

# Consultation related to the e-Highway2050 Strategic Environmental and Sustainability Assessment (SESA).

## Consultation Document and Questionnaire Form

October 2013

Feedback and answers **TO BE RETURNED BEFORE**  
**FRIDAY 1<sup>st</sup> OF NOVEMBER 2013 to [info@e-Highway2050.eu](mailto:info@e-Highway2050.eu)**



## Structure of this consultation document:

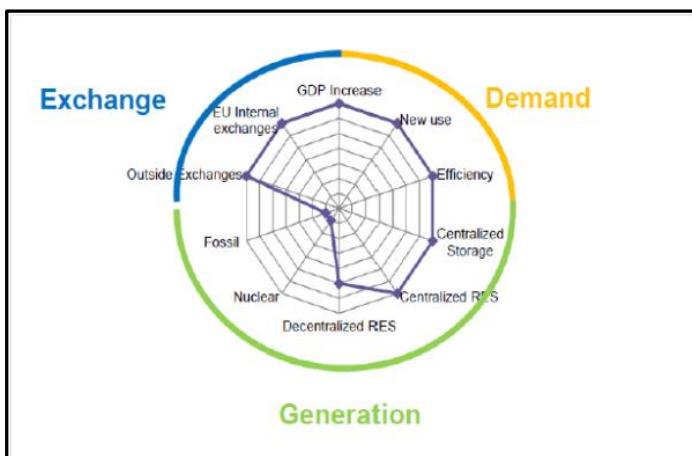
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# 1 What is e-Highway2050?

The e-Highway2050 project is an EU Seventh Framework Programme<sup>1</sup> intended to support the planning of the **Pan-European Transmission Network** – i.e. the electricity network to serve the European Union and beyond – to ensure the reliable delivery of existing and potential new sources of renewable electricity as well as supporting the integration of the wider pan-European market. The project looks to the future, to the period **2020-2050**, and will result in a **modular development plan** for implementing possible future electricity transmission grids.

Alternative pan-European **grid architectures** are being developed based on a range of plausible **future scenarios** for Europe's energy systems. The grid architectures will be strategically assessed in terms of their potential ability to support environmental and sustainability conditions for development.

The scenarios have been developed around three broad **parameters** that influence future energy systems: 1) energy exchange; 2) energy demand; and 3) energy generation. The possible future layouts and designs of the grid will therefore depend on the types of electricity generation, amount of demand and energy efficiency, and the degree of exchange of electricity supply across EU and Member State borders



A key objective of the pan-European grid architectures developed through e-Highway2050 is to **improve connectivity** between areas of demand and areas of supply, as future **energy consumption** areas are not necessarily located in close proximity to Europe's main, future **energy production** areas. Development at this level raises a number of **strategic opportunities** and **risks** for the environment and overall sustainability.

<sup>1</sup> EU Seventh Framework Programme homepage: [http://cordis.europa.eu/fp7/home\\_en.html](http://cordis.europa.eu/fp7/home_en.html) [accessed 02/10/13]

A key component of e-Highway2050 is working with stakeholders to identify the **conditions** that grid architectures for 2050 will have to satisfy, to help ensure **pathways for sustainability** and a sustainable outcome overall.

Further information on e-Highway2050, including a more detailed explanation of the **methodological approach** and its constituent **work packages** can be found on the e-Highway 2050 website at: <http://www.e-highway2050.eu/e-highway2050/>

## 2 Purpose of this consultation

*The purpose of this consultation is to capture a range of interests and perspectives concerning environmental and sustainability issues associated with the development of pan-European grid architectures.*

Sections 3 and 4 provide further detail on the proposed methodological approach to the strategic environmental and sustainability assessment of the potential grid architectures. Section 6 poses a number of **consultation questions** and provides a template for stakeholders to respond to those questions. In general terms however, we are seeking your views on the following:

- What are the key sustainability **opportunities** and **risks** posed by long-term electricity grid-development in Europe?
- What are the main **drivers** of long-term electricity grid-development in Europe?
- Do you have any **general comments** on the range of environmental and sustainability assessments factors and criteria proposed?
- What are your thoughts on the proposed **framework for assessing** possible future grid architectures? Do you have any suggestions for other aspects or issues that should be considered at this strategic level?

The approach to the strategic environmental and sustainability assessment of the possible grid architectures in e-Highway2050 is based on a strategic thinking model developed by Partidário (2012)



that has been endorsed by the EC<sup>2</sup>. The approach is referred to as **Strategic Environmental and Sustainability Assessment or SESA**.

SESA is a **highly strategic** approach designed to **support** decision-makers by providing information on the broad sustainability risks and opportunities associated with strategic actions.

SESA recognises that strategic decision-making for **long-term** time horizons – e.g. evaluating possible future grid architectures for a Pan-European Transmission Network in 2050 – generally involves a high degree of **uncertainty**. Accordingly, the SESA approach is **qualitative, responsive to change and collaborative**.

The outcomes of this consultation will help to qualify some of the inherent uncertainty around e-Highway2050 by understanding the **priority issues** and **different perspectives** as well as **key opportunities** and **risks** that will be reflected in the subsequent development of the assessment framework.

### 3 Overview of the SESA methodology for environmental and sustainability assessment



SESA will be used to assess the grid architectures in a comparative way, identifying potential sustainability **opportunities** and **risks** of developing a pan-European electricity grid in the long-term, looking to 2050.

The purpose is to interact and help grid designers and decision-makers, during early 2014, to integrate environmental and sustainability priorities in the design of a preferred grid architecture, in a way that ensures key development conditions that are sound in environmental and wider sustainability terms.

<sup>2</sup> Partidario, MR 2012. Strategic Environmental Assessment Better Practice Guide - methodological guidance for strategic thinking in SEA: <http://ec.europa.eu/environment/eia/sea-support.htm> [accessed 03/10/13]

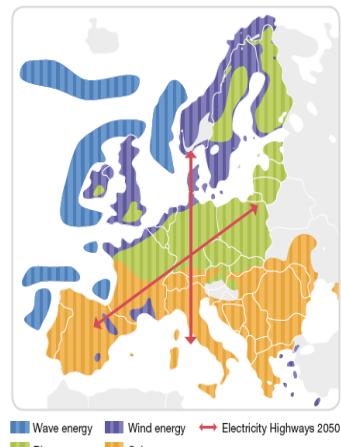
### 3.1 What will the SESA assess?

SESA will assess **strategic grid architectures** in terms of the inherent **strategy** behind the architectures, i.e. in terms of the mix of generation technologies and approaches to demand/consumption management, European regional balances and opportunities for international linkages.

The design of potential grid architectures is informed by plausible future European energy system scenarios<sup>3</sup>, based on the three parameters of energy **exchange**, energy **demand** and energy **generation**. The relative importance of these three parameters influences the design and layout of the grid architectures.

An **illustrative** scheme is shown on the figure opposite, showing the layout of EU internal **exchanges** and outside **exchanges** (e.g. between Southern Europe and North Africa in the south and Scandinavia and Russia in the north-east).

Generation technologies considered in e-Highway2050 are fossil fuels, nuclear and centralised/decentralised renewable energy systems (RES). Example RES technologies are illustrated on the figure above: wind; wave; biofuel; and solar energy.



### 3.2 How will the SESA assess the possible grid architectures?

SESA uses a methodological focusing device called **Critical Decision Factors** or **CDF**. The CDF are designed to **focus attention** on the issues that really matter – strategic themes that result from the cross-relationship of 1) the e-Highway2050 objectives (i.e. what the project is trying to achieve); 2) relevant environmental and sustainability issues and trends; and 3) relevant priority policies.

<sup>3</sup> The five energy system scenarios were developed during an earlier stage of the e-Highway2050 project: <http://www.e-highway2050.eu/e-highway2050/work-package-2/> [accessed 03/10/13]

The CDF will thus reflect the key environmental and sustainability **conditions** that are fundamental to successful **sustainable outcomes** for e-Highway2050. Where these conditions are **satisfied** there will be **opportunities**. Where the conditions are **not satisfied**, there will be **risks**. Guidelines for continued integrated planning and operationalization will be suggested. Further details on the CDF and other aspects of the assessment framework are provided at Section 4.

## Summary of SESA methodology

### Stage 1: Understanding the context and strategic focus for the environmental and sustainability assessment – establish Critical Decision Factors

**NB:** Stage 1 ensures that the assessment focuses on issues of **strategic importance**, highlighting the conditions that grid architectures for 2050 must satisfy in order to **ensure sustainable outcomes** in the long-term. Stage 1 involves:

- **Defining the problem framework:** *what are the key environmental and sustainability issues and trends of relevance to e-Highway2050?*
- **Defining the governance framework:** *what governance arrangements are already in place? What additional structures and processes may be required to support the effective delivery of e-Highway2050?*
- **Defining the strategic reference framework:** *what is the relevant policy framework for e-Highway2050 and what are the key objectives and targets? How do these support or constrain the activities of e-Highway2050? Are there any major conflicts or synergies that need to be considered?*
- **Defining the assessment framework:** *integrating all of the above to identify the conditions or Critical Decision Factors (CDF) that e-Highway2050 will need to satisfy to ensure success. Development of more detailed assessment criteria and indicators to support the assessment*

### Stage 2: Assessing candidate grid architectures, identifying pathways for sustainability and developing guidelines

**NB:** Stage 2 is scheduled to commence in early 2014. The assessment framework (CDF, assessment criteria and indicators) developed in Stage 1 defines the conditions that grid architectures must satisfy to ensure sustainable outcomes. In Stage 2, the candidate grid architectures are **assessed** against the assessment framework, identifying the specific **risks** and **opportunities** associated with the grid architectures, and the **most suitable options** in terms of their ability to deliver sustainable outcomes for e-Highway2050. The outcomes of this assessment will be consid-

ered in conjunction with the **operational assessment**, when selecting a **preferred architecture** for the modular development plan.

#### Stage 3: Continuous process linkages, stakeholder engagement, monitoring and evaluation

**NB:** key aspects of Stage 3 are designed to support continuous process linkages between the e-Highway2050 consortium members and relevant stakeholders as well as to ensure that the implementation is followed up by continuous monitoring and evaluation. Accordingly, some Stage 3 related actions are already in place, as exemplified by the consultation agenda outlined in the next steps section below. One of the key aims of Stage 3 is to **link SESA outcomes with stakeholders** and strategic **decision-making**

## 4 The proposed SESA assessment framework

As described at section 3.2, the SESA assessment framework comprises the CDF, assessment criteria and indicators. The assessment framework defines the **conditions** that grid architectures must **satisfy** in order to deliver **sustainable outcomes**. CDF are structured in criteria for assessment and use indicators as the assessment metrics. Accordingly, the assessment framework reflects the **critical strategic issues** of relevance to **e-Highway2050** and long-term **electricity grid development** in Europe. This will ensure that the SESA identifies relevant risks and opportunities, thereby supporting the development of grid architectures that can best contribute to **sustainable outcomes** in the long-term.

The figure below depicts the three sets of key issues that have been **cross-referenced** and **integrated** to inform the proposed SESA assessment framework – the CDF – which is depicted in the centre of the diagram. Of overarching importance is the e-Highway2050 **strategic objective** – this is what the grid architectures must be able to deliver: “*to develop a grid which supports progress to a high proportion or mix of electricity from renewable energy systems (RES) and develop options for a complete pan-European grid architecture based on different scenarios*”.

This is supported by key **environmental** and **sustainability issues/trends** of relevance to e-Highway2050 – six broad themes have been identified: 1) governance issues, legal and institutional framework; 2) social equity and consumption behavior; 3) energy security; 4) environmental issues; 5) economic issues; and 6) technological issues. Further, there are a range of **priority policies** that set the context within which the grid architectures will operate e.g. Energy 2020, a strategy for com-



petitive, sustainable and secure energy<sup>4</sup>, Energy roadmap 2050<sup>5</sup>, the 2030 framework for climate and energy policies<sup>6</sup> and the European Landscape Convention<sup>7</sup>. Informed by the integrated consideration of the above sets of issues, the following Critical Decision Factors for the assessment of the e-Highway 2050 grid architectures have been identified:

1. Social perception and acceptance;
2. Energy security and energy technologies;
3. Geo-political economy and regional equity; and
4. European regional governance.



The proposed SESA assessment framework structured around the identified CDF is outlined in the tables below (CDF1-4).

The goal of this consultation is to refine the SESA focus/approach and assessment framework below. It is very important to the success of the overall e-Highway2050 project that the perspectives and opinions of key stakeholders are incorporated within the SESA assessment framework. The SESA team values **stakeholder input** to reflect a wide range of interests and perspectives, also to ensure SESA can be grounded in reality. Specific consultation questions relating to the assessment framework can be found in Section 6.

## CDF 1 Social perception and acceptance

**Objectives / Scope:** To focus on all factors that affect a sense of well-being, and consequently determine perception, and acceptance of grid development, including social equity, individual and community benefits, environmental issues such as noise, health issues, biodiversity, ecosystem services and landscape, urbanisation, energy related behavioural trends, as well as vulnerability to climate change and extreme events

Assessment Criteria
<b>Social Equity</b> <ul style="list-style-type: none"> <li>- Access to benefits and costs to all citizens in the area of influence</li> <li>- Consumption behaviors</li> </ul>

<sup>4</sup> [http://ec.europa.eu/energy/strategies/2010/2020\\_en.htm](http://ec.europa.eu/energy/strategies/2010/2020_en.htm) [accessed 08/10/13]

<sup>5</sup> [http://ec.europa.eu/energy/energy2020/roadmap/index\\_en.htm](http://ec.europa.eu/energy/energy2020/roadmap/index_en.htm) [accessed 08/10/13]

<sup>6</sup> [http://ec.europa.eu/energy/green\\_paper\\_2030\\_en.htm](http://ec.europa.eu/energy/green_paper_2030_en.htm) [accessed 08/10/13]

<sup>7</sup> [http://www.coe.int/t/dg4/cultureheritage/heritage/Landscape/default\\_en.asp](http://www.coe.int/t/dg4/cultureheritage/heritage/Landscape/default_en.asp) [accessed 08/10/13]

<ul style="list-style-type: none"> <li>- Green behavior (attitude towards RES technologies, nuclear, shale gas)</li> <li>- Stakeholder engagement and social/public perceptions/acceptance</li> </ul>
<b>Biodiversity, landscape and Ecosystem services</b>
<ul style="list-style-type: none"> <li>- Relevance of biodiversity to livelihoods and European changing lifestyles</li> <li>- Future Legacy: enhancement of natural and cultural values</li> <li>- Landscape enhancement (character, amenities)</li> <li>- Ecosystem services performance, including resilience to extreme events</li> </ul>
<b>Vulnerabilities</b>
<ul style="list-style-type: none"> <li>- Health vulnerabilities to noise, radiation and climatic extreme events</li> <li>- Land vulnerability to climatic extreme events</li> <li>- Grid infrastructure vulnerability to climatic extreme events</li> </ul>

## CDF 2 Energy security and technologies

**Objectives / Scope:** To focus on clear trends towards favouring EU and national policies concerning RES, technological enhancement to favour complementary, interconnectivity, smart initiatives that reduce costs and increase benefits and ensure energy security across and within MS policy and practice

Assessment Criteria
<b>Energy Efficiency</b>
<ul style="list-style-type: none"> <li>- GHG emissions</li> <li>- Policies/ Measures to increase energy/resource efficiency</li> <li>- Renewable energy potential and sources</li> <li>- Centralized and decentralized RES production</li> </ul>
<b>Innovation and technological development</b>
<ul style="list-style-type: none"> <li>- Interconnectivity of energy sources and production</li> <li>- Maturity of new technologies for medium to long-term implementation</li> <li>- Smart grids</li> <li>- Investments in Research and Development</li> </ul>
<b>Energy security</b>
<ul style="list-style-type: none"> <li>- Maturity of new technologies to ensure the security of supply with a given demand</li> <li>- Supply to demographic scenario demands</li> </ul>

## CDF 3 Geo-Political Economy and regional equity

**Objectives / Scope:** To focus on European competitiveness in its geo-political environment considering energy, balanced by the need to ensure regional equity within European MS concerning sources of energy, market accessibility and distributional equity, and implications for national/local economies and development options.

Assessment Criteria
<b>International competitiveness</b> <ul style="list-style-type: none"><li>- Joint transnational and national investment and trade initiatives</li><li>- Contribution of economic activities of the energy sector in the trade balance</li></ul>
International energy trade
<b>Market dynamics and regional equity</b> <ul style="list-style-type: none"><li>- Improved communities well-being in the area of influence</li><li>- Fuel and energy costs, market value of affected land</li><li>- Risk assessment of projected infrastructures</li></ul>
Distributional effects and benefits across countries

## CDF 4 European Regional Governance

**Objectives / Scope:** To focus on the governance conditions to operationalize the European internal market of electricity distribution and management of the EH2050 concept, including national systems capacity to deliver international/global agreements, regulations, competences, responsibilities across the Union, restricting factors at European and national levels.

Assessment Criteria
<b>Policies and politics</b> <ul style="list-style-type: none"><li>- Harmonization between legislation and regulations</li><li>- National policies strategic priorities</li></ul>
Energy security and non-dependency from countries outside of Europe
<b>Responsibilities and competences</b> <ul style="list-style-type: none"><li>- Coordination of European grid - strategies for joint / collaborative / articulated management</li><li>- Border institutional cooperation mechanisms</li><li>- Mechanisms for supporting the grid responsibilities within each member-state</li></ul>
Stakeholders engagement and public information

## 5 Next steps

Consultation on this paper sets the beginning of the stakeholder engagement process on the SESA. There will be a number of other opportunities to input on the approach and assessment framework during October and November 2013 as detailed in the table below, and also between January and April 2014, to input to Stage 2 of the SESA.

Completed questionnaire templates (see Section 6) in response to this consultation and general queries/comments concerning the e-Highway2050 project as a whole should be sent to:  
[info@e-Highway2050.eu](mailto:info@e-Highway2050.eu).

For specific queries/comments concerning this consultation on the SESA approach and assessment framework or the SESA more generally, please contact rbrunosoares@ist.utl.pt.

<b>e-Highway2050 stakeholder engagement programme</b>			
<b>Stage</b>	<b>Activity</b>	<b>When?</b>	<b>Who?</b>
1. Refining SESA focus and assessment framework	Consultation on SESA focus/ approach and proposed assessment framework	October 2013	All stakeholders
	Web-conference on feedback received from first consultation (see above)	Late November 2013	Respondents to first consultation and other key stakeholders by invite
	Web-conferences for specific discussion groups (if required)	Late November 2013	Discussion groups
2. SESA preliminary outcomes	Consultation via web	January and April 2014	Discussion groups
	Workshop in Brussels	March 2014	All stakeholders
3. SESA Final Results and Follow-Up	Dissemination of report via website	July 2014	All stakeholders

## 6 Questionnaire Form

Feedback and answers **TO BE RETURNED BEFORE FRIDAY 1<sup>st</sup> OF NOVEMBER 2013** to [info@e-Highway2050.eu](mailto:info@e-Highway2050.eu)

This questionnaire is structured as follows:

- A) Questions on key environmental and sustainability issues and trends of relevance to e-Highway2050;
- B) Questions on the proposed assessment framework for environmental evaluation of e-Highway 2050;
- C) General questions.

Please note that response boxes will expand to accommodate more text and that respondents should write in these.

Please refer to Sections 1 – 5 above when responding to this questionnaire



## A) Key environmental and sustainability issues to be taken into account in the strategic environmental and sustainability assessment

1. What are the main drivers of long-term electricity grid-development in Europe?

*Please list 5 drivers in order of importance*

1. Integration of all RES in Europe
2. Create a single electricity market and therefore reduce prices for all consumers
3. Reduce CO2 emissions
4. Decrease dependence from third countries
5. Further integration and interdependence among MSs to improve security of supply at least cost

2. What are the priority policies of relevance to long-term electricity grid development in Europe?

*Please list 5 policies in order of importance*

1. energy policy
2. environment policy
3. climate policy
4. investment policy
5. technology policy

3. What are the key opportunities and risks for sustainable development posed by long-term electricity grid-development in Europe? Please list your top 3 opportunities and top 3 risks.?

<i>Opportunities</i>	<i>Risks</i>
1. Full RES development	1.
2. Use and export of European technology	2.
3. Skilled Employment opportunities	3.

**Comments:**

## B) The proposed assessment framework

4. Does the proposed assessment framework reflect the fundamental factors that need to be considered in decision-making in order to support the design of a more sustainable electricity grid for 2050?

Yes

No

### Comments:

5. Are there any other critical issues that should be covered in the assessment framework?

*Where relevant, please list 3 additional critical issues in order of importance*

- 1.
- 2.
- 3.

6. Are there any issues covered in the assessment framework that are not critical or that overlap with or duplicate other issues each other?

## C) General questions

7. Do you have any general comments on the appropriateness and utility of the proposed approach to strategic environmental and sustainability assessment?

**Comments:**

Web-conferences are being organized to discuss the responses to this consultation (see Section 5 above):

- Web conference on general feedback
- Web conference for specific discussion groups (if required)

If you would like to be contacted about these web-conferences, please provide an email address below.

## Stakeholder information

Expert Name	Ana Aguado
Organization	<b>Friends of the Supergrid</b>
Sector ( <i>please tick</i> ) :	
Government/ policy sector:	
Private sector:	<b>X</b>
NGO:	
Contact	<b>Ana Aguado, CEO (<a href="mailto:ana.aguado@fosg.eu">ana.aguado@fosg.eu</a>)</b>
Date	<b>01/11/2013</b>

**THANK YOU FOR YOUR CONTRIBUTION!**

## Consortium.

