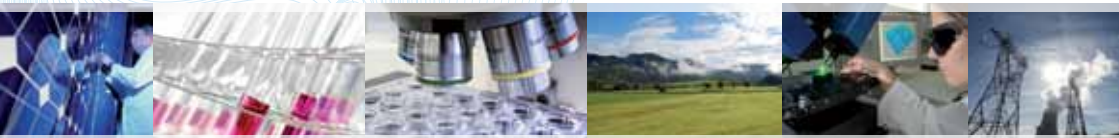


# JOINT RESEARCH CENTRE

European Commission



## Science at the service of society

**European Commission**

Joint Research Centre

**Legal Notice**

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this publication.

A great deal of additional information on the European Union is available on the Internet. It can be accessed through the Europa server <http://europa.eu/>.

JRC57879

ISBN: 978-92-79-16417-0

Catalogue number: KJ-31-10-575-EN-C

DOI: 10.2760/12793

July 2010

Luxembourg: Publications Office of the European Union

© European Union, 2010

Reproduction is authorised provided the source is acknowledged.

*Printed in Belgium*

## **Mission**

The mission of the JRC is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union. Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.

## **Vision**

The JRC's vision is to be a trusted provider of science-based policy options to EU policy makers to address key challenges facing our society, underpinned by internationally-recognised research.

JRC  
Joint Research Centre

Supporting legislation

Serving society

[www.jrc.ec.europa.eu](http://www.jrc.ec.europa.eu)


Research solutions  
for quality policymaking

JRC  
European Commission

## 50 YEARS IN SCIENCE

The Joint Research Centre was originally established in 1957 under the Euratom Treaty. Euratom's role is to promote nuclear safety and security in Europe and the JRC has been contributing to this aim with its research activities ever since.

Corresponding to customers' needs, the JRC expanded to also embrace other fields important to policy making such as environment, consumer protection, crisis management and security. It has transformed itself from a purely research-driven organisation focusing on nuclear technology to a customer-driven, research-based policy-support organisation. The JRC, as part of the European Commission, is today deeply embedded in the European Research Area and the EU legislative process.

A photograph of Máire Geoghegan-Quinn, Commissioner for Research, Innovation and Science, speaking at a podium. She is wearing a purple blazer, glasses, and a brooch. Her hands are raised in a gesture of emphasis. The background is a blurred indoor setting, likely a conference room or parliament.

**“The specialist support provided by the JRC is pivotal as we promote growth in Europe based on knowledge and innovation. During my mandate, I want to make sure we make full use of Europe’s research excellence. The JRC has a central role to play as we develop a green, innovative, sustainable economy of the future.”**

**MÁIRE GEOGHEGAN-QUINN,  
COMMISSIONER FOR RESEARCH, INNOVATION AND SCIENCE**

## ROBUST SCIENCE FOR EU POLICIES

Europe faces major challenges – economic recovery, energy security, globalisation, climate change. To address these, European policies must aim at stimulating smart and sustainable growth, while making the economy greener and more innovative.

The Joint Research Centre delivers the robust science for EU policies necessary to tackle these challenges. In close cooperation with the policy maker, JRC scientists bring together partners from Europe and the world to model scenarios and assess policy options, develop and harmonise standards and measurement technologies, and support policy anticipation, development, implementation and evaluation.

A close-up photograph of a laboratory setting. A hand wearing a light blue nitrile glove is holding a glass pipette, carefully dispensing a liquid into a test tube. In the foreground, a rack holds several other test tubes, one of which contains a vibrant pink liquid. The background is softly blurred, showing a white lab coat sleeve. A white horizontal band with blue text is overlaid across the middle of the image.

**JRC STRATEGY 2010-2020**



In order to reinforce its role as a policy support provider and to be able to address key challenges facing our society, the JRC has put forward a new vision and corporate strategy for 2010-2020. It emphasises the JRC's aim to pro-actively offer identification and analytical comparison of science-based policy options which will enable policy-makers to make well-informed choices.

The JRC will provide more integrated and cross-policy analyses delivered by multi-disciplinary research teams and complement its customer-driven approach by a strong forward-looking and horizon scanning capacity. This will be achieved by enhancing the JRC's competences in economic and socio-economic research and computer based modelling.

The JRC will focus on seven thematic areas which are presented in this booklet. Each area is accompanied by one example of the JRC's manifold activities.

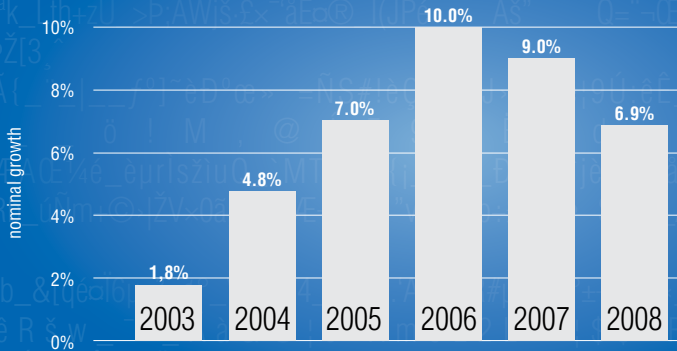
# TOWARDS AN OPEN AND COMPETITIVE ECONOMY

A photograph of a busy port. In the foreground, there are several stacks of colorful shipping containers in shades of red, blue, green, and orange. In the middle ground, a large yellow ship is docked at a pier. Behind the ship, there are several large red gantry cranes. The background shows a blue sky with some clouds and distant mountains.

The main goal of the Europe 2020 strategy will be for Europe to prosper as a knowledge-based more inclusive economy, open to the world, growing fast and sustainably and creating high levels of employment while maintaining high social standards.

Responding to the growing demand for the development of a Commission in-house capacity, the JRC is enhancing and expanding its analytical capabilities to be better able to address questions related to macroeconomic stability and structural reform of the economy. Analysis will focus on the trade-offs and frictions between competing objectives, such as the short- versus the long-term, while taking into account future constraints and opportunities. These include the impact of economic activities on the environment, the shifting composition and age distribution of Europe's population, and the challenges and opportunities of globalisation.

**Figure S1. R&D investment growth of the *Scoreboard* companies**



Note:  
The different Scoreboards  
are not directly comparable  
because of changes in the  
sample composition.

Source:  
The EU Industrial R&D  
Investment Scoreboards (2004,  
2005, 2006, 2007, 2008, 2009)  
European Commission,  
JRC/DG RTD.

*Despite the fact that the economic crisis started in the second half  
of 2008, companies increased R&D investment  
by 6.9% in 2008 by investing 430.8 billion Euros.*

## EXAMPLE

### **EU R&D corporate investment scoreboard**

The EU Research and Development (R&D) Industrial Investment Scoreboard is part of the European Commission's monitoring activities to improve the understanding of relevant trends in the private sector and the factors affecting them. The annual publication of the Scoreboard is intended to benchmark the EU's R&D investment and that of other developed economies. It also highlights the importance of R&D for business and encourages enterprises to disclose information about their R&D investments.

The 2009 Scoreboard shows that the growth in R&D investment of EU companies is higher than that of non-EU ones. This represents a trend break given that in the previous six years the R&D growth of corporate investments in Europe was lower than in other regions.

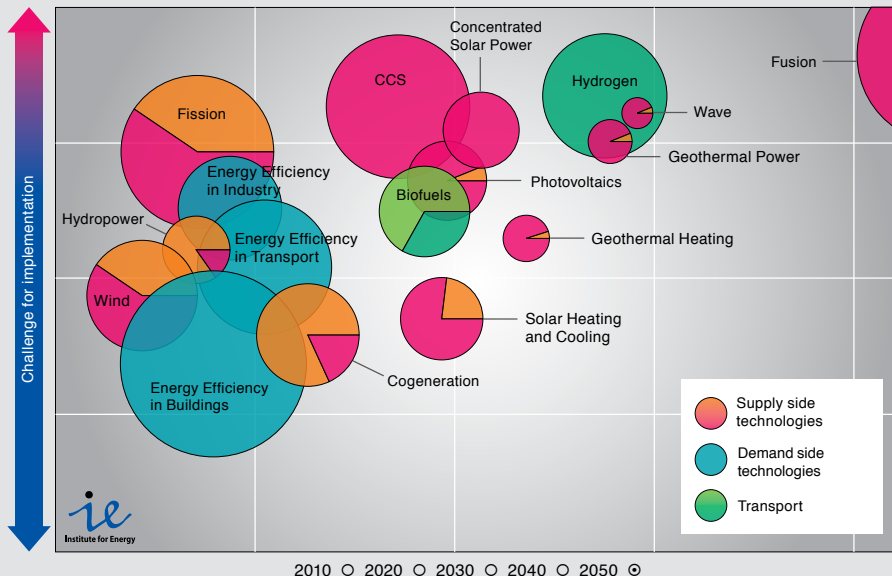


**DEVELOPMENT OF A  
LOW CARBON SOCIETY**

Europe aims to decouple economic growth from the use of resources, support the shift towards a low carbon economy, increase the use of renewable energy sources and promote energy efficiency. The JRC supports the development of a low carbon society through a combination of experimental, analytical and modelling tools essential for testing policy options, assessing the impacts of these options and investigating innovative approaches.

Electricity production and transport are two areas that significantly contribute to greenhouse gas emissions and are the target of climate change mitigation measures. Research at the JRC addresses energy efficiency of buildings and appliances, transport emissions, low carbon energy technologies as well as consumption patterns.

The graph gives an overview of the status and potential of energy technologies by 2050, showing the potential leverage effect of the Strategic Energy Technology Plan (SET Plan).





## EXAMPLE

### **Strategic Energy Technologies Information System (SETIS)**

“SETIS”, the online Strategic Energy Technology Information System developed and run by the JRC, provides the latest research results on the status, forecasts and R&D investment figures for low-carbon technologies. It underpins the effective strategic planning, conception and development of EU energy technology policy and serves in particular the implementation of the Strategic Energy Technology Plan (SET Plan).


SETIS assesses and monitors those technologies that have a significant potential to help Europe meet its energy and climate change targets, such as wind power, solar power, carbon capture and storage, and bioenergy. The information system offers interactive tools to compare the maximum potential and energy production costs foreseen for the different technologies over time.



# **SUSTAINABLE MANAGEMENT OF NATURAL RESOURCES**

Major pressures for the future of Europe and the world will relate to the availability, quality and use of strategic resources such as energy, food, water, air, minerals and land. It is the sustainable management of these resources that is likely to present the main societal, scientific and policy challenges in the decades to come.

Building on its recognised competences in environmental sciences, the JRC is developing further the integrated analysis of environmental scenarios and policy options from a socio-economic perspective. The overarching scientific aim is to develop a mid- to long-term sustainability research agenda to improve our knowledge of the functioning and interaction of complex natural systems. This includes the effects of economic activities on the environment and the opportunities for innovation and sustainable economic growth deriving from a “greening” of Europe.



*During the past decade, forested areas worldwide shrank by 5.2 million hectares on average every year. This is almost twice the size of Belgium.*

## EXAMPLE

### **Forest monitoring in Africa**

Knowledge about food security, land availability and natural resources are crucial for informed decision making. Whereas in Europe advanced information availability can be taken for granted, this is not the case in other parts of the world. The JRC therefore helps developing countries in supporting their own capacity-building and makes valuable monitoring data accessible. The JRC builds up durable monitoring facilities in these countries to spread knowledge and offer training.


The state of forested areas in Central Africa is of particular concern. High resolution satellite imagery helps to identify deforestation. The accurate up-to-date information and training delivered by JRC scientists are used for more efficient forest management policies and the safeguarding of natural resources by the African authorities.



# **SAFETY OF FOOD AND CONSUMER PRODUCTS**

Harmonised European food safety standards respond to a pressing need to ensure that materials and technologies used in food production are safe for consumers. To obtain standards agreed at a European level, JRC scientists offer competences for the standardisation of testing methods and models to ensure the quality and safety of consumer products. As a result, the same testing standards can be applied in all Member States of the European Union.

The JRC is also maintaining a high level of expertise to swiftly react to any potential food or feed crises by developing, harmonising and implementing constantly improved test methods throughout the European Union, while co-operating closely with the European Food Safety Authority.

A female scientist with brown hair and safety glasses is working in a laboratory. She is wearing a white lab coat over a dark top. In the foreground, there is a magnetic stirrer with a glass flask containing a light-colored liquid. Behind it, a complex apparatus of glass tubes and metal stands is visible, with several red-colored components. The background is a plain, light-colored wall.

*The JRC has helped to revise the EU official list of food simulants by running more than 8000 experiments on the interaction between food packaging materials and more than 30 different types of food.*



## EXAMPLE

### **Testing food contact materials**

When preparing or consuming food one wants to be sure that the kitchenware items used are safe. No harmful chemicals should be released when heating up pans or using plastic spoons to feed children. The JRC checked samples of these items and noted a high release of chemicals from some kitchenware into food. In the past, very different ways of testing such products were also observed due to a lack of a common approach in the Member States.

The European Union Reference Laboratory for Food Contact Materials, run by the JRC, developed guidelines on test conditions for kitchenware. All official control laboratories in the EU now comply with these new procedures. The JRC assists laboratories in the EU and third countries to conduct experiments and comparative exercises so that testing can be done effectively and correctly. This ensures the safety of all items used in kitchens and therefore the food we eat.

# **NUCLEAR SAFETY AND SECURITY**



Nuclear power is the principal low carbon source of base load electricity in the EU, accounting for one third of current electricity generation. Research activities on nuclear safety include the safety of both existing and new reactors and of nuclear fuel itself. The JRC coordinates the EU contribution to the International Forum for the development of the next generation of nuclear reactors. It also carries out research to reduce the radio-toxicity of waste both in activity and in time and to prevent the release of radionuclides into the biosphere.

In the field of nuclear security, the JRC contributes in the area of safeguards, non-proliferation and the fight against illicit activities involving nuclear and radiological material. By developing advanced methods and technologies to discover illegal activities, the JRC collaborates with the International Atomic Energy Agency and supports Commission services.



*Within 24 hours a team of JRC “atomic detectives” can deliver a first analysis of confiscated nuclear material to the appropriate authorities.*

## EXAMPLE

### **“Atomic detectives”**

Combating illicit trafficking in nuclear materials has led to the development of a new discipline called nuclear forensic science. Scientists at the JRC are key contributors in this field: they develop methods for investigating seized materials and prepare response plans for incidents involving radioactive materials. To improve security at Europe’s borders, training is given to national authorities on how to identify radioactive material and prevent its trafficking.

The JRC also has a team on standby at all times to respond immediately whenever illegal nuclear materials are seized inside the EU or at its borders. Investigators from the JRC help to determine the material’s composition and its origin.

The image shows a multi-story building that has been severely damaged, likely by an earthquake. The structure is partially collapsed, with concrete beams and walls crumbling. Debris is scattered on the ground. A white rectangular box is overlaid on the upper portion of the image, containing the text 'SECURITY AND CRISIS MANAGEMENT' in blue, bold, uppercase letters. The background shows the skeletal remains of the building's interior, including some furniture like chairs and a table.

# **SECURITY AND CRISIS MANAGEMENT**

The JRC is dedicated to improving the EU's capacity for crisis management, for example in response to floods, forest fires or earthquakes. JRC scientists develop early warning systems and methodologies for rapid damage assessment that greatly enhance preparedness for natural disasters and the effectiveness and speed of relief operations, limiting also economic losses.

Through novel technologies including automated satellite imagery analysis, web intelligence and real-time information systems, the JRC supports the EU and other international organisations in coordinating crisis response, reconstruction and humanitarian aid measures. Another key area is the analysis and protection of critical infrastructures such as transport networks, communications and energy networks or chemical facilities.

Satellite imagery coverage readily available at the JRC before the Haiti earthquake.

*Haiti earthquake: Within 18 minutes, alerts were sent out to around 9000 users, mainly aid organisations, initiating the preparation of relief efforts.*





## EXAMPLE

### **Global Disaster Alert Coordination System**

Together with the United Nations, the JRC has developed the Global Disaster Alert Coordination System (GDACS), which aims at facilitating the international response. This automatic system combines information on the event, the population and their needs, indicating the extent to which international humanitarian intervention is required.

In January 2010, a magnitude 7 earthquake hit Haiti with disastrous consequences. The JRC carried out a rapid damage assessment based on the analysis of very high resolution satellite imagery acquired before and after the disaster. This analysis provided valuable information for rescue operations, as well as for the subsequent reconstruction and recovery planning efforts.



**REFERENCE MATERIALS  
AND MEASUREMENTS**

Better healthcare, food safety and environmental protection are just some of the ways in which accurate and reliable measurements enhance our quality of life. There is an increasing demand for more accurate measurements, particularly in emerging fields such as biotechnology and personalised medicine.

At the heart of reliable measurements are reference materials. They provide a benchmark for analytical laboratories around the world to deliver reliable and traceable results. The JRC is one of the leading producers of certified reference materials in the world, particularly in the clinical, food and GMO application areas.



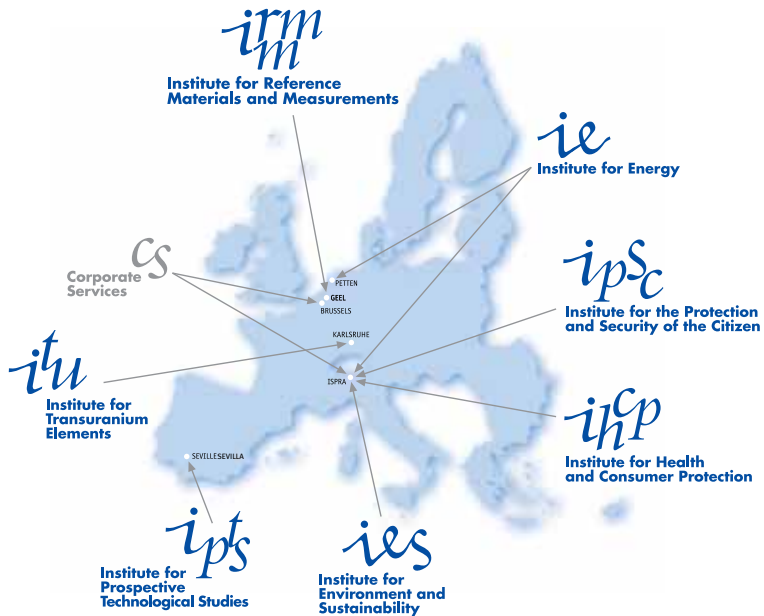
*The JRC offers over 600 certified reference materials for applications in the fields of food and feed analysis, environmental analysis, engineering and health.*

## EXAMPLE

### **Sample testing in diagnostics**

Standards of patient treatment in hospitals should be of equally high levels throughout the whole of Europe. Although invisible, sample testing is a major branch in diagnostics where measurement discrepancies can affect the quality of the medical treatment. A commonly used diagnostic in hospitals is the measurement of serum proteins. These proteins function as very sensitive markers for infections, liver disorders or iron deficiency.

As a contribution to quality assurance of measurements, the JRC recently developed a reference material certified for the mass concentration of twelve human serum proteins. The material ensures continuity in the standardisation of serum proteins, which is crucial in clinical chemistry. It enables laboratories worldwide to use common reference ranges, and to compare results over time and between hospitals and countries.



## JRC - FACTS & FIGURES

- Established in 1957
- Seven institutes in five countries
- Research fields include: energy, environment, transport, climate change, competitiveness, safety of food and consumer products, security, crisis management, nuclear safety and security
- 2736 permanent and temporary staff in 2009
- 1559 scientific publications in 2009, 524 in peer-reviewed journals
- Budget: 330 million Euros annually, plus 60 million Euros earned income

**CONTACT:**

Geraldine Barry  
European Commission  
Joint Research Centre  
Internal and External Communication  
B-1049 Brussels

**Tel:** +32 2 297 41 81

**Fax:** +32 2 299 63 22

**E-mail:** [jrc-info@ec.europa.eu](mailto:jrc-info@ec.europa.eu)

**Web:** [www.jrc.ec.europa.eu](http://www.jrc.ec.europa.eu)





Robust science for policy making

[www.jrc.ec.europa.eu](http://www.jrc.ec.europa.eu)



Publications Office

