Stirling engines in the context of the EU's energy priorities

Paul Verhoef

**Head of Unit
DG RTD G3: Renewable Energy Sources**

Paul.Verhoef@ec.europa.eu

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"Renewable energies and their development is a sine qua non if tomorrow's Europe really is going to create lasting, consistent and sustainable locational advantages which are directly comparable with those of other world players."

"I want the European Union to become the world number one in renewables."

*Jean-Claude Juncker,
President-elect of the European Commission*

EU Energy policy priorities

- Energy security strategy
- Energy efficiency goals
- Renewable energy targets for 2030
- Infrastructure renewal and interconnection
- Smart/intelligent networks
- New players with new roles/services
- Focus on needs of users

Some of the ongoing actions

- Development of new technology and innovation
    - H2020 – energy sources, conversion, grids, storage, efficiency
- Consideration for the entire energy system
    - Technical
    - Economic
- Align economic efficiency and technical optimisation through market design
- Stimulate investments
- Align actions of Member States and Commission

Energy Challenge: SET-Plan
(Strategic Energy Technology Plan)

Technology Pillar of EU energy & climate policy (20/20/20 targets)

Accelerate development of key low-carbon technologies
- to make them affordable and competitive faster
- to reach EU 2020 targets at lower cost
- to support security of energy supply

Competitiveness of EU industry
- engine for growth and jobs

Europe 2020 Strategy

Comprehensive public-private coordinated strategy

Involves all stakeholders (EC/Member States, industry, research)
- A new way of working (to avoid fragmentation of efforts)
- Coordination at both strategic planning and implementation

Implementation via innovative instruments:
- Industrial initiatives: public-private partnerships with industry
- Research Alliance (EERA)

SET-Plan – Integrated Roadmap

<u>Communication on Energy Technologies and Innovation</u> adopted on 2 May 2013

Key conclusions of the Communication:

- SET Plan as the core strategy to deliver on the energy challenge - provides the reference point for EU, national, regional and private investments in energy R&I

- However, needs reinforcing, to respond to the new challenges such as system integration, industrial leadership, new and emerging technologies and to better consolidate R&I capacity and resources across Europe

SET-Plan – Integrated Roadmap

The Integrated Roadmap will:

- address energy system integration,

- consolidate the up-dated technology roadmaps of the SET Plan

- cover the entire research and innovation chain from basic research to demonstration and support for market roll-out

- identify clear roles and tasks for the various stakeholders

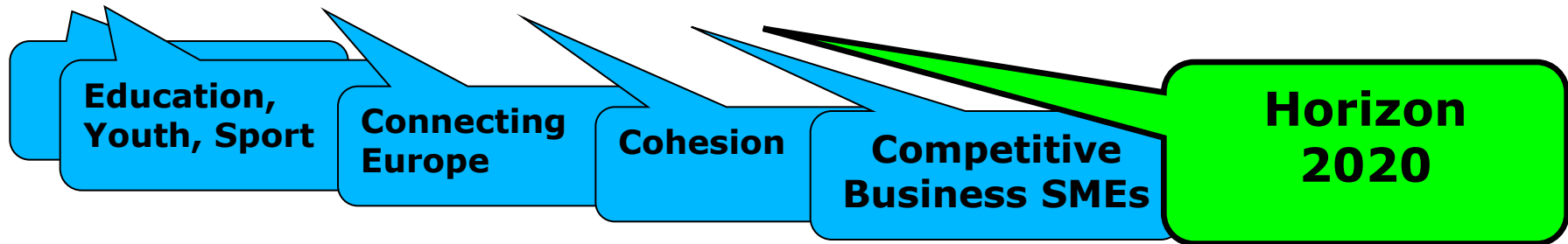- Provide new confidence to investors

SET-Plan – Integrated Roadmap

- A comprehensive proposal of R&I actions has been provided by the stakeholders' Coordination Group and Working Group

- Stirling engines are mentioned as a technological option

- The Member States are providing comments on the R&I actions. The first draft of the Integrated Roadmap should be ready by October 2014.

Horizon 2020

The Multiannual Financial Framework (MFF) 2014-2020:

1. Smart & inclusive growth

Education, Youth, Sport **Connecting Europe** **Cohesion** **Competitive Business SMEs** **Horizon 2020**

2. Sustainable growth, natural resources
3. Security and citizenship
4. Global Europe
5. Administration

Horizon 2020

Three priorities:

1   Excellent science
2   Industrial leadership
3   Societal challenges:

- *Health, demographic change and wellbeing*
- *Food security, sustainable agriculture, marine and maritime research and the bio-economy*
- *Smart, green and integrated transport*
- *Climate action, resource efficiency and raw materials*
- *Inclusive, innovative and secure societies*
- *Secure, clean and efficient energy (funding 5,93 Beuro)*

Horizon 2020

First Horizon 2020 Work Programme

Basic principles:

- 2-year work programme to allow for better preparation of applicants

- Challenge-based approach (not prescribing technology options)

- Cross-cutting actions

- Use of TRLs to specify scope of activities

Horizon 2020

Technology Readiness Levels

TRL 0: **Idea**. Unproven concept, no testing has been performed.

TRL 1: **Basic research.** Principles postulated and observed but no experimental proof available.

TRL 2: **Technology formulation**. Concept and application have been formulated.

TRL 3: **Applied research**. First laboratory tests completed; proof of concept.

TRL 4: **Small scale prototype** built in a laboratory environment.

TRL 5: **Large scale prototype** tested in intended environment.

TRL 6: **Prototype system** tested in intended environment close to expected performance.

TRL 7: **Demonstration system** operating in operational environment at pre-commercial scale.

TRL 8: **First of a kind commercial system**. Manufacturing issues solved.

TRL 9: **Full commercial application**, technology available for consumers.

Horizon 2020

Research and Innovation actions:
Actions primarily designed to establish new knowledge and/or to explore the feasibility of a new or improved technology, product, process, service, or solution, including testing and validating on a small scale laboratory prototype.

Innovation actions:
Actions primarily aimed at producing plans and arrangements or designs for new, altered or improved products, processes or services.

Horizon 2020

Call LCE (Competitive Low-carbon Energy)
First Call: H2020-LCE-2014-1

Proposals concerned with <u>Stirling engines</u> have been submitted for the following technology-specific challenges:

- *Making CSP plants more cost competitive*

- *Innovative solutions for solar cooling systems*

- *Improving efficiency of biomass CHP systems*

Two proposals have been invited to second stage

The future of energy in the EU

- A flexible, modernised, integrated, smart system
- Agile and innovative providers of new energy services
- Well-informed and smart users
- A system underway to full decarbonisation
- A market design that allows to reap the full benefit of new technology and innovation
- A cost-efficient system allowing for a competitive EU

Your ideas are important. Your involvement is essential!