JRC’s structure

The JRC’s headquarters are in Brussels, in close proximity to many of its most important stakeholders. These include the policy-making Directorates-General of the European Commission and other institutions, in particular, the European Parliament.

Most of JRC’s scientific work is carried out in JRC’s institutes, located on specialist sites in five countries. The main site is in Ispra, Italy, which hosts the European electric vehicle and smart grids interoperability centre.

Facts & figures about the JRC

- Established 1957
- 2,828 scientific and technical personnel
- 7 scientific institutes
- 245 instances of support to the EU policy-maker in 2011
- 1,356 publications in 2011

As the Commission’s in-house science service, the Joint Research Centre’s mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new methods, tools and standards, and sharing its know-how with the Member States, the scientific community and international partners.

Key policy areas include: environment and climate change; energy and transport; agriculture and food security; health and consumer protection; information society and digital agenda; safety and security, including nuclear; all supported through a cross-cutting and multidisciplinary approach.

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E-mobility and smart grids at the JRC

E-mobility-clean and environmentally friendly transport using electric vehicles—is based on an innovative, climate friendly technology with big growth potential. For this dynamic sector, standards and interoperability are becoming increasingly important as they provide a predictable framework that gives innovators confidence to bring their products to market.

The automotive industry, electricity suppliers and legislators are all pushing for standardisation in the field of e-mobility. For global automotive manufacturers and suppliers, this is particularly urgent as they must make investment decisions to support production of e.g., plug-in hybrid vehicles for the next model years. In parallel, utilities and network operators, who are investing heavily in the development of ‘intelligent’ electricity distribution systems—smart grids—need to future-proof their infrastructure investments to meet the needs of a step-wise electrification of road transport as well as the specificities of different renewable energy production methods. The European Commission plays an important role in the standardisation process at European and global level in promoting global harmonised standards and enhancing product safety standards as well as interoperability.

The Joint Research Centre (JRC), the European Commission’s in-house science service, provides evidence based advice for EU policy makers and assists in establishing standards in many different areas. It works closely with EU bodies, external partners, industry and international standards organisations to develop and verify standards. With focused research efforts, the JRC aims to play a key role in the shaping of standards and policy in the e-mobility sector as well as assist the EU’s energy efficiency targets for 2020.

FOSTERING CLOSER EU-US COLLABORATION

The JRC hosts one of the two EU-US Electric Vehicle and Smart Grid Interoperability centres. They were set up following the signing of a Letter of Intent for closer cooperation on e-mobility and smart grids between the JRC and the US Department of Energy. The centres are located at the JRC facilities in Ispra, Italy and at Argonne National Laboratories in the US.

The objective of the twin centres is to promote a common approach between the US and the EU with regards to testing of relevant electric vehicle and smart grid equipment, and the fostering of global standards. In addition, they focus on the interoperability issues between e-vehicles, smart grids and recharging systems.

The centres also provide testing facilities for electric vehicles and the related supply equipment, and participate in each others’ inter-laboratory comparisons. Finally, they aim to promote a link between the US and the EU vehicle industries on electric vehicle interoperability.
Moving towards a low carbon society: electric vehicles, smart grids and renewables

The move towards a low carbon society will require progress in parallel areas: renewable energy production and e-mobility both require smart grids to achieve their potential. Development of clean road transport is important as the transport sector has seen its green house gas emissions grow consistently. The success rate of e-mobility is intrinsically linked to smart grid development as the charging infrastructure is a precondition for large scale adoption of electric vehicles. Of course, the dependency goes both ways: large scale adoption of e-mobility is crucial for the large scale infrastructure investments to be profitable.

Smart grids will form the backbone of this future power system of the EU, enhancing energy efficiency and security. These upgraded electricity networks with intelligent metering and monitoring capacities as well as a two-way digital communication between supplier and consumer should predict and intelligently respond to the behaviour and actions of all users connected to them, resulting in the efficient delivery of reliable, economic, and sustainable electricity services.

Wide-scale implementation of renewable electricity generation is critical to meet EU’s energy goals for 2020 which include the aim of having 20% of total energy supply from renewable sources. One important challenge is the fact that certain energy sources, e.g. wind and solar power, are dependent on the weather. This results in uneven energy generation patterns, which the smart grids are designed to compensate. Electric vehicles and other appliances that store energy address vehicle batteries, with particular focus on their durability and changing time as well as their performance in different temperatures and under different driving conditions.

In 2011, the JRC started the extension of its VELA installations to encompass the testing and development of electric vehicles. It set up a new laboratory that will focus on the testing of electric vehicles and smart grids, and will pay particular attention to the communication between them. The research will cover aspects related to safety and vehicle performance with respect to driving range, energy efficiency and durability of the vehicle. In parallel, complementary research will address vehicle batteries, with particular focus on their durability and changing time as well as their performance in different temperatures and under different driving conditions.

VELA—the European electric vehicle and smart grid interoperability centre

JRC’s Vehicle Emissions Laboratory (VELA) has state of the art equipment capable of measuring the emissions and environmental impacts of a range of vehicles from motor-cycles to trucks according to standard test protocols as well as under realistic operating conditions. In addition it carries out energy efficiency and cost-benefit analysis of cleaner transport technology options including electrical, hybrid, hydrogen and fuel cell vehicles.

In addition to this, JRC scientists will develop test procedures and assessment tools for hybrid/electric vehicles, to support EU legislation. The creation of JRC’s laboratory will support the development of standards regarding vehicle-grid interconnections, energy distribution and safety measures for the vehicles and their components. The cooperation between the JRC and Argonne National Laboratories in the US will promote global standards and address the interoperability issues between electric vehicles, smart grids and recharging systems.

JRC’s work on smart grids

The JRC has expanded its capacity and focus to support further research and development of smart grids. As part of this effort, the JRC has established a European Reference Centre for Energy Security. This provides a technical competence to support the technical development of standards and include a real-time simulation for the assessment of smart grids operation. The JRC is also running an Energy Security Competence Centre, which together with a Smart Grid Simulation Centre will help to explore the stability of networked physical systems.