the road transport research and innovation. It includes all research, technological developments, innovation and demonstration in support to the improvement of the energy efficiency of road transport vehicles and the use of new types of non-conventional energies into road transport such as electricity, natural gas, LPG and LNG, bio-diesel and synthetic fuels.

The scope of the activities include both advanced power-trains technologies and new vehicle architectures, weight reduction, improved aerodynamics and rolling resistance. The scope also includes the interface with road infrastructures. When it comes to new type of energies, the interfaces between the vehicles and the recharging infrastructure will also be taken into account with particular attention on standardisation issues. Demonstration activities will play an essential role in ensuring a proper and timely deployment of the new technologies. In this respect, innovation activities linked with other EU funding mechanisms such as cohesion and regional funds will be looked at.

This call has been defined taking into account the other calls and initiatives where the Transport Challenges is concerned, particularly the calls on ‘Mobility for Growth’ and ‘Smart Cities and Communities’, and the ‘Fuel Cells and Hydrogen 2’ joint technology initiative. Multi-sectoral research involving other Challenges such as Energy and Environment coupled with research on new materials, advanced production and ICT will be encouraged, particularly in fields like advanced energy storage systems and interfaces between vehicles and energy recharging infrastructures.

1. Next generation of competitive Li-ion batteries to meet customer expectations

Specific challenge: It is important that next generations of electric and plug-in hybrid vehicles incorporated basic electric components, such as electric batteries, that are manufactured in Europe. This is not the case for the first generation of these vehicles that incorporate non-European battery technologies. The challenge to be addressed is the development of new materials and technologies for advanced Li-ion batteries to support the development of a strong European industrial base for Li-ion batteries.

Scope: The research will address a multidisciplinary approach covering advanced electrochemistry, safety aspects, resistance to high-power charging, recyclability and combination with other types of storage systems.

In addition, better knowledge on ageing mechanism and its modelling will be developed in order to support test procedures and international cooperation in view of the development of standards.

Expected impact: The research will bring European industry to a stronger position on the world market making it possible to launch new production in Europe while at the same time addressing the short comings of electric cars as compared to conventional cars.

Form of funding: Collaborative Project (100%) – Single stage

Year: 2014

2. Optimized electric vehicles energy management

Specific challenge: Range limitations is one of the major drawbacks of electric vehicles due to the limited capacity storage of electric batteries. The problem is worsened by the need to use a share of the storage capacity in order to feed auxiliary equipment such as climate control. In extreme conditions up to 50% of the batteries' capacity is absorbed by these systems. The systematic management of energy in electric vehicles is a means to have longer range without sacrificing comfort. The challenge is therefore to extend the range of electric vehicles in all weather conditions.

Scope: Research will address the combination of the following developments: comprehensive thermal management system (including thermal installation and cooling), life duration enhancing as a side effect of thermal management, energy efficiency of electrified accessories, energy harvesting functions and automated and eco-driving strategies.

Expected impact: The research will contribute to a faster introduction of electric cars. Cars autonomy will be increased thanks to a reduction of at least 90% of energy used for passenger comfort and at least 30% of component cooling in extreme conditions.

Form of funding: Collaborative Project (100%) – Single stage

Year: 2014

3. Future natural gas powertrains and components for cars and vans

Specific challenge: The challenge is to reach the fleet level 95g CO₂/km and 147g CO₂/km emissions targets respectively for passenger cars and light duty commercial vehicles (according to the new Worldwide harmonised Light Vehicle Test Procedure), through the development of advanced powertrain concepts based on natural gas. Significant improvements in terms of real life NO_x emissions are also expected.

The technology needs to be competitive with respect to current vehicles using conventional fuels. Therefore the challenge can only be reached if the new components enabling the use of natural gas can be produced at low cost and the vehicles have a range of at least 600 km.

Scope: The research will address the combination of combustion process optimisation, variable compression, control systems, dual fuel operation, optimised fuel injection, adoptive system to cope with different types of blends, after-treatment systems, advanced fuel tanks and overall powertrain optimisation.

Expected impact: The research will contribute to meet the 2020 polluting emission limits in real driving conditions. Concerning CO₂ emission, the research will achieve a reduction of at least 20% (including unburned methane and N₂O) than the best vehicles on the market in 2013.

Form of funding: Collaborative Project (70%) – Single stage

Year: 2014

4. Hybrid light and heavy duty vehicles

Specific challenge: The competitiveness of European road transport vehicles manufacturers is based on technological leadership, particularly as concerns powertrains. But their position is threatened by the growing success of imported hybrid vehicles from Asia. The challenge is to recover a leading position in hybrid technology. The technology will also have positive effect on the decrease of CO₂ emissions from road transport and air quality.

Scope: The research will develop new knowledge on components and system engineering, simulation and technology integration with an aim to achieve powertrain weight and cost reduction, increased functionality, simplification of complex systems, efficiency and affordability while decreasing emissions and improving performance and comfort. The research will be validated through at least one demonstrator for light or heavy duty vehicles.

Expected impact: The research will achieve a 20% reduction of CO₂ equivalent emissions and a 20% powertrain weight and volume reduction with respect to the best in-class vehicle on the market in 2013, while having a maximum 10% overcost. To meet air quality targets, the research will achieve emission levels below the 2020 limits in real driving conditions. Also, 20 km zero emission ranges will be achieved for light duty vehicles.

Form of funding: Collaborative Project (70%) – Single stage

Year: 2014

5. Ultra-light electric vehicle concepts

Specific challenge: Europe has to face tough challenges in the field of environmental protection, traffic congestion, competitiveness and jobs preservation. This calls for new and more efficient mobility concepts. Light category vehicles are well placed to answer the demands for less energy consumption, space and affordability. They represent an attractive solution in congested cities with scarce parking space. At present internal combustion engines for L category vehicles present problems in terms of pollution and noise. The challenge is to develop a new generation of electric powertrains for L category vehicles that are quiet, clean, energy efficient and safe and take into account their changing forms and uses.

Scope: The research will focus on energy efficiency improvements and polluting emission reduction for a wide range of vehicle types (from mopeds to quads). Research will address battery packs, electric and hybrid power trains, system integration and innovative vehicle architecture. The project results will be validated through demonstrators.

Expected impact: The research will contribute significantly easing congestion and reducing consumption and the environmental burden of transport. The research will also enhance the competitive position of the European industry. Research in this area will also support the implementation of the Clean Power for Transport strategy by developing the next generation of light urban vehicles.

Form of funding: Collaborative Project (70%) – Single stage

Year: 2014

6. Advanced power electronics including high temperature and cost-effective active and passive cooling

Specific challenge: Power electronic devices (such as inverters, boost converters and chargers) are costly and strongly influence the energy efficiency, weight and available volume of electric cars. These devices are often derived from other applications and need adaptation to automotive specifications. The challenge is therefore to develop a new generation of power electronics components tailored to the specificities of electric vehicles in order to reduce their cost, increase efficiency and functionality.

Scope: Starting from existing results on the basic materials, innovative concepts should be developed to optimise the devices and their packaging with respect to safety, reliability and lifetime while developing the corresponding test and monitoring concept. Other critical aspects such as EMC, control, health monitoring and diagnostics, modelling and functional safety should be considered. Possible standardisation aspect should also be addressed at the earliest possible stage.

Expected impact: The developed technology will greatly contribute to affordable and appealing vehicles able to respond to the air quality and decarbonisation challenge. The technology will achieve a 30% volume and weight reductions of the complete power electronics/cooling package at a 50% lower price and delivering significant efficiency improvement.

Form of funding: Collaborative Project (100%) – Single stage

Year 2015

7. Third generation fully electric vehicles and innovative battery management

Specific challenge: A ground-up re-design of full electric vehicles (FEVs, including Battery EVs, Plug-in Hybrids or range extended EVs) is needed to completely take advantage of all of the design freedoms and opportunities in defining and developing the electric/electronic architecture and its components. Such a radical approach is expected to yield novel high-performance FEV concepts and substantially reduce vehicle costs while providing benefits in terms of customer acceptance and energy efficiency.

An important component that needs to be specifically addressed is battery management systems (BMS), which are fundamental for many aspects of electrified vehicle performance, from energy efficiency (and therefore range) to safety, battery life and reliability. Improving these aspects is a major technological challenge for the success of electric vehicles and their impact on social challenges. Europe has a competitive lead in BMS in several fields., It is important to strengthen this position and maintain jobs in Europe. Finally it is essential for competitiveness to achieve significant cost reductions by standardising components and interfaces.

Scope:

- Research will address FEV concepts featuring a complete revision of the electric and electronic architecture to reduce complexity and the number of components and interconnections, whilst improving energy efficiency, functionality and modularity. This can be supported by drive-by-wire or wireless communication. Challenges in safety, security, reliability and robustness, including electro-magnetic compatibility,

are also to be addressed. Work shall pursue a high degree of vehicle system integration and standardisation and cover the entire electric vehicle value chain.

- BMS work will focus on any combination of the following aspects:
 - Categorisation of existing battery, BMS and converter subsystems.
 - Novel BMS designs with improved thermal management, power density and life time, safety and reliability.
 - Modelling and simulation tools for BMS improvement.
 - Standardisation of BMS components and interfaces.
 - Test methodologies and procedures to evaluate the functional safety, reliability and lifetime of battery systems.

Expected impact: The research will improve the cost-performance ratio and will contribute to the market take-up of FEVs. It will strengthen the global competitiveness of the European automotive sector along the value-chain allowing manufacturers to be amongst the leaders in the development of third generation ‘ground-up’ designed FEVs.

BMS research in particular will improve the vehicle range and/or weight, battery life and reliability without compromising on safety and delivering a more robust battery system. As a consequence, the challenge will help developing better electrified vehicles in terms of customer needs and societal challenges.

Standardised BMS components and interfaces developed on this basis will also strengthen the competitiveness of the European industry.

Form of funding: Collaborative Project (70%) – Single stage

8. Powertrain control for heavy-duty vehicles with optimised emissions

Specific challenge: Reducing real life emissions and consumption of heavy duty road haulage is the main societal challenge for the sector. Fuel efficiency and emissions reduction are sometimes dependent on how they interact with each other and with the specific vehicle application and operating conditions. The challenge is therefore to develop new means of flexibly and globally controlling engine and emissions in an optimal way for each application in order to utilize the potential of the individual systems to its maximum.

Scope: Research should be performed on how to optimise the control of powertrains taking into account specific transportation tasks. This can be achieved by using the information provided by new generation navigation systems and emission sensors linked to the On Board Diagnosis/On Board Measuring system. The strategy will use data such as transport assignment (total weight, vehicle configuration, etc), traffic and weather conditions, topography and road network on the chosen route, driving patterns of the surrounding vehicles, the state of combustion engine, after treatment and transmission, monitored emissions emitted, etc.. The resulting technology should deliver a global optimum for consumption (for both fuel, electric energy and other consumables related to emission control such as urea or ammonia) and noxious emissions on each mission.

Expected impact: A reduction of fuel consumption of at least 20% should result, while not exceeding Real Driving Emissions limits according to the established procedures for expected post-Euro VI regulation.

Form of funding: Collaborative Project (70%) – Single stage

Year: 2015

9. Future alternative fuel powertrains and components for heavy duty vehicles

Specific challenge: The challenge is the development of advanced powertrain concepts for heavy duty vehicles, either dual-fuel or optimised for pure natural gas operation, meeting the CO₂/km emissions targets currently under definition.

At the same time, significant air quality improvements, particularly in terms of NO_x in the case of lean-burn or dual fuel concepts, must be targeted by greatly reducing real driving emissions in all conditions.

In order to achieve a real impact on the societal challenges, vehicles using the developed technology need to be competitive with current vehicles using conventional fuels. Therefore an additional technological challenge is to develop specific components (for instance better fuel tanks for liquefied natural gas) for this type of fuels with lower cost, volume and weight while keeping high safety standards.

Scope: The research will include adequate combinations of combustion process optimisation, variable compression ratios, engine control, dual fuel operation, optimised fuel injection systems, adaptive systems and sensors to keep into account different fuel qualities and hydrogen blends, new generation after-treatment systems (in particular for NO_x and methane slip especially during transients and at low temperatures) and overall powertrain optimisation, advanced fuel tanks (high pressure gaseous, liquid or solid state) and any other innovative concepts and components for the different vehicle categories.

Expected impact: In order to address the air quality challenge, real driving emission levels respecting post-2020 emission limits and procedures shall be achieved. The capability to maintain this performance during the engine life should be also demonstrated through accelerated procedures.

As far as the climate change challenge is concerned, the research target is to achieve at least 10% lower CO₂-equivalent emissions (i.e. including unburned methane and N₂O) than the best vehicles on the market in 2013.

Ranges of at least 800 km on natural gas should be demonstrated while keeping weight, volume and cost penalties to a similar level than best in class current vehicles.

All developed technology should be integrated on vehicles that should be tested by independent bodies on the WHDC test procedures, including the relevant PEMS approaches.

Form of funding: Collaborative Project (70%) – Single stage

Year: 2015

10. Radically new vehicle concepts for passengers in urban areas

Specific challenge: Cities in the next 10 to 20 years will have different patterns and configurations. There will be on one side an increase of population in cities and the necessity for more clean and quiet environment on the other side. To achieve the European objectives of a more efficient and sustainable urban transport system, there is a need to increase the use of space efficient and less polluting transport solutions in urban areas. Radically new vehicle concepts for passengers (and the related parallel evolution of innovative infrastructure solutions) will be required to address the increase of population and mobility needs.

Scope: The activities will aim at investigating the potential of radically new vehicles concepts (e.g. cable cars, straddling bus, tubular rail,...) for personal mobility in urban areas. Proposals for the WP year 2015 should address research and development in order:

- To develop a proof of concept of new vehicle for passengers, including its integration with the infrastructure; contribution of the new vehicle concepts to the overall urban energy efficiency should be also looked at.
- To validate this new development and its integration e.g. through modelling or by developing a mock-up or prototype. It must be understood also whether their acceptance and ability to accommodate the evolution of personal mobility with new services, enabled by societal evolution and regulations/standards, could play a major role in a future transport system.
- Depending of the level of maturity of the concepts, feasibility studies or prototype can be carried out. The expected performances of the system should be demonstrated e.g. in term of energy efficiency, of space saving, integration in existing cities, etc.

Expected impact: Innovative vehicle concepts able to respond to growing urban mobility challenges.

- Increased acceptance and take up of new urban vehicle concepts.
- More inclusive urban transport system with better access for all.
- Reduction of CO₂, pollutant emissions and noise at least in compliance with EU legislation.
- Reduction in term of congestion and space saving in cities.
- Increased energy efficiency urban transport and improved transport safety.
- Proposals must ensure at least a neutral impact on climate change.

Form of funding: Collaborative Project (100%) – Single stage

Year: 2015

CALL 'BLUE GROWTH' (TRANSPORT CHALLENGE CONTRIBUTION)

1. The offshore challenge - Preparing the future maritime economy

Specific challenge: Human based activities in Europe's seas and coasts are expected to intensify, diversify and expand further offshore driven by the increasing lack of space available on coastal areas and the exploitation of marine energy, biological and mineral resources in the deep sea.

One way to make use of our seas in a smarter, more sustainable and less disruptive manner is to combine different activities at sea at the same location (e.g. energy production and storage, fisheries and aquaculture, transport & logistics hubs, observation and monitoring). Some EU funded research projects have looked at such options using multi-use offshore platforms.

However the development of large scale offshore activities in deep sea areas necessitates overcoming a series of technological challenges related to surface support facilities, control systems, fluid and solid transport or remotely operated robots / vehicles. There is a need to:

- assess the most likely economic developments in the maritime economy; and
- the corresponding technological challenges that should be addressed to allow these developments to happen.

Scope: Proposals will analyse and identify the potential socioeconomic developments in the new maritime economy and the most plausible corresponding business models. This will include issues of competing access to marine space between different activities and, more broadly, all social and environmental impacts including impacts on coastal areas.

Proposals will review the existing multi-use offshore platforms and their business models, as well as other possibilities. They will seek to identify the technological challenges to be overcome to make these business models operational.

Proposals will also set-up a mechanism associating key scientific and industrial stakeholders interested in the development of the Blue Economy, with a view to define a shared research and technology agenda to address the offshore challenge and support the advent of the future maritime economy.

Expected impact: The research will lead to:

- Scenarios and research agenda to unlock the potential of the European maritime economy;
- Mobilisation of key European level key maritime (industrial and scientific) stakeholders to support the Blue Growth agenda;
- Support to the EU Blue Growth and marine spatial planning policy objectives.

Form of funding: Coordination and Support Action – Single stage

Year: 2014

2. Delivering the Sub-sea technologies for new services at sea

Specific challenge: The development of a new maritime economy necessitates tackling a range of technological challenges. One such challenge is the ability to remotely execute unmanned underwater operations ranging from simple observation / data collection and transmission of information to more complex industrial operations. Existing technologies derived from marine research (Remotely Operated Vehicles - ROVs, Autonomous Operated Vehicles – AUVs) must be industrialised, i.e. made more robust, reliable and sophisticated (in terms of operating capabilities) and with increased autonomy. Another challenge is the ability to operate at even higher depths (down to 6,000m), and in extreme conditions (e.g. Arctic regions, with corrosive products, heavy / viscous liquids, high pressure - high temperature systems, etc.). The control of the potential impact on the environment of these activities is also important.

Scope: Proposals should address feasibility studies and definition studies (including demonstrators) of the main components required to work undersea. The areas of interest are the following:

- Remotely Operated Vehicles and Subsea Construction systems
- Specialised “Robots” and Autonomous Underwater Vehicles, deployment, recovery and docking systems.
- Subsea “factory” Machineries.

Expected impact: The research will:

- Enable the sustainable exploitation of deep sea resources by European industries and support to EU Blue Growth agenda.
- Increase safety of the existing and new offshore maritime economy.
- Improve the scientific capacity to observe and understand the deep sea environment and resources.

Form of funding: Collaborative Project (100%) – Two stage

Year 2014

3. Response capacities to oil spills and marine pollutions

Specific challenge: The development of deep sea resources exploitation (particularly offshore Oil and Gas) is moving maritime operations to extreme pressure and low temperature conditions, with many unknown factors and limited response capacity.

As shown by the Gulf of Mexico accident in 2010, besides the lack of appropriate means to deal with a large scale pollution event at high depth / pressure, it is particularly challenging:

- to predict the evolution of the pollution (e.g. oil spill).
- to design an appropriate response combining the right mix of interventions (e.g. mechanical collection, burning oil on surface, use of dispersants, bioremediation, natural dispersion or transformation of spilled oil...).

Recently the Galway event on transatlantic marine research partnership highlighted the need to *“Develop and maintain the capacity for rapid response to unanticipated and episodic events that require immediate scientific investigation to advance knowledge”*.

Scope: The research should aim at developing an integrated response capacity to major pollution events (particularly oil & gas) in extreme oceanic conditions. The integrated approach should combine oceanographic prediction of the pollution behaviour, understanding of impact of pollution, physical intervention and bioremediation and their impact on ecosystems, the use of specialised vessels and underwater (autonomous) vehicles.

It should improve capacity to predict the evolution of the pollution and its impact on the marine environment as well as the response capacity, with integrated models and tools that can support decision making in the management of such events. It can also cover, as appropriate, recommendations for infrastructure works to help protect sensitive ecosystems in high risk areas.

The research activities should foster transatlantic cooperation.

Expected impact: The research will lead to:

- Contribution to the safety of the new / offshore maritime economy and create a better environment for blue growth investments.
- Preservation of the marine environment and marine ecosystems and protection of coastal economies and communities.
- Contribution to the implementation of the EU regulation on safety of offshore oil and gas prospecting, exploration and production activities.
- Improvement of societal acceptance of offshore activities.

Form of funding: Collaborative Project (100%) – Two stage Year: 2015

4. Building with nature – smart and sustainable dredging

Specific challenge: With 80% of the world's population living in lowland urban areas by 2050, climate change, sea level rise and increase societal demands, surface water infrastructure development in those areas is facing new challenges, particularly the need to balance the sustainable functioning of ecosystems with the demand for development and use.

As regards dredging and hydraulic infrastructures, it is particularly important to utilize natural processes and provide opportunities for nature to be part of the hydraulic infrastructure development process.

While some work has been done to develop the concept, there is a need to develop it further to ensure that new ways of undertaking hydraulic infrastructures works fully take into account the value of ecosystems, where they take place. It is also needed to assess how such approaches could be applied in different maritime basins, with their different economic, geophysical and ecological conditions.

Scope: Research requires a multidisciplinary team and approaches involving detailed analyses of physical, ecological and social systems, where hydraulic infrastructure works are made.

The project will review existing knowledge, research and practices in this area. It will select a number of European geographical areas and ecosystems, representative of the diversity of European sea basins. It will seek to apply the building with Nature concept by observing the ecosystem processes and suggest innovative designs for main hydraulic infrastructures /

dredging works, including as appropriate technological developments in dredging vessels. On the basis of general principles, it will develop more specific guidelines adapted to the different maritime basins / ecosystems. Models and simulation tools will be developed to apply the concept to different conditions.

One (or more) pilot projects will be undertaken, to demonstrate the added value of the “Building with Nature” concept with a particular hydraulic infrastructure.

Expected impact: The research will:

- Increase sustainability and climate resilience of hydraulic infrastructures and dredging works.
- Consolidate global competitiveness of the European “hydraulic infrastructures” industries.
- Promote “building with nature” practices through scientifically based and location-specific design rules and environmental norms that fit better with the local environment.
- Support the development of a blue and sustainable maritime economy.

Form of funding: Collaborative Project (100%) – Two stage

Year: 2014

CALL 'SMART CITIES AND COMMUNITIES' (TRANSPORT CHALLENGE CONTRIBUTION)

1. Alternative fuels for Smart Cities

Specific challenge: As stated in the Action Plan on Urban Mobility, European towns and cities face ever growing challenges to reduce the negative impacts of transport activities on the climate, the environment and citizens' health, to render urban mobility more sustainable, and to reduce dependence on fossil fuels. The White Paper 'Roadmap to a single European transport area' calls for phasing out conventional fuelled vehicles in urban areas by 2050. The Clean Power for Transport Package established a long-term strategy on alternative fuels to meet the energy needs of all transport modes while being consistent with the EU 2020 strategy, including decarbonisation. It recognises that the benefits of alternative fuels are initially larger in urban areas, where pollutant emissions are of great concern, and in freight transport, where fuel-alternatives have reached a sufficient level of maturity. Therefore, there is a need to support the market introduction of innovative, alternative fuelled vehicles in local fleets with the accompanying fuelling infrastructures.

Scope: Proposals should address:

- Innovative infrastructure concept and development for alternative fuels to facilitate their replication and deployment in European cities, including assessment of the relevant concepts combined with the adequate vehicles. New business models and standardisation aspects should form an integral part of the work and recommendations for regulatory measures could be made.
- Alternative fuels vehicles (including PTW) with biofuels, synthetic fuels; liquefied petroleum and natural gas as well as electricity are part of the European alternative fuels strategy. The performance of these fuels from the environmental and security of supply side will be improved though production mainly from renewable energy. Coordination activities to monitor, evaluate and compare the performance of the pilot applications should be included. ICT tools to enhance customer acceptance of these technologies should be addressed. Proposals should cover several of the following alternative fuels: bioethanol blends 20% or 25% bioethanol in petrol, ethanol 95% in diesel engines (ED 95), biodiesel blends equal or higher than biodiesel 10% in diesel, and CNG, LPG and blends of synthetic fuels (GTL and BTL) with diesel.
- Energy management and, in particular in the case of electromobility, the impact on the electricity grid of the deployment of high amount of vehicles and the associated smart grid solutions must be assessed.

Expected impact: Beside reducing the use of 'conventionally-fuelled' cars and reducing the emission pollutants in urban areas, a much greater insight is obtained in the economic viability and 'value case' for end-users (citizens, businesses and local public organisations) of integrated smart city solutions will be obtained, because performance at system level is confirmed in real life operating conditions.

Form of funding: Collaborative Project (70%) – Two stage

Year 2014

2. Actions to stimulate market demand for smart city solutions

Specific challenge: Cities and communities are the engine of job creation and economic growth, and they are creative hubs where new public services and businesses could develop.

To accelerate and promote the city's sustainable development, a huge array of smart city solutions are available for decision makers in local administrations, businesses and citizens. Each city and community has different needs and their own existing infrastructure and different decision making processes (political, across layers of government, citizen involvement, data availability). Information, toolkits and guidance on wide-scale implementation, potential impacts (on greenhouse gas emissions, energy bills, quality of life, air quality, consumer acceptance, etc.) and to finance smart city solutions are lacking amongst decision makers in city administrations, in civil society and in businesses in Europe.

This topic invites proposals on themes that drive structural changes, catalyse development of new eco-systems and of new markets. The following themes strongly encourage the submission of proposals that cut across-'silos' and that engage the creativity of people and organisations that have been less active in Framework Programmes up till now.

- The development of tools for efficient replication of smart city solutions in other cities and communities This would entail tools that can be used by businesses and public sector decision makers for efficient replication of investments of smart city solutions and validating (especially obstacles/ problems) these on a number of cases. The project should pro-actively involve potential end-users and develop practical tools. Although this is not a research project itself about evaluation metrics for smart city solution projects, the results of this project may identify recommendations for future research activities and for collecting new sources of data (only 2015).
- The development and implementation of a dashboard for evidence-based design and delivery of smart city solutions in cities and communities. This should help decision makers in the public and private sector with planning their smart city investments, assessing progress thereof and tools for comparing progress with other initiatives (cities, types of investments, or other). The actual development (with strong up-front end-user involvement) of the dashboard (based on existing methodologies and international standards) will contribute to creating know-how and sharing of metrics and assessment methodologies across sectors, stakeholder communities and governance layers. The project may identify needs for future research activities, recommendations to policy makers for collecting new sources of data and possibly form the basis for policy recommendations for a 'smart city index'.
- Establishing networks of public procurers in local administrations on smart city solutions. These networks should aim at networking public procurement bodies in order to establish "buyers' groups" for innovative smart city solutions that improve the potential impact of the investment for cities and their citizens, and improve framework conditions for innovation. These networks will help public procurers to increase their capacity to undertake a better coordinated and articulated dialogue with suppliers about future needs by exchanging experience in procurement practices and strategies and by undertaking joint or coordinated actions. The networks will have two requirements: procurement around a common need for which goods and services intersection at the ICT-energy-transport in urban areas are bought as investment, and

secondly that the solution(s) will be relevant to procurers in other EU Member States. It is envisaged that there will be a fairly small core consortium of public procurers that organises dissemination activities.

- The establishment of a challenge and inducement prize competition: smart solutions for creating better cities and communities (needs to be in 2014, create visibility). A Smart Cities and Communities Challenge Prize competition invites in any ideas (businesses, notably start-ups and SMEs, gaming, arts, humanities social innovation etc) for transforming our urban space into a more sustainable and liveable environment for citizens and businesses. Prize winners will receive prize money and coaching for 1 year from business and public sector and civil society leaders. The competition itself will feature various stages with coaching of quarter/semi-finalists as well, follow-up and a strong push for sharing ideas and experiences.
- The establishment of a support action which should organise a prize competition process over 3 years, including concept, dissemination, jury work, follow-up, events. The competition should result in two types of 'direct grants' in the form of 'stand alone prizes':
 - for converting ideas into business ventures around urban challenges: 100.000 EUR each per prize winner = 1 million EUR in total (5 prizes each year, 2 years in a row); and
 - for support to an entity or a consortium to develop new products or services (or combinations thereof) with significant impact on urban challenges: 1 million each, 5 prizes each year, 2 years in a row.
- The development of building structured dialogues around public acceptance of smart city solutions for transforming cities of the future. Proposals are invited that plan to develop original, novel tools for engaging with different groups of stakeholders in cities and communities, by creating a community of critical thinking and by generating strategic advice (wanted and unwanted) to deal with social, economic, sustainability and ethical issues of smart city development. Specific issues could be (non-exhaustive list); urban planning, underpinning 'value cases' (who pays, who benefits), future regulatory activities and research/innovation programmes.
- The creation of the 'Make my Street Smart' platform to support development and most importantly application of innovation in/on/at/above urban streets. This action invites local partnerships of city administrators, community organisations or businesses to sign up to the 5000 KM challenge – about as far as you can go from the most northern town in Europe to the most southern town in Europe (excluding EU overseas territories). Urban streets play an important role in how increasing numbers of people in our cities move about, relax, shop, interact, conduct business, etc. At the same time, innovation opens up new solutions in mixing the types of transport, energy and ICT we use in our streets, and in the way we design (new types of local partnerships and interactions and use streets. The outcome of this action is to create a low-threshold, visible platform where local administrators, citizens and their networks get access to information about innovative solutions that they could apply in their communities, and obtain know-how about investing in these. The project should also develop recommendations about value and business models, regulation and prioritisation of possible areas for future pilots.

- Building capacity to work across policy areas and to combine policy instruments for wide-scale deployment of smart city solutions. This action will map policies (possibly starting around a number of 'case studies', and doing ex-post evaluations around these) and will map and bring together existing networks (now often organised by sector) to create a forum for peer-to-peer learning with policy practitioners around the central question of how to scale up smart city solutions. Development and implementation of European, national, regional and local regulations can have far-reaching impacts on the scale and speed of implementation of smart city solutions. Moreover, policies are often working in silos (transport, energy, ICT, urban planning) and may have competing priorities that result in hampering market deployment (CSA). Follow-up actions could be at national, regional, local but also at EU level (e.g. ERANET).

Expected impact: Market demand for smart city solutions can be boosted by increasing consumer awareness about technologies and processes used in implementing smart city solutions. Biggest levers are procurement and investment planning tools for local administrations and business, and creating better public acceptance and engagement. The Smart cities and communities Challenge Prize competition invites new ventures– particularly from SMEs and start-ups. Through the 'Make my Street Smart' platform, Mayors/community organisation can sign up to tools for investments in streets.

Form of funding: Coordination and Support Action – Single stage

Year: 2014, 2015