

ESIA European semiconductor industry response to the EU Commission's Green Paper:

From Challenges to Opportunities: Towards a Common Strategic Framework for EU Research and Innovation funding; Brussels, 9.2.2011 COM (2011) 48

About ESIA:

The Mission of the European Semiconductor Industry Association (EECA-ESIA) is to *represent, promote and defend the vital interests of the European-based semiconductor industry and to ensure its competitiveness in the global market.* The semiconductor industry provides the key enabling technologies at the forefront of the development of the Information Society. The sector supports over 110,000 direct jobs and up to 500,000 induced jobs in Europe, operating in a worldwide market valued at \$298bn (Europe \$38bn) in 2010. With membership covering companies, national sector associations and research institutes, ESIA is the voice of the semiconductor industry in Europe.

A: Questions 1-8: Working together to deliver on Europe 2020

1. How should the Common Strategic Framework make EU research and innovation funding more attractive and easy to access for participants? What is needed in addition to a single entry point with common IT tools, a one stop shop for support, a streamlined set of funding instruments covering the full innovation chain and further steps towards administrative simplification?
2. How should EU funding best cover the full innovation cycle from research to market uptake?
3. What are the characteristics of EU funding that maximise the benefit of acting at the EU level? Should there be a strong emphasis on leveraging other sources of funding?
4. How should EU research and innovation funding best be used to pool Member States resources? How should Joint Programming Initiatives between groups of Member States be supported?
5. What should be the balance between smaller, targeted projects and larger, strategic ones?
6. How could the Commission ensure the balance between a unique set of rules allowing for radical simplification and the necessity to keep a certain degree of flexibility and diversity to achieve objectives of different instruments, and respond to the needs of different beneficiaries, in particular SMEs?
7. What should be the measures of success for EU research and innovation funding? Which performance indicators could be used?
8. How should EU research and innovation funding relate to regional and national funding? How should this funding complement funds from the future Cohesion policy, designed to help the less developed regions of the EU, and the rural development programmes?

ESIA answers to questions 1-8:

Of particular importance ("very important") for ESIA are questions 1, 2, 3, 4, 7, 8.

- **Programmes and funding initiatives must be simplified. (Q1)**

The European funding landscape and its rules are too complex both in terms of number of programmes (JTI, PPP, KIC, ERC, CIP, FET) and in terms of their internal bureaucracies and processes. It is essential to avoid duplication and overlaps between these and simplification is crucial. Particularly SMEs cannot afford the resources required to handle the complexities. Simplification in the above direction would make the use and benefits of EU research and innovation funding more attractive and more accessible.

- **Strong European value chains must be further strengthened and serve as example for other cases. (Q2, Q15)**

Presently there is not a deficit of innovative ideas in the European micro/nanoelectronics ecosystem, but there is a deficit of those being exploited within Europe.

European scientific research – although excellent - is not always being converted into manufactured products, in time for the market needs, as already identified in the KETs process with reference to the European 'valley of death'. The path from fundamental science to system product is many-branched and global today; so Europe must take steps to assure that an appropriate proportion of valued and economically significant parts are maintained and exploited here. In particular we must take active steps to encourage those areas throughout the path (life-cycle) where we already have, or have the potential to

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develop, a position of international leadership. There is currently a disconnect between the long-term science-driven research and the industrialisation (commercialisation innovation) process which could be better aligned. The output of the former should provide the input to the latter and ensure that the innovative themes are addressed.

- **The new Framework must cover the full innovation cycle. (Q1,Q2)**
R&D&I should be supported by a much more integrated approach in the new Framework to cover the full innovation cycle. Research, Development and Innovation (R&D&I) are not independent of one another, and successful products have well integrated components of each. This situation is not helped by inadequate understanding of these respective roles. The present FP7 programmes tend to support research in one area, R&D in another and innovation again in another; and is further divided by preconceptions and predispositions of academia, SME and large enterprises and the differences between these. Understanding the inter-linkages and removing these artificial boundaries would therefore allow the much-needed focus on the full innovation cycle, as well as making EU funding more attractive and competitive.
- **The same framework should address the three pillars described in the KET interim report¹. (Q2)**
In order to ensure a successful innovation process, the different time horizons also have to be integrated in a same framework to address the three pillars described in the KET interim report (from science to technological research, product development and competitive manufacturing) and to be able to execute focused joint strategic programmes. This kind of cooperation between the different levels of the research (academic, institutes, industry), which covers the whole value chain of innovation (i.e. research, development, industrialization and manufacturing) is vital for creative innovation. Innovation drivers should be the focus more than the innovation users.
- **The measures for success for EU research and innovation funding should follow economic rather than scientific performance indicators. (Q7)**
Innovation means to bring an idea near to market. Publications and conferences give an impression about the scientific quality of the R&D work. However, the real impact shall be assessed on the basis of valid economic outcome, higher growth, employment and more SME participation.
- **Future European co-operation and funding schemes should facilitate European cross-border cooperation². (Q8)**
This will allow bridging the gaps between regional and national funding schemes. This is a way of guaranteeing the uptake of the R&D results by industry and society in the most efficient way.
- **European research and innovation funding must be used for initiatives of pan-European interest. (Q8)**

¹ http://ec.europa.eu/enterprise/sectors/ict/files/kets/hlg-working-document_en.pdf
& http://ec.europa.eu/enterprise/sectors/ict/files/hlg-ket-presentation-public_en.pdf

² See also ESIA Position Paper 29.03.11: 'Europe needs a stronger and more effective European cross-border funding instrument to reap the full benefits of its centres of excellence.' www.eeca.eu/esia/

Wide European cross-border cooperation and clear evidence of European added-value and exploitation should be emphasised.

- **Europe should fund areas with instruments which are not available at regional and/or national level. (Q4, Q8)**

Instruments should not be restricted by national priorities. The current implementation of the co-financing model of strictly coupling EC funding with national / regional funding for the JTIs ENIAC and ARTEMIS adds too much complexity and inefficiency and should be avoided or at least improved.

For example, the recent introduction of JTIs has created the necessity for a more precise delineation with existing EUREKA tools to avoid overlapping. Progress has been made to improve the global efficiency between JTIs and EUREKA clusters, but ESIA, CATRENE and AENEAS are convinced that – in the actual situation - the merge between EUREKA clusters and JTIs will not enhance the efficiency of R&D support. This point of view was also the conclusion of the independent experts of the interim audit on ARTEMIS and ENIAC.

Possible problems caused by the co-existence of specific European funding instruments with the national ones can only be overcome through a joint strategic approach leading to complementarities of the schemes. The current assignment of short- to medium-term research and development largely to national funding makes it more difficult to efficiently utilize the benefits of European cross-border research in these projects.

When strategic programmes are needed to develop competitive and leading edge solutions for a market, partners should adopt a bottom-up approach with a flexible environment and organization as offered for example by the EUREKA organisation. That kind of project requires compact consortia with some key actors of the domain. Industry considers that a financial support by the EC, as implemented at the beginning of EUREKA, will leverage the global efficiency and impact of the EUREKA projects, and in this way clusters are open to EC funding. This may also contribute to solve existing cross-border funding issues, particularly for small countries.

In addition the JTI funding efficiency would be more effective if the strict link between Member State and EC funding is removed.

- **Structural funds should also be useable for supporting R&D&I activities. (Q8)**

With this, they can favour the development of competitive local clusters through R&D&I funds, providing full access and spill-over effect to larger centres of excellence. Structural funds can also directly strengthen existing globally competitive centres of excellence.

- **The eligibility criteria for R&D should be modified in accordance with ESIA Position Paper.³ (Q2, Q27)**

The application of the R&D funding criteria in the EU means that the more R&D is product development-orientated, the less it is considered eligible for funding. This only seems to be the case in the EU, and goes well beyond original WTO guidelines. In some parts of the world this distinction does not even exist – R&D is simply R&D. Yet the development stage of R&D is also the area where many KET companies often invest most of their R&D. It is where the ideas generated in research labs find their commercial and societal application. For semiconductors as Europe's most R&D intensive industry

³ See ESIA Position Paper Oct. 2010: 'European R&D Funding Support for Micro/nanoelectronics'

sector, some 60-70% of company R&D is spent on the development side. EU funding schemes can currently support only some 10% of this. Having more deployment-orientated criteria would make Europe's framework conditions work better and be more attractive. The right changes would have a positive leverage effect for deployment in Europe. They would contribute to establishing a more global level playing field and remove an obstacle within the EU state aid regime. It would therefore be beneficial to:

- Based on an increased budget, re-interpret percentages applied to R&D categories *industrial & experimental* R&D. In the short term: a more global market interpretation of existing rules should allow higher funding intensity for R&D&I activities presently considered in the 'experimental development' range (25 % funding).
- In the longer term: harmonisation of the European rules with the more generous state aid practice in other regions in the world and compatible with WTO rules.

- **The SEA (Semiconductor Equipment Assessment) instrument should be re-introduced. (Q2)**

The SEA instrument created a lot of benefit for European equipment vendors (and their customers) and should again play a more prominent role within the funding schemes.

- **Both large and smaller projects are important, but the role of smaller, focussed projects shall be strengthened again. (Q5, Q10)**

Although large strategic projects are very important to address key challenges, 'small' 'bottom-up' projects such as the classical STREPs (Strategic Targeted Research Projects) in the European framework programmes were in the past very efficient to deliver very good results in well-focused areas. In parallel to the establishment of 'top-down' ETPs (European Technology Platforms) like ENIAC, the possibilities for such smaller 'bottom-up' projects have strongly diminished and should be increased again. Not only the European Commission with STREP type projects, but also EUREKA play a vital role in supporting successful bottom-up initiatives valid also for larger projects.

B. Questions 9-13. Tackling societal challenges

9. How should a stronger focus on societal challenges affect the balance between curiosity-driven research and agenda-driven activities?
10. Should there be more room for bottom-up activities?
11. How should EU research and innovation funding best support policy making and forward-looking activities?
12. How should the role of the Commission's Joint Research Centre be improved in supporting policy making and addressing societal challenges?
13. How could EU research and innovation activities attract greater interest and involvement of citizens and civil society?

ESIA answers to questions 9-13:

Of particular importance ("very important") for ESIA are questions 9, 10, 13

- **The balance between curiosity-driven research, and agenda-driven activities should not be strongly changed by focussing on societal challenges. (Q9)**

Societal challenges can contribute strongly in acting as technology drivers, and vice-versa technology - including processing technology - contributes strongly to finding solutions to and serving societal challenges. This link is especially strong in the case of generic technologies.

- **The possibilities for (smaller) 'bottom-up' projects have strongly diminished and should be increased again. (Q5, Q10)**

Although large strategic projects are very important to address key challenges, 'small' 'bottom-up' projects such as the classical STREPs (Strategic Targeted Research Projects) in the European framework programmes were in the past very efficient to deliver very good results in well-focused areas. Therefore, they should be re-enforced in parallel to

the establishment of ‘top-down’ ETPs (European Technology Platforms) like ENIAC. Not only the European Commission with STREP type projects, but also EUREKA play a vital role in supporting successful bottom-up initiatives.

- **The impact of Key Enabling Technologies (KETs - like Microelectronics) on all of our lives and well-being must be made visible. (Q13)**
 Pointing out how research can contribute to addressing defined societal challenges can help to promote ambition for technology leadership in Europe and their social acceptance. People do not wish to work on technical details but want to know they are working on a project relevant to society. At the same time defining solutions to societal challenges can act as a strong market pull factor. Rallying behind ‘man-on-the-moon’ goals could be a good example. (E.g. Energy efficiency: ‘CO₂-neutral housing’; ‘50% reduction of traffic CO₂ emission’. Connected mobile devices: ‘50% less traffic congestion;’ ‘Pan-European road tolling system’. Security: ‘Zero traffic casualties’ ‘100% watertight EU borders’. Health: ‘Majority of in-vitro diagnostics done at home’; ‘Average EU life expectancy of 80’.)
- **Sufficient funding should be specifically assigned to the creation of a Europe-wide "Microelectronics Living Lab". (Q13)**
 This "Microelectronics Living Lab" would illustrate the benefits of micro/nanoelectronics for the society, facilitating the adoption of technological innovation by society (i.e.: lab-on-chip, micro-fluidics, RFID, etc.). Living labs can increase awareness for applications of the future and their benefits.
- **Sustainable talent has to be recruited for key enabling technologies (like microelectronics). (Q13)**
 Stimulating a greater public awareness of and interest in technology, especially among younger generations and those in full-time educations, will direct sustainable talent into the micro/nanoelectronics industry. As an integrated part of programmes, partners within consortia should also connect directly with schools to raise awareness.

C. Questions 14-19. **Strengthening competitiveness**

14. How should EU funding best take account of the broad nature of innovation, including non technological innovation, eco-innovation and social innovation?
15. How should industrial participation in EU research and innovation programmes be strengthened? How should Joint Technology Initiatives (such as those launched in the current Framework Programme) or different forms of 'public-private partnerships' be supported? What should be the role of European Technology Platforms?
16. How and what types of Small and Medium-sized Enterprises (SME) should be supported at EU level; how should this complement national and regional level schemes? What kind of measures should be taken to decisively facilitate the participation of SMEs in EU research and innovation programmes?
17. How should open, light and fast implementation schemes (e.g. building on the current FET actions and CIP eco-innovation market replication projects) be designed to allow flexible exploration and commercialisation of novel ideas, in particular by SMEs?
18. How should EU level financial instruments (equity and debt based) be used more extensively?
19. Should new approaches to supporting research and innovation be introduced, in particular through public procurement, including through rules on pre-commercial procurement, and/or inducement prizes?

ESIA answers to questions 14-19:

Of particular importance (“very important”) for ESIA are questions 14, 15, 16, 17, 19

- **European funding schemes should support – where adequate – a multidisciplinary approach. (Q14)**
 An important aspect is the need to organize more multidisciplinary projects. For example, the decision by the EUREKA clusters to manage proposals also with a multidisciplinary focus through existing tools is useful in order to address the new social challenges that Europe is facing. And clusters are already managing some of these projects.

- **Skills and excellence have to be enhanced in Europe. (Q14)**

Human resources are essential for the competitiveness of Europe. Therefore we have to support education of a sufficient pool of experienced and talented engineers and researchers.
- **FP8 must favour the setting-up of a developer's community. (Q14, Q15)**

In order to take account of the broad nature of innovation, in some specific areas like embedded systems and especially in the mobile platform domain, FP8 must favour the setting-up of a developer's community based on an ecosystem covering the full value chain of innovation: hardware, software, validation, training, dissemination. One of the strengths of such a kind of ecosystem is in its capacity to expose small to very small organizations to a large potential market. It is important at European level to find a way to create ecosystems where big companies could help pulling smaller ones in their wake. This is even fundamental when assuming that innovation is also coming from SMEs.
- **R&D in manufacturing science must consequently be supported to improve the competitiveness of European semiconductor industry. (Q4, Q15)**

Manufacturing is a key asset for Europe and to stay competitive, the semiconductor industry must improve its manufacturing effectiveness. In this perspective, the SMEs could bring a major contribution in particular by their predominant role in the equipment semiconductor manufacturing landscape. A specific focused action in manufacturing science will allow SMEs to acquire specialized skills which they can use to expand their activity towards other semiconductor factories and beyond their traditional sector.
- **Creation of a European network of local ecosystems which combine all necessary competences and efforts around joint long term strategic technological programmes. (Q14)**

An effective way to achieve this would be to complement the Framework Programme with national and corporate investments to achieve the European integration desired. In some respects the ENIAC/ARTEMIS JTI's have the appropriate governing structure in place to drive this ambition for micro/nanoelectronics and embedded systems. To make the programmes effective, a common strategy of EU and Member States is necessary, as well as the right funding schemes (currently there is no cross-border funding scheme and a lack of Member State commitment to programmes already agreed to) (Q14).
- **Formation of "Competences Centres" with truly European agendas. (Q14, Q15, Q22, Q27)**

This would help strengthen Europe's science base and its competitiveness in order to achieve global pre-eminence whilst avoiding unnecessary duplication of effort and unnecessary regional competition. Means to reach this is to align individual interests and abilities, as well as to close the gap between advanced research performed by the academic laboratories and institutes - and its industrial integration. ETPs can play an important role in this by helping clarify the vector for technology and application development, to detail the stages along the life-cycle, to identify the national and regional competencies and how they might usefully network to the greatest European benefit. The local association of any R&D with commercial exploitation has a profound impact for developing local ecosystems and economic value; but none more so than the association of R&D with its volume manufacturing facility. The micro/nanoelectronics industry believes that in this context it is strategically important for Europe to maintain and develop a profitable and competitive manufacturing base.

- **Easy access to the EU research and innovation programmes must be given to SMEs. (Q16)**

They are the bedrock of innovation and employment in Europe. However, there is no such thing as a “standard” SME and each will have individual needs not only based on their technology but also those requirements that reflect the business realities of being an SME – these include limited resources, a focus on short cycle times for return on investment and limited “networks”. For SMEs to be fully involved in cooperative innovation programmes simple access mechanisms and “guided” networking with potential partners is essential. SMEs need to be able to engage, without excessive bureaucracy, in a full range of funding programmes (from small “local” through medium “regional/country” and large “European”) - ideally guided through the opportunities by their local Public Authority representatives and WITHOUT having to independently access multiple funding programmes. Ideally, a mechanism would exist where geographically widespread SMEs have access to first local and then transnational "showcases" whereby they can seek compatible partners and larger companies have access to all the innovation that may form the basis of large, game changing and innovative projects. Access to and involvement in a network of technology clusters as well as “showcase” opportunities with larger enterprises could help capability awareness and cooperation. Finally, commercial outcomes are essential. Innovation is only meaningful to an SME if it can turn the outcomes into a market, either internally within a consortium or directly to the customer.

- **For SME, support - not just funding - should come in formats that suit both large and small and short and long-term projects. (Q17)**

Speed and flexibility fit well in the SME environment, along with a focus on a commercial outcome. Too many ideas can either remain unrealised or are eclipsed by faster competitors that are either better funded and/or supported.

Quantity is also important; though attention is often focused on creating “large” SMEs as a measure of success this will always be a rare, if welcome, event. Supporting a very large number of SMEs who thereby achieve good growth with the resulting increase in employment and technology capability within Europe will have a much more beneficial economic effect than creating one “giant SME” – or new large enterprise.

- **European technical standards have to be established and adopted early. (Q19)**

This of can favour the rapid development of European markets for technology products, and the whole European infrastructure involved in their life-cycle. Public procurement on common European standards is important to transform societal challenges into lead markets and drive innovation and economic growth. ETPs can play a leading role in standards and public procurement, in initiating or kick starting the markets. A few of the opportunities for this today are: the electric car, smart grids, healthcare, wireless systems, energy saving, security and the connected home. Public authorities can play a pivotal role here in acting as first adopter and show case for innovation, as a procurer for innovation and as drivers of demonstration projects.

D. Questions 21-27. Strengthening Europe's science base and the European Research Area

21. How should the role of the European Research Council be strengthened in supporting world class excellence?
22. How should EU support assist Member States in building up excellence?
23. How should the role of Marie Curie Actions be strengthened in promoting researcher mobility and developing attractive careers?
24. What actions should be taken at EU level to further strengthen the role of women in science and innovation?
25. How should research infrastructures (including EU-wide e-Infrastructures) be supported at EU level?

26. How should international cooperation with non-EU countries be supported e.g. in terms of priority areas of strategic interest, instruments, reciprocity (including on IPR aspects) or cooperation with Member States?

27. Which key issues and obstacles concerning the ERA should EU funding instruments seek to overcome, and which should be addressed by other (e.g. legislative) measures?

ESIA answers to questions 21-27:

Of particular importance (“very important”) for ESIA are questions 23, 25, 26, 27

- **Marie Curie actions could be strengthened by the mutual and automatic recognition of academic degrees inside Europe. (Q23)**

Marie Curie actions can contribute remarkably in attracting young scientists - especially women - and forging closer co-operation with the universities aiming to create content and disseminate methodologies matching well with the skills required by the evolution of the micro/nanoelectronics industry.

- **Research infrastructures should be strongly guided by the respective ETPs and supported by the CIP. (Q25)**

For the micro/nanoelectronics domain specifically there is a need to set-up a research infrastructure ecosystem based on a focused strategic technological joint programme. Such an infrastructure has to be strongly guided by the ETP, with the advanced R&D issues (academic and institutes) supported by the EC, and the industrial R&D activities by the national authorities. The CIP (Competitive Innovation Programme) should facilitate the participation of the SMEs to the R&D Programme.

- **The EC should propose a framework for cooperation with non-EU countries which guarantees reciprocity and mutual protection of IP rights. (Q26)**

This would bring strong benefit for Europe and would limit the risk of being cut-off from key developments as a region. Reciprocity should be guaranteed. Cooperation is already a reality with globally acting R&D players and a supporting role along the above lines would be beneficial for Europe.

- **Members States’ strategies should be aligned with an overall European strategy. (Q27)**

This can resolve the current funding issue.

- **European funding schemes should allow for cross-border cooperation.⁴**

This would guarantee the uptake of the R&D results by industry and society in the most efficient way. European funding should be used as a glue to stimulate cross-border cooperation and ensure a significant degree of European exploitation.

- **A single European patent and a reduction of patent costs should be introduced. (Q27)**

But this should not happen by decreasing the unique patent quality of the EU system.

- **Europe should fight for a global level playing field rather than concentrating on the EU internal competition. (Q27)**

From a European economic perspective and for globally competing companies/industries, the focus should be being leaders in a **global level playing** field rather than concentrating on the EU internal competition. ‘Strengthening competitiveness’ and innovation should be regarded under this perspective.

⁴ See also ESIA Position Paper 29.03.11: ‘Europe needs a stronger and more effective European cross-border funding instrument to reap the full benefits of its centres of excellence.’ www.eeca.eu/esia/