



# ***SafeFuture***

***SAFETY – SECURITY - SUSTAINABILITY***

*Safe innovation for a competitive and sustainable future*

*Safety as a trade-mark of the technology "made in EU"*

## ***Approach***



*An initiative from*

***ETPIS***

***European Technology Platform Industrial Safety***

[\*www.industrialsafety-tp.org\*](http://www.industrialsafety-tp.org)

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## Document History

Date	Events, milestone, meeting where the present document was reviewed
May 19, 2010 with ETPIS members	First ideas exchanged during 5 <sup>th</sup> ETPIS General Assembly
early July 2010	Concept of SafeFuture initiative presented to European Commission representatives and a selected panel of ETPIS active members,
July 9, 2010	Concept of SafeFuture initiative reviewed and discussed at the High Level Group meeting
July-August 2010	Elaboration of a booklet focusing on the Work Programme 2012 with the contribution of several active members of ETPIS, based on SafeFuture strategy
early September, during the Industrial Technologies 2010 Conference	Presentation of the booklet focusing on the Work Programme 2012 to European Commission representatives and a selected panel of ETPIS active members
November 2010	Conversion of the booklet into the Strategic Research Agenda for the SafeFuture initiative in order to collect comments and feedbacks from ETPIS members and the European Commission
March 2011	Contribution from the Executive Board and a selection of key experts
May 2011	Draft public version giving the orientations of the SafeFuture Roadmap
July 2011	Public version to consult the members and stakeholders
July 2012	Updated version based on comments collected among the HLG and open consultation (ETPIS members and stakeholders)

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## OVERALL OBJECTIVE

**The overall objective of the SafeFuture initiative is to support the EU2020 Strategy, in particular the sustainability and competitiveness targets, while implementing the ETPIS long term vision.**

SafeFuture initiative aims at improving the competitiveness of European industry and generating knowledge to ensure its transformation from a resource-intensive to a knowledge-intensive base, by creating step changes through research and implementing decisive knowledge for new applications at the crossroads between different technologies and disciplines. This will benefit both new, high-tech industries and higher-value, knowledge-based traditional industries, with a special focus on the appropriate dissemination of RTD results to SMEs.

ETPIS Long Term vision has been adopted in 2005 and is summarized as follows:

By 2020 a **new safety paradigm** will have been widely adopted in European industry. Safety is seen as a key factor for **successful business** and an inherent element of business performance. As a result, industrial safety performance will have progressively and measurably improved in terms of reduction of reportable accidents at work, occupational diseases, environmental incidents and accident-related production losses. It is expected that an "incident elimination" and "learning from failures" cultures will develop where safety is embedded in design, maintenance, operation at all levels in enterprises. This will be identifiable as an output from this Technology Platform meeting its quantified objectives.

By 2020 there will be **structured self-regulated safety programmes** in all major industry sectors in all European Countries. These will have firm, measurable performance targets for accident elimination and will meet the annual reduction rate stated in the Technology Platform objectives.

By 2020, **accident free mind set workplaces** will become the norm in Europe.

This will contribute in a major way to sustainable growth for all industry sectors in Europe and improvement of social welfare.

The concept of the initiative is based on a pragmatic approach: integrated safety and security, implemented at an early stage when dealing with emerging technologies, improve industry competitiveness and social welfare. Prevention is more effective than mitigation or emergency, with a long term perspective. This has been demonstrated by cost benefit analysis both for occupational health and safety (see the EU-OSHA report on economic incentives<sup>1</sup>) and for major accident hazards prevention<sup>2</sup>.

This document presents the SafeFuture initiative from ETPIS in the context of the EU2020 Strategy and the European 2020 Flagship Initiative Innovation Union. It describes in particular activities related to research, development and innovation in the field of industrial safety and provides information for implementation.

<sup>1</sup> EU-OSHA report on economic incentives

[http://osha.europa.eu/osha/portal/en/publications/reports/economic\\_incentives\\_TE3109255ENC/view](http://osha.europa.eu/osha/portal/en/publications/reports/economic_incentives_TE3109255ENC/view)

<sup>2</sup> BP Oil Spill Deep Horizon report

<http://www.oilspillcommission.gov/final-report>

First, in chapter I, the new political context set up by the EU2020 Strategy is analyzed from the industrial safety point of view, and the role of ETPIS in this context is described.

Then, in chapter II, the approach and the concept of SafeFuture are presented. All key elements of the EU2020 strategy such as research, demonstration, standardization, education, SMEs, international cooperation are addressed.

The chapter III presents preliminary directions for the implementation.

## I EVOLUTION OF THE CONTEXT

This document contains a set of ideas and proposals related to the inclusion of the issue of industrial safety into the European Work Programmes for the next years to support the implementation of the **EU2020 Strategy**, and to **address the EU Grand Challenges**.

### I.1 Adoption of the EU2020 Strategy

On June 27, 2010 the European Council has adopted the European 2020 Strategy, a *strategy for smart, sustainable and inclusive growth*

- **Smart Growth: Economy based on knowledge (education) and innovation**
- **Sustainable Growth: Greener, more resource efficient and competitive economy**
- **Inclusive Growth: High employment delivering social and territorial cohesion**

This includes:

1. Reduce greenhouse emission by at least 20%
2. Increase the use of renewable energy sources to 20% of total energy consumption
3. Increase energy efficiency with 20%
4. Increase the R&D spending to 3% of GDP
5. Transfer research to innovation

The objectives of the strategy are:

- **Successful exit from the crisis**
  - sustain demand and stem the rise in unemployment
- **Boost competitiveness**
  - make EU industry lead in world markets
  - strengthen and modernize our industrial base
- **Lay foundations for a sustainable future**
  - sustainable growth of economies and societies
  - tackle climate change including energy efficiency
- **Drivers**
  - Knowledge, Sustainability, Competitiveness, Innovation, Recovery, Social aspects

For update see: [http://ec.europa.eu/europe2020/index\\_en.htm](http://ec.europa.eu/europe2020/index_en.htm)

ETPIS, with its vision, supports the implementation of the **EU2020 Strategy** applying the following principles:

- The change in the values of the society towards more safety, environment friendliness and sustainability is an opportunity to develop new products, new services and new activities.
- Pro-active attitudes with the development of safer and cleaner products and processes right from the beginning directly contribute to sustainable development. This has to be accompanied in the regulatory framework which also has to be compatible with innovation in the industry. Europe cannot afford to have regulations lagging behind innovation.
- In a lot of situations, quick safety progress can be achieved by implementing the best practices or solutions already existing. Therefore, sharing of best practices between industry sectors, between Member States and between Communities and focus on the implementation of existing knowledge may bring great and quick benefits.

- The European governance of emerging risks related to innovation (e.g. massive use of nano-particles in the industry, adoption of new energy carriers...) has to be updated to give more flexibility while ensuring a high level of protection of the citizens. This reduces also the time to market as demonstrated by the iNTeg-Risk project<sup>3</sup> or IRIS project<sup>4</sup>. Goal-based regulations supported by effective standards should be therefore promoted.
- Changes in the society have to be carried out with the support of all stakeholders. The dialogue and participation of the interested parties should be maintained. Therefore, the links with the professional associations and federations, trade unions and with the scientific organizations are very important.
- The European solutions have to be developed and implemented in an international context because most of the societal challenges faced by Europe are not only European challenges but most of the time they are global. Then the solutions developed need to be elaborated in partnership with other international teams. In this context, common projects with the USA, Japan, China, India, Latin America... are strategic.

## I.2 The EU Grand Challenges

The "Lund declaration" in July 2009 under the Swedish presidency of the European Union was the first time that the concept of EU Grand Challenges appeared so clearly at the political level.

"European research must focus on the Grand Challenges of our time moving beyond current rigid thematic approaches. This calls for a new deal among European institutions and Member States, in which European and national instruments are well aligned and cooperation builds on transparency and trust.

Identifying and responding to Grand Challenges should involve stakeholders from both public and private sectors in transparent processes taking into account the global dimension.

The Lund conference has started a new phase in a process on how to respond to the Grand Challenges. It calls upon the Council and the European Parliament to take this process forward in partnership with the Commission."

There is no exhaustive list of the EU Grand Challenges, but they can be identified as:

- Climate change
- Health and ageing
- Use of natural resources
- Green energy
- Energy security
- Clean transport
- Sustainable industrial production
- Land use
- ...

In the today context, with the economic crisis, these Grand Challenges represent powerful **drivers of change** in economy and society, generate major **global market opportunities**.

At the same time, the development of the solutions to these challenges requires **EU-scale approaches** with the engagement of a critical mass, both in terms of research and industrial investment, that will generate the expected innovation (from **research to market**).

The process is simple: **New needs → new ideas → new markets**. The needs to address the Grand Challenges, expressed by the society and endorsed at the political level, will generate new ideas materialized by new technologies, new products and new services that will open new market for tomorrow, contributing to the European economical competitiveness and sustainable growth.

ETPIS leadership believes that the new technologies, new products and new services that will be imagined and designed have to be sustainable and robust in terms of safety and security, since there is a societal demand.

Indeed, *INDUSTRIAL SAFETY* constitutes a transversal field of knowledge which provides an important added value in all European industry sectors, especially with the aim to develop sustainable technologies and products.

<sup>3</sup> <http://www.integrisk.eu-vri.eu>

<sup>4</sup> <http://www.vce.at/iris/>

The table hereunder gives an overview of the contributions and solutions that are proposed by the European Technology Platform on Industrial Safety.

Societal Challenges	Contributions from ETPIS	Partnership
Climate change	<ul style="list-style-type: none"> <li>• Share best practices on risk assessment and management of natural hazards which frequency is increasing due to climate change.</li> <li>• Improve risk management of natural hazards triggering accidents on technological infrastructures (NaTech). The particular questions addressed by ETPIS members are:                             <ul style="list-style-type: none"> <li>- Multi-hazard and vulnerability assessment</li> <li>- Optimisation of land-use planning strategies based on cost-benefits analysis</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• JRC-IPSC (Ispra)</li> <li>• EEA (Copenhagen)</li> <li>• ...</li> </ul>
Clean energy	<ul style="list-style-type: none"> <li>• Accompany the safe development of clean energy with a life cycle perspective (from well to grave). Several problems have to be solved regarding safety issues, e.g.:                             <ul style="list-style-type: none"> <li>- Safe capture, transport and storage of CO<sub>2</sub></li> <li>- Safe development of Hydrogen as an energy carrier</li> <li>- Control the runaway reaction in Li-Ion batteries and limit hazard issues (flammability, toxicity) in advanced super-capacitors</li> <li>- Secure charging processes of lithium based batteries, in particular at extreme temperatures and fast charging modes</li> <li>- Better integrate good and bad lessons from the past (energy related safety breakthroughs, worst case learning...)</li> <li>- Deployment of the use of alternative fuels in the aircraft industry and other non terrestrial transport systems: compatibility of the materials, logistic constraints and compatibility of various types of alternative fuels...</li> </ul> </li> <li>• More generally, we need to anticipate and solve safety related issues pertaining to new high energy high power electric storage systems under deployment for e-mobility or devoted to serve intermittent energy sources (photovoltaic, wind...) as well as innovating solution to be implemented to smart grid systems</li> <li>• On the production side, bio-based advanced processes and global production systems will have to cope with increasing flexibility with regard to bio-sources used as feedstock, output level or with regard to co-products valorization potential without any compromise with safety levels ; anticipated modern concept (say at the 2020 skyline) of what is known as biorefinery will need in depth analysis of safety issues in terms of identification, design of safety barriers, functional safety analysis, flexibility related demands...</li> <li>• It is anticipated that biofuel driven biorefinery will dominate coming decade deployment of biorefineries, whereas biochemicals (commodities, high added value chemicals) will then take the lead, with the objective of becoming self sufficient in terms of energy consumption (use of low temperature degraded sources of energy, energy conversion of biomass residues...): such a change may present emerging challenges in terms of safety that need to be identified at early stages. This topic will also impact safe production of chemical and materials (sustainable industrial production)</li> <li>• Green and white biotechnologies will have to be considered in terms of evaluation and management of the accidental biological risk (dissimination of micro-organisms) ; with this respect we have to anticipate better acceptance of genetically modified organisms...</li> <li>• Besides, intrinsic safety will have to be promoted when intensification principles will also be relevant for more overall energy efficiency, which does not necessary serve safety per se</li> <li>• Safety will have to be considered as a core topic of interest and adequate metrics be developed to evaluate safety performance, as a full pillar of sustainability and not underscored through too simply safety goals resulting from societal, environmental or economic sides of sustainable development (like fixing a goal for number of days without any worker injury requiring medical rest...)</li> <li>• As energy demands will essentially grow from emerging economies (BRIC countries and others...), ambitious training programs to promote adequate safety culture and safety practice at a world scale</li> </ul>	<ul style="list-style-type: none"> <li>• JTI FCH</li> <li>• ZEP</li> <li>• Biofuels TP</li> <li>• TPWind</li> <li>• EERA</li> <li>• EIBI</li> </ul>



Societal Challenges	Contributions from ETPIS	Partnership
	<p>will be requested, with a high opportunity for EC countries to take advantage of earliest interest, appropriate legislation frameworks and related industrial know-how</p> <ul style="list-style-type: none"> <li>• Emerging material of interest (from biomass feedstock up to advanced chemicals with high added value potential as a byproduct will have to be evaluated experimentally or predicted (QSPR models...) for both physico-chemical and toxic or ecotoxic hazards</li> <li>• Anticipate recycling issues as soon as the design stage of energy related equipment or processes ; as an example of justification, battery recycling has already proven a safety issues</li> <li>• Critical infrastructures regarding energy production plants or transport will also need to be considered in terms of security of supply (mind potential undesirable events like copper cable thieves ...)</li> </ul>	
Sustainable transport infrastructures	<ul style="list-style-type: none"> <li>• Accompany the development of the greening of transport. ETPIS members are working for example on the compatibility of the existing underground infrastructures with the new energy vectors. The questions addressed are: <ul style="list-style-type: none"> <li>- Adaptation of the underground parking slot in a city centre for vehicles using hydrogen or compressed natural gas</li> <li>- Upgrade of the design of underground stations and terminals to enable the safe use of a diversity of energy carriers for the vehicles (cars, buses, trams)</li> <li>- High-speed trans-European rail cargo</li> <li>- Co-development of transport infrastructures and high power electric grid</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• reFINE (initiative from ECTP)</li> <li>• ...</li> </ul>
Sustainable industrial production	<ul style="list-style-type: none"> <li>• Improve the performance and functionality of personal protective equipment (PPE).</li> <li>• Develop methods to maintain safety of aged and repaired structures (industrial facilities, power plants...) and provide technologies for life extension, as well as improve reliability based design and structural health monitoring (SHM) and risk based inspection technologies: introduction of safety dynamics concept</li> <li>• Develop specific solutions for new products or new processes such as engineered nanomaterials. The solutions are in terms of: <ul style="list-style-type: none"> <li>- Specific measurement techniques to assess the exposure of the worker and of the consumers, and the impact on the environment.</li> <li>- Risk reduction technologies (PPE, cleaning of contaminated areas)</li> <li>- Elaboration of reference documents and methods to deal with emerging risks</li> <li>- Development of simulation tools (VR) and new training programmes to train employees in safety critical situations</li> </ul> </li> <li>• Support the development of the European Factory of the Future, by managing emerging risks through new integrated solutions (safety systems, advanced PPEs, new organisational models, ergonomics, etc), enabling higher productivity under better workplaces.</li> </ul>	<ul style="list-style-type: none"> <li>• Manufacture and Factory of the Future PPP</li> <li>• Textile and clothing ETP</li> <li>• Raw Material EIP</li> </ul>
Aging population	<ul style="list-style-type: none"> <li>• Improve the management of safety competencies and skills in industry and public authorities, <ul style="list-style-type: none"> <li>- where the experienced employees are going to retire</li> <li>- where aged personal have to perform safety critical tasks in the industry</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• EU-OSHA</li> <li>• JPI "More years, better lives"<sup>5</sup></li> <li>• ...</li> </ul>

<sup>5</sup> Joint Programming Initiative: <http://www.jp-demographic.eu/>

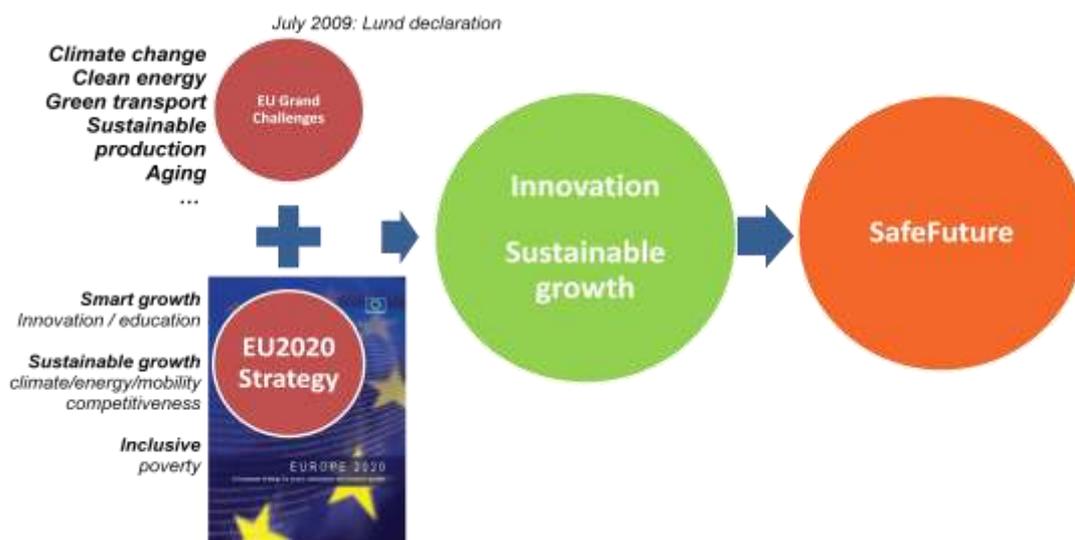
### I.3 SafeFuture: A European Partnership for industrial safety, security and sustainability

In this new context, ETPIS has adapted its organization and operation process to develop a **European Partnership for industrial safety, security and sustainability** which will support the EU2020 Strategy.

Therefore, SafeFuture enables ETPIS to input the European Innovation Union initiatives<sup>6</sup> and partnerships to bring the expertise related to industrial safety, security and sustainability.

It is crucial to rapidly transform wishes and good intentions in concrete activities, initiatives, projects and solutions to make progress.

Thus, inspired by the European Commission event in May 2010 focusing on the synergies between the European Technologies Platforms to solve societal Grand Challenges ([ETP Conference: Working Together on Societal Challenges](#)) and the EU2020 Strategy, ETPIS has launched at its last General Assembly the idea to prepare an ambitious initiative, where **safety performance** will be the **main target and an enabling factor for a sustainable future**.



The initiative "**SafeFuture - Safe innovation for a competitive and sustainable future**" is organized around 4 pillars that will bring innovative and sustainable solutions to the European Grand Challenges:

- **Safe Infrastructure**, to address e.g.: life extension of process plants, transport infrastructures, power plants, off-shore platforms...; intensification of Natural catastrophes due to climate change; design and monitoring for long term operation for Carbon Capture and Storage; protection and security of critical infrastructures...
- **Safe Energy**, to address e.g.: safety of the use of new energy carriers for vehicles (FEV, fuel cells, CNG, biofuels...); safety for the green energy technologies (wind mills, photovoltaic panels, concentrating solar power (CSP)...); making the underground transport infrastructure compatible with the new energy carriers; combining pan European transport infrastructures and smart high power electricity grids...
- **Safe Products and Production**, to address e.g.: development of the European Factory of the Future, by managing emerging risks through new integrated solutions (safety systems, advanced personal protective equipments, new organizational models, ergonomics, etc.); enabling higher productivity under better workplaces; safety for the green jobs; safe production and use of nanomaterials...
- **Transversal issues**, to solve existing challenges for sustainable integration, interaction and risk governance such as: difficulties in putting together different risk mitigation policies and ensuring their compatibility (Risk-Risk trade-offs), Multi-risk and interdependencies of risks in a global competitive market...

<sup>6</sup> [http://ec.europa.eu/research/innovation-union/index\\_en.cfm](http://ec.europa.eu/research/innovation-union/index_en.cfm)



SafeFuture is aimed at **structuring and coordinating the research investment on safety and security** to support the **sustainability objective of the EU2020 Strategy** in the context of intensive innovation.

SafeFuture is organized as a **European Partnership for safety, security and sustainability** with the ambition to implement the initiative on a PPP model, since safety is beneficial for both public and private sectors.

## II SAFEFUTURE APPROACH AND ROADMAP

### II.1 General approach

The proposed topics are based on the following main inputs:

1. Strategic Research Agenda of ETPIS<sup>7</sup> (especially the recommendations of the ETPIS Focus Groups and Hubs)

The SRA was published in January 2006 and its content was updated and further discussed since its first release.

2. Recommendations of the High Level Group of ETPIS European Technology Platform Industrial Safety (also on the meeting of July 9, 2010 in Zürich)

During a process which lasted almost one year, the HLG of ETPIS with representatives from several industry sectors has selected a list of priorities which is presented in the table hereunder:

Human Factors in Emergency and Crisis Management
Human Centered Design & Human Factors in Organizational and Managerial Safety
Understand the particularities for the pedagogy in the field of safety (based on risk perception), and improve education & training for students, workers, (safety) managers...
Risks emerging from introduction of New technologies including methodology of integrated risk management for new technologies
Methods to maintain safety of aged and repaired structures and provide technologies for life extension & Reliability based design and structural health monitoring (SHM) and risk based inspection technologies

3. Priorities established on international level, e.g.:
  - a. World Economic Forum – Global Risk Report 2010<sup>8</sup> and 2011<sup>9</sup>,
  - b. OECD – Future Global Shocks<sup>10</sup>,
  - c. IRGC (International Risk Governance Council) – Risk Governance Deficits<sup>11</sup>,
  - d. EU-OSHA ESENER<sup>12</sup> (European Survey of Enterprises on New and Emerging Risks, 2010)

In addition, the following inputs were taken into account:

1. Survey of industrial needs performed by ETPIS and EU-VRi (8 surveys since 2008)
2. Experiences and results from large FP7 projects (e.g. IRIS, iNTeg-Risk, ENISA, EURACOM...)
3. Readiness of the industrial partners involved in ETPIS to invest more than 200 million € into a PPP-action of "SafeFuture"

**All these inputs, combined with the new context described in the previous pages have led to the preparation of the new ETPIS Roadmap related to the SafeFuture initiative.**

<sup>7</sup> [http://www.industrialsafety-tp.org/downloads/DETAILED\\_SRA\\_ETPIS\\_January2006\\_1.pdf](http://www.industrialsafety-tp.org/downloads/DETAILED_SRA_ETPIS_January2006_1.pdf)

<sup>8</sup> [http://www3.weforum.org/docs/WEF\\_GlobalRisks\\_Report\\_2010.pdf](http://www3.weforum.org/docs/WEF_GlobalRisks_Report_2010.pdf)

<sup>9</sup> <http://riskreport.weforum.org/>

<sup>10</sup> <http://www.foresight-platform.eu/wp-content/uploads/2010/06/2.2-Schieb-FutureofForesightViennaJune14.pdf>

<sup>11</sup> [http://www.irgc.org/IMG/pdf/IRGC\\_rgd\\_web\\_final.pdf](http://www.irgc.org/IMG/pdf/IRGC_rgd_web_final.pdf)

<sup>12</sup> <http://osha.europa.eu/en/riskobservatory/enterprise-survey/enterprise-survey-esener>

## II.2 Synergies between safety, security and sustainability to achieve competitiveness

Safety and security have been artificially separated in many programs – there will not be one without the other in the future: this integration requires the shift to a new paradigm with more integration of the concepts (methods) and for the implementation (technologies).

Sustainability refers to both safety and security for the workers, for the consumers, for the environment with a short and long term perspective and it includes the economical performance. Often the safe option is the most efficient economically if the investment in safety is considered in a long term perspective. This becomes more and more obvious in our risk averse society.

Safety, security and sustainability are key factors in several European **Grand Challenges**. It is illustrated by the following examples:

- **Ageing of the infrastructures (industry, transport, energy...) (Safe Infrastructure)**  
Infrastructures such as industrial facilities, bridges, tunnels, railway system, power plants are reaching the term of their designed life time, any safety consequences of life extension have to be clearly analyzed (risk informed decision); on the other hand, infrastructures built today or to be built in the near future should integrate in their design solutions that guarantee economical performance for a long time in a quickly changing world without compromise on safety and sustainability.
- **Sustainable energy and the greening of transport (Safe Energy)**  
The safe development of clean alternative energy needs that several problems have to be solved regarding the technology itself but also the integration of the new technology in the present systems; the greening of transport has to be treated with the same systemic view, e.g. the existing underground infrastructures have to be adapted to the new energy vehicles using hydrogen, batteries or compressed natural gas.
- **Sustainable industrial production (Safe Production and Products)**  
The development of new technologies, new products or new processes using nanomaterials, bio-resources and alternative energies requires new specific measurement techniques to assess the exposure of the worker and of the consumers, and the impact on the environment, new risk reduction technologies (PPE, cleaning of contaminated areas), and the elaboration of reference documents and methods to deal with emerging risks. This has to be done in a proactive manner since regulation is always lagging behind innovation.
- **Climate change and global warming (Cross Cutting)**  
In the current changing climate, managing (prevention, preparedness, response and recovery) the consequence of more intense natural disasters such as flooding, fire forest, hurricane, dry area extension cannot be done without full integration of industrial safety methods and technologies.
- **Public health**  
Nanosafety is an important, but (although trendy) by far not the only concern relevant for public health; consistent and efficient implementation of REACH is also an issue that requires RDI investment in particular in alternative methods for the testing of the toxicity of chemicals.
- **Aging societies**  
Aging societies also means aging of industrial workforce, involving all the relevant issues like economical, social inclusion, accessibility; it means also the urgent need to find solutions in terms of knowledge management and experience/expertise sharing;

For the future of Europe, the greatest challenge is to make sure that the new products, innovative services and production systems are sustainable, i.e. environmental friendly, competitive and safe.

Indeed, new industrial technologies bring new safety challenges that need to be addressed at an early stage of the design: e.g. the development of nanotechnologies, the extensive use of new energy carriers such as hydrogen, batteries or bio-fuels. They require expertise in risk assessment and management, and knowledge on the hazardous phenomena as well as on the technical and organizational measures to control the risk.

Based on this statement, ETPIS has launched at its last General Assembly an ambitious initiative where **safety performance** will be the **main target and an enabling factor for a competitive and sustainable future**.

The initiative "**SafeFuture** - *Safe innovation for a competitive and sustainable future*" will include two types of actions:

1. Embedded industrial safety concept into technological EU RDI projects, in this case safety will be an add-on in the projects focusing on the technological development.
2. Specific targeted safety & security research and innovation projects, both, for the development of new technologies and products ensuring that built-in safety & security remains the trade-mark and competitive advantage of the technology "Made in EU". These cross-cutting researches and innovations will benefit several industry areas and the general risk governance at company and authority level.

Thus, the **SafeFuture** initiative is structured around four key issues:

- **Safe Infrastructure**
- **Safe Energy**
- **Safe Products and Production**
- **Cross-cutting issues**

SafeFuture is aimed at **structuring and coordinating the research investment on safety and security** to support the **sustainability objectives of the EU2020 Strategy** in the context of intensive innovation. The ambition is to implement the initiative on a PPP model, since safety is beneficial for both public and private sectors.

These 4 key issues are developed in more details in the next chapters.



However, looking at the content is important but it is not enough. To make sure that the results and knowledge gained through research are implemented for the benefits of the industry and of the society, several aspects have to be addressed very specifically:

- SMEs: how to make them pro-active regarding safety, security and sustainability?
- Standardization: how to fill the gap between innovation and regulation? How to keep the dynamic and the flexibility needed for the entrepreneurs?
- Education: how to keep the knowledge and skill up to date in a fast changing world?
- Partnership with key players: how to find the synergies with existing organizations to make them benefit from safety?
- International cooperation: how to collaborate with other international initiatives to learn from each other?

These aspects are addressed in the next paragraphs.

### II.3 Research relevant for SMEs

The leading idea of the call is: "Local application of the global safety state-of-the-art solutions".

There are 19 million SMEs in the EU operating in hugely different sectors and employing nearly 75 million people. However, SMEs also record an over proportional 82% of all occupational injuries, even rising to about 90% for fatal accidents.

On the other hand, large companies which are among the world leaders in their sectors have built their reputation on excellent records regarding rare occupational injuries and fatal accidents as well as high quality/safety of their products.

Therefore, SMEs are a key target of the initiative "SafeFuture". SMEs are often at the source of new technologies, new processes and new products that generate new risks: safety has to be embedded right from the beginning of the design stage. To be able to do so, new solutions have to be developed to ease the access to safety knowledge, methods and technologies to the SMEs.

## II.4 Standardization

In general ETPIS promotes standardization activities aiming at formalizing good practices on industrial safety issues and thus giving public access to this knowledge including to SMEs.

Standardization is also promoted within ETPIS as a complement to goal-based regulation which appears to be the most effective approach for safety; effective in the sense of adapting solutions to the specific process/context and enabling quick adaptation to the technological progress.

### II.4.1 Support the STAIR approach developed by CEN-CENELEC

The European Standards Organizations CEN and CENELEC with the support of the European Commission DG ENTER have started to inform research and innovation actors on the value of standardization as an instrument for knowledge transfer and see a major advantage in having an integrated approach between Standardization, Innovation and Research.

In an **integrated approach between Standardization, Innovation and Research**, standardization does not come as an afterthought but is built into a project proposal right at the start. This introduces significant benefit potential for the project itself and for any actions after the project's life-time.

In order to promote such an integrated approach between Standardization, Innovation and Research, CEN and CENELEC have produced a structured approach, called STAIR<sup>13</sup>.

ETPIS supports the STAIR approach from the beginning and encourages the projects initiated in the context of ETPIS to include standardization activities in their work plan to ease further dissemination and implementation of the results.

### II.4.2 Establish a permanent support to ease standardization process in RDI projects developed within ETPIS

In order to go further in this direction, ETPIS has identified a team with volunteers ready to assist the project leaders. This team will be the link between the researchers and the standardization bodies, at the European level and/or at national levels.

### II.4.3 Other ideas to be further developed

- Standardization for new and emerging technologies
- Globalization of industrial safety: establishing global standards of best practice
- Voluntary safety certification, safety self-assessment and safety rating of new technologies

## II.5 Education and mobility

This chapter is based on the contribution received by the HUB Education and Training of the Spanish Platform on Industrial Safety (PESI).

The purpose of this chapter is to improve knowledge, abilities and behavior for safety of all personnel, at all levels, through education and training in order to achieve a workplace without incidents and accidents, as well as to eliminate the risks to health, safety and the environment.

The approach is from the perspective of education and training for managers, workers and the general public, principles and relevant methods for industrial risk assessment, risk prevention, safety culture, reduction and management of risk, as well as health and occupational safety from school to university, through working life and social activities. It gives special attention to those educational areas which need to be developed in a parallel way to the evolution and needs of industry.

Education and training have important roles in:

- Increasing knowledge and creating safety culture.
- Establishing competence needs, abilities and skills to identify, evaluate and manage the risks.

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<sup>13</sup> <http://www.cen.eu/cen/Services/Innovation/STAIR/Pages/default.aspx>

- Maintaining and developing the personal knowledge and professional competitiveness concerning safety issues.
- Improving safety.
- Deployment phase for research results.

The strategy followed to identify what is needed to be renewed and adapted in education for safety, consisted of two parts: the first related to the identification of existing **deficiencies or problems** in the current system; and the second related to proposals for corrections or **improvement**.

### II.5.1 Deficiencies and problems detected

1. The current education system is not adapted to the industrial requirements for safety. It is more theoretical than practical. During the university or polytechnic degree studies, there is a clear lack of consideration for safety within the study programs. It exists for the postgraduate qualification programs, but this is limited to those people who can afford to pay for attending these courses.
2. Lack of adaptation of teaching methods towards changing attitudes for developing a risk prevention culture, which helps to create a frame of reference, so that people are encouraged to take on this culture as part of their basic values.
3. The present educational model is not sufficiently flexible to meet industrial needs. The courses offered as continuous learning programs are very specific and mainly provide information on recent or newly applicable regulations. General training for safety issues for the public is not easy to find, with the exception of postgraduate courses, which nevertheless are not suitable for everybody.
4. It is noticeable that most workers have a confusing idea about ISO standards requirements, which are purely voluntary practices, compared to legal obligations. There are often uncoordinated or contradictory instructions issued by the support departments to those people responsible for the legal compliance and standard certifications.
5. Activities raising awareness of industrial safety issues are needed for all levels of personnel within a company (management, those responsible for maintenance, operators). Informative sessions, seminars and other similar activities focused on the importance of ensuring the requirements of law and regulations are known and met, as well as the legal liability implications for non-compliance (penalty system) are beneficial for this purpose.
6. It is imperative to provide adequate training for those professionals who are involved in the design, construction and maintenance of the industrial premises, which should be an integral part of the work routine.
7. Promotion of safety training to be considered as an added value for qualifications. Presently, employers may not consider "safety training" as an essential condition when they initiate recruitment processes.
8. When hiring personnel, it is common for companies to find that candidates/future workers need training on occupational risk prevention, risk management, industrial safety and accident severity to ensure that they adopt safe working practices.
9. Training people who have the responsibility for developing legislation and regulations for industrial safety is crucial. They should be experienced, deeply aware of the industry, as well as the legislative and practical requirements of workplace health and safety requirements.
10. Information or learning gained from past experiences on accidents and near-misses are not sufficiently disseminated to provide or improve understanding of the causes of such occurrences.
11. Regarding the skills, abilities, and people behavior at all levels of companies (workers, technicians, managers, specialists), the following issues were identified as areas to be improved:
  - Ability to communicate correctly.
  - Working within a group. (Improve the "empowerment")
  - Abilities to work for industry.
  - Positive attitude to rules and safety regulations. Zero tolerance for breaking any rule.
  - Eliminate the prevalent, preconceived, idea as macho attitude: it will never happen to me.
  - Promote the awareness of safety actors regarding the "responsibility for their actions".
  - Behavior and attitude of the leader and subordinates when facing crisis or emergency situations, focusing particularly on eliminating those attitudes which induce the person to follow their own ideas instead of the established standards.
  - Improvement of people performance towards best safety practices. Prepare them for the change of attitude.

## II.6 International cooperation

The proposal is to promote the idea of "Inherent safety of EU innovation & technologies as a competitive advantage of the EU industry". Therefore, the international cooperation should target three main groups of countries:

- The "competitors": The countries which do or tend to offer industrial technologies competitive to the EU ones, but without or with only partially complying to EU industrial safety standards, especially when promoting their technologies in non-EU countries. The cooperation with these countries should promote "global compliance with EU-like safety standards". Examples of these countries could be India and China.
- The "partners": The countries which do have high level industrial safety standards, but often very different from the EU ones. The cooperation with these countries should promote "establishing and further development of global industrial safety standards". Examples of these countries could be USA, Canada, South Korea, Australia and Japan.
- The "clients": The countries which need both local technologies and local standards of industrial safety improved. The cooperation with these countries should promote "raising awareness about the need of global industrial safety standards". Examples of these countries could be African and Latin American countries.

## II.7 Building on existing structures: Partnership with key players

Since industrial safety is a cross-cutting topic, when safety concepts, methods, technologies, etc. have to be embedded in solutions aimed to be applied in specific industrial sectors, these solutions have to be developed with the experts of these sectors.

Therefore, in the next pages, for each pillar of the SafeFuture initiative, the list of key players is provided, with information about the relation between ETPIS and these key players.

The list of key players will include:

- Professional associations from the concerned industry sectors
- Scientific associations
- Networks and projects consortia
- Other European Technology Platforms
- Regulatory bodies

### III IMPLEMENTATION

This document describing the approach will be completed with a series of documents presenting the detailed technical content of the 4 pillars of SafeFuture:

- **Safe Infrastructure**
- **Safe Energy**
- **Safe Products and Production**
- **Transversal issues**

Each of the 4 pillars will be addressed with the following aspects:

- Grand Challenges (Current situation and future needs)
- On-going projects and needs (research and implementation)
- Standardization activities and needs
- Actions to involve SMEs or to disseminate knowledge to them
- Education and training
- International cooperation
- Links with other ETPs, Association or Federations, and with possible Innovation Partnerships and other structuring initiatives

These documents will be developed thanks to a set of inputs from brainstorming performed in relation with ETPIS activities (brokerage events, seminars, General Assembly...) that have already taken place and specific workshops that are planned for the second semester 2011.

Once the technical content will be elaborated, an implementation plan will be developed.

Implementation will be organized via calls for projects in the:

- Regular Framework Programme<sup>14</sup> (FP7 and FP8) , in almost all its parts:
  - Health
  - Food, Agriculture and Fisheries, Biotechnology
  - Information & communication technologies
  - Nanosciences, nanotechnologies, materials & new production technologies, both in terms of "vertical actions" (targeted research projects) and "horizontal actions" (coordination, support, ...),
  - Energy
  - Environment (including Climate Change)
  - Transport (including aeronautics)
  - Socio-economic Sciences and the Humanities
  - Space
  - Security
- Coordination of Research Activities
- Joint Technology Initiatives (Public-Private Partnership in EU Research)

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<sup>14</sup> [http://cordis.europa.eu/fp7/home\\_en.html](http://cordis.europa.eu/fp7/home_en.html)

SafeFuture intends also to provide inputs to programs such as the new Competitiveness and Innovation Framework Programme<sup>15</sup> (CIP), Education and Training programmes, and Structural and Cohesion Funds for regional convergence and competitiveness, as well as work programmes defined in line with specific action plans or strategy (e.g. the SET-Plan and the corresponding Research and Technology Agenda, the NER300<sup>16</sup> related to EU-climate action).

### III.1 Financing instruments

Three main lines of implementation are proposed, namely:

- **Regular European Commission calls:** Embedding of ETPIS topics in FP7/FP8 projects dealing with “Safe new materials & technologies” and “Safe production networks and processes” mainly in the NMP programme, but also in other parts of the EC workprogramme and directly with some executive DGs such as Enterprise, Environment, Energy, Move, Info, Sanco...
- **PPP-Financing** for single projects of “SafeFuture” initiative (approx. volume of 200 mil. € envisaged – min. 50% industry) at European and national level (in line with the European Innovation Partnership principles)
- **Direct industrial financing**, e.g. through multi-client industrial projects with EU-supported coordination

NB:

No activities are proposed, assuming that the ERANET on Industrial Safety, SAFERA, will be launched in 2011 (based on the call published on July 20, 2010).

### III.2 Other actions

It is expected that the initiative on “SafeFuture” will trigger a series of new related projects on the following levels:

- National levels (in cooperation with National Technology Platforms industrial safety and National Mirror Groups)
- EUREKA
- Specialized EU agencies: EU-OSHA, ECHA...
- Company level: Mirror actions and development of company practices for implementation of concepts agreed on the EU, global and national level

### III.3 RSFF and EIB

Investment in research, development and innovation (RDI) has been identified as a key factor to improve competitiveness and ensure long term economic growth and employment in Europe. But finding private funding sources for RDI projects can be difficult due to their nature:

- complex products and technologies
- unproven markets
- intangible assets
- information difficult to evaluate by the financial sector.

For this reason, the European Commission and the European Investment Bank have joined forces to set up the Risk Sharing Finance Facility (RSFF). RSFF is an innovative scheme to improve access to debt financing for private companies or public institutions promoting activities in the field of RDI.

RSFF is built on the principle of credit risk sharing between the European Community and the EIB and extends therefore the ability of the Bank to provide loans or guarantees for investment with a

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<sup>15</sup> [http://ec.europa.eu/cip/index\\_en.htm](http://ec.europa.eu/cip/index_en.htm)

<sup>16</sup> [http://ec.europa.eu/clima/funding/ner300/index\\_en.htm](http://ec.europa.eu/clima/funding/ner300/index_en.htm)



higher risk and reward profile. The RSFF has a EUR 2bn capital cushion, EUR 1bn from the EIB and the same amount from the Commission's 7th Research Framework Programme (2007-2013), enabling the Bank to lend more than EUR 10bn for this kind of investment. By mid-2010 already EUR 6bn had been committed.

RSFF financing is available for promoters and entities of all sizes and ownerships, including corporations, midcaps, small and medium-sized enterprises, special purpose companies, public-private partnerships and joint ventures, research institutes, universities and science and technology parks.

See: <http://www.eib.org/products/loans/special/rsff/index.htm>