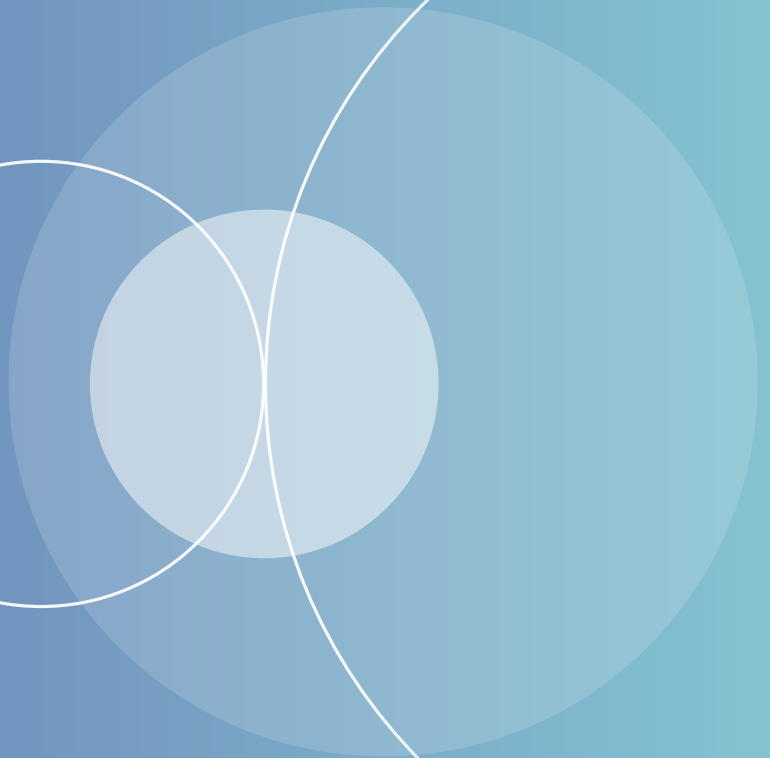
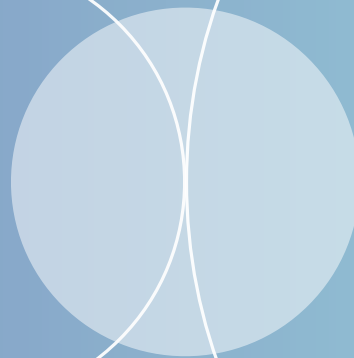
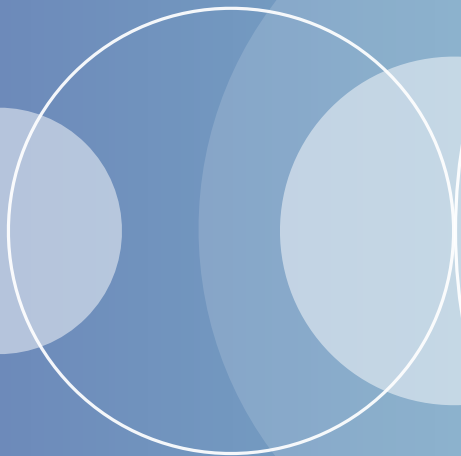


# JRC Essentials

Tools and Practices for  
Countries and Regions



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# Foreword

Are you a researcher or administrator? Are you interested in how we can collectively make better policies? Are you interested in cutting-edge research? If you answer “yes” to any of these questions, then this publication is for you.

What are the tools and opportunities that the Joint Research Centre (JRC), the European Commission’s in-house science and knowledge service offers to the women and men working in the field of science for policy in the EU’s Member States and regions?

This publication seeks to answer that question by making the wealth of JRC’s knowledge and expertise more accessible. From data analysis and modelling tools to knowledge management platforms and training programs, it showcases the wide range of JRC resources available. Whether you are a policymaker, a researcher,

or a practitioner, this guide is designed to help you tap into the expertise and knowledge of the JRC, and to leverage the power of science and technology to drive positive change.

About 2 000 scientists from the 27 Member States of the European Union work in more than 50 big scale laboratories and offices spread across five scientific sites based in Italy, Germany, Spain, Belgium and the Netherlands, as well as in Brussels. They also support my political task as European Commissioner for Startups, Research and Innovation to harness the power of science and knowledge and build a stronger, more competitive and more resilient Europe.

I warmly invite you to browse through this guide and discover the tools and opportunities offered by the Joint Research Centre.

**EKATERINA ZAHARIEVA**

*Commissioner for Startups,  
Research and Innovation*



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# I. About the JRC

An overview of the JRC's mission, areas of competence, its scientific portfolios, and collaborations with external partners

# Who are we?

When policymakers create laws that affect millions of Europeans, how can they be confident that these laws will help people live better and safely? Which sources of information can they rely on? Who can they trust?

The Joint Research Centre (JRC) is the scientific and knowledge service of the European Commission. It provides independent, evidence-based knowledge and science supporting EU policies to positively impact society.

The JRC plays a key role at multiple stages of the policy cycle. It works closely with other Commission departments, EU institutions and agencies, as well as with scientific partners and policy organisations in Europe and internationally. It also has close links with the science for policy ecosystems in the 27 EU Member States at all levels, including their regional and local dimensions.

Through its Scientific Directorates and five scientific sites based in Italy, Germany, Belgium, the Netherlands and Spain, it offers scientific expertise and competencies from a wide range of scientific disciplines in support of the policy priorities of the European Commission.

The JRC's areas of competence include energy, mobility and climate, sustainable resources, societal resilience and security, health and food, a fair and sustainable economy, data and digital transformation, innovation in science and policymaking, and nuclear safety and security. It also manages top-level research infrastructures in more than 50 large-scale laboratories.

 [Read more about the JRC's core mission.](#)

**“** *The JRC plays a key role at multiple stages of the policy cycle. It works closely with other Commission departments, EU institutions and agencies, as well as with scientific partners and policy organisations in Europe and internationally.*



# Why should you engage with us?

The JRC strives to ensure that its work has high scientific value and to be a reliable partner in developing and translating scientific data into credible and trustworthy evidence for policy. Its value proposition is based on three main concepts, starting with the anticipation of scientific and policy trends. Secondly, the integration of all factors related to societal challenges helps to clarify complexity and bridge silos. Finally, the JRC evaluates the impact of science on the whole policy cycle.

The JRC shares its knowledge to provide national, regional and local authorities with relevant evidence for policymaking. While its main focus is on the European level, JRC has tools that are of relevance to the member state and regional levels, too. JRC collects and gives access to vast amounts of country-specific and regional data that can be used in raw form or together with its analyses relevant to the European context. JRC collects

and facilitates the exchange of best practices. And last but not least: it provides open access to many of its world-class research infrastructure.

Ensuring that the best available evidence flows seamlessly to policymakers where it is needed, in good time, is a common challenge. If scientific knowledge for policy can circulate more easily among Member States and the EU institutions, its impact is likely to increase. JRC prioritizes strategic partnerships and works with the broader community of knowledge brokers to share and strengthen its own capacity to ensure that science delivers for EU policy.

JRC invites you to browse through this booklet which provides an overview of some of our most relevant tools and practices available to our stakeholders from governments, central and local administrations, academia, and other research organizations across the EU.



## ANTICIPATION

The JRC uses its science to harness the power of foresight and to boost its anticipatory capabilities.



## INTEGRATION

The JRC uses its science to look at synergies, trade-offs and gaps between EU policies—within and across high-level objectives—and between internal and external policies, especially as it augments efforts to work on EU priorities with international partners.



## IMPACT

The JRC uses its science to focus on the impact of EU policies, continuing to support their design, monitoring and performance assessment.

# Institutional Networks

The JRC Board of Governors (Board) is its main governing body.


The Board assists and advises the JRC Director-General on matters relating to its role and the scientific, technical and financial management. It also assures continuous and close links to EU Member States and associated countries within the EU Framework Programme for Research and Innovation.

The Board is composed of one representative from the science for policy ecosystem in each EU Member State and associated country, who also represents the interests of the JRC in their respective countries.

 Find more about the JRC Board of Governors [here](#).

In addition, the JRC operates a network of National Contact Points (NCPs), who act as intermediaries and operational contact points with the relevant stakeholders in their countries.

NCPs are support structures that have become an essential component in the implementation of the EU's Research Framework Programmes, and play an important role in disseminating and conveying to Member States and countries associated on the various collaboration opportunities offered by JRC. NCP(s) are appointed by the relevant national authorities in their country.

 Reach out to your JRC NCP for more information [here](#).

**“ The JRC Board of Governors assures continuous and close links to EU Member States and associated countries within the EU Framework Programme for Research and Innovation. ”**





# Current collaborations



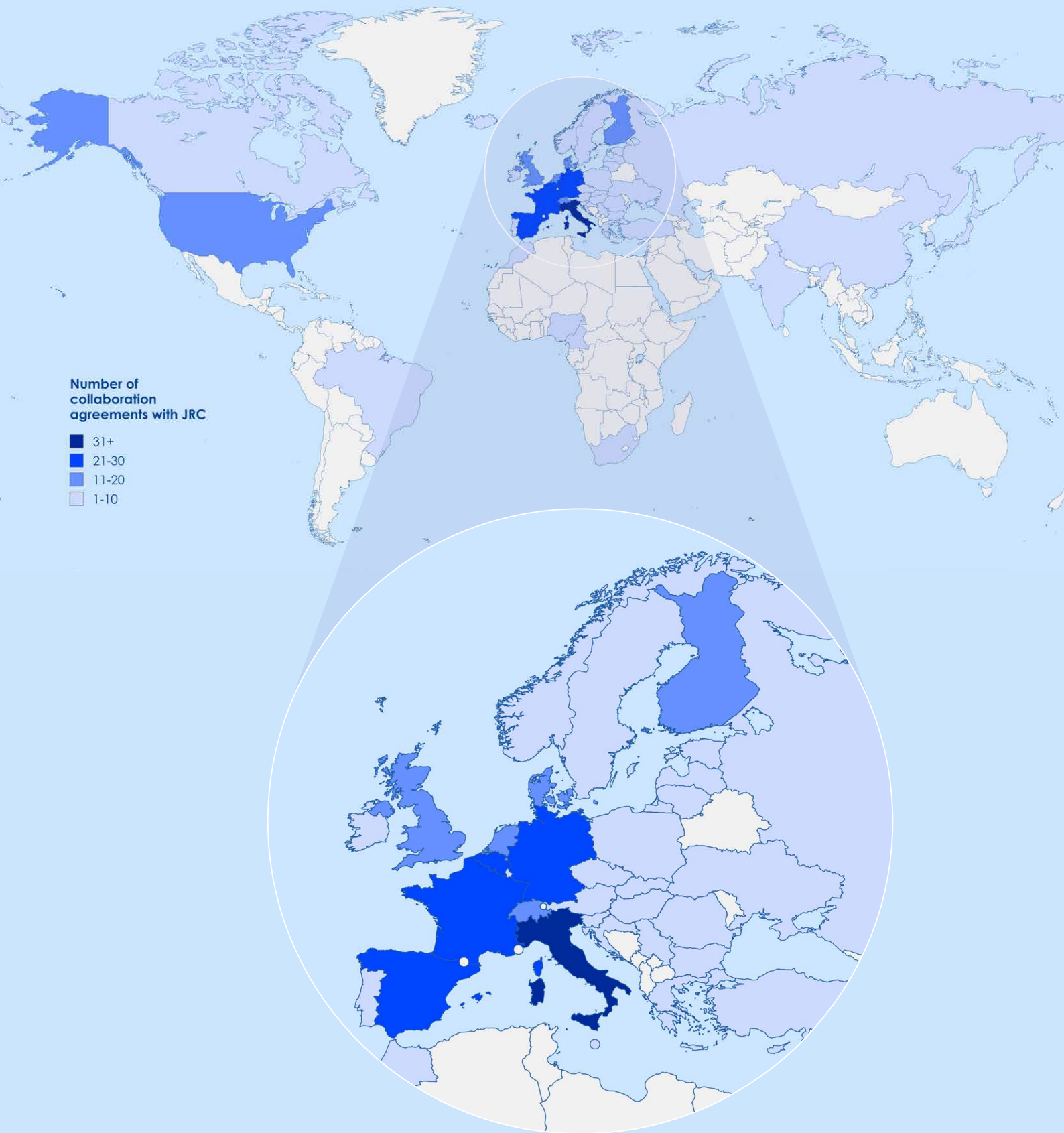
Between 2018 and 2022, over 80% of JRC scientific publications were co-authored with scientists from approximately 3 200 institutions across 134 countries on all continents. Among these, researchers from EU countries were the most numerous, ranging from 255 in Germany to nearly 200 in France, Italy, and Spain, as well as others across all EU Member States. The JRC pursues an active international cooperation with countries associated to Horizon Europe, as well as, bilaterally, with the USA, Japan, South Africa, India, Brasil, as well as at regional level with the African Union, CELAC, ASEAN.

The JRC has over 200 active collaboration agreements with external partners in EU Member States, of which around 30% are related to nuclear topics. By working in enhanced partnerships, the JRC improves its capacity to anticipate new challenges and opportunities.

**“ Between 2018 and 2022, over 80% of JRC scientific publications were co-authored with scientists from approximately 3 200 institutions across 134 countries on all continents.**

It also helps policymakers better understand issues and provide answers and solutions to the complex and interlinked challenges faced by our societies. Collaborations involve research projects, knowledge dissemination, policy papers, workshops, conferences and initiatives to promote the mobility and training of scientists.

The JRC has in place a multi-level system of networks to manage relationships with Member States and beyond, such as the countries associated to the Horizon Europe programme. Its main stakeholders are either institutional policymakers, who often coordinate the science for policy communities under their geographical competence, as well as knowledge holders and producers, to facilitate the exchange of data, expertise and resources. Proximity partnerships are particularly structured and intense with the host countries of JRC sites: Ispra in Italy, Seville in Spain, Petten in the Netherlands, Geel in Belgium and Karlsruhe in Germany.



# Science for Policy

In September 2021, just after the peak of the pandemic, 68% of European citizens believed that scientists should intervene in political debate to ensure that decisions take into account scientific evidence. Well before that date, disseminating a culture of evidence-informed policymaking was a topic very close to the JRC's heart.

This culture should not only apply to European institutions. All actors of the different science for policy ecosystems in Member States, at national as well as at regional and local levels, have a role to play to ensure that their political action is based on a solid evidence-based input. The JRC works closely with Member States to interconnect the different science for policy ecosystems, identify synergies and opportunities for mutual support, and contribute to nurturing the European ecosystem as a whole.

The JRC runs several projects and tools to support and better connect science and policymaking. It works with Member States to foster administrative

reforms, provides training to scientists and policymakers, studies human and societal behaviours, as well as socio-economic ecosystems, and identifies bottlenecks and potential areas for cooperation.

Research on the science behind values and identities, as well as on trustworthy government communication, helps policymakers at all levels to navigate complex and polarising political issues and communicate better with citizens.

Over the recent years, technical support has been provided to authorities in Member States including Belgium, Czechia, Estonia, Greece, Latvia, Lithuania and the Netherlands to build capacities for evidence-informed policymaking in the post-pandemic phase. Competence frameworks for scientists and policymakers have been developed to mutually engage the two dimensions through materials, courses, and self-reflection tools that support professional competence development at all levels.

## Key Facts & Figures



**3 000+**

Open-access data sets



**2 700**

Employees



**100+**

Models used



**70%**

Staff engaged in research



**60**

World class research infrastructures



**5%**

JRC publications among top 1% most cited

# II. Thematic Areas

A selection of 21 of the main topics JRC works on, with an emphasis on the tools – as well as how they are used in practice by our stakeholders



# Biodiversity

## Restoring the natural capital of the planet



“ *The EU acknowledges the important role citizens play in reporting alien species in their environments.* ”

Given its organic nature, many of us think that biodiversity simply ‘happens’. We assume it is an adaptable, shape-shifting phenomenon we can all enjoy when we take a walk in the park or a trip to the forest. However, threats to Europe’s ecosystems are greater than ever from climate change, the way we use the land and sea, and due to pollution. Invasive alien species, such as the Asian hornet and milkweed can also disrupt nature’s fragile balance.

There is growing awareness that conserving ecosystems and helping them flourish is vital for human well-being and animal life. Nearly half of the global GDP is linked to nature, while biodiversity loss is one of the top five risks to the economy.

Increased knowledge, effective policies, stimulating awareness, ownership and support to targets are



all key to protecting and restoring environmental balance. The JRC’s activities approach this multi-dimensional task through a prism of ‘One Health’—the concept that the health of humans, animals and the environment is intrinsically linked.

 [Download the JRC’s portfolio on healthy biodiversity and natural capital.](#)

## TOOLS

### EASIN: keeping a check on unwelcome visitors

The European Alien Species Network (EASIN) is a JRC initiative enabling the exploration of knowledge about alien species (AS) in Europe from a wide variety of information sources. EASIN fosters transnational collaborations to tackle invasive alien species (IAS) aiming for the accomplishment of biodiversity and sectoral policies, and addresses research needs. It is a unique scientific network covering all environmental realms, 64 countries (Member States, candidate countries to the EU, and neighbouring countries) and all taxonomic groups. Anyone can access and contribute to EASIN's knowledge base—from researchers to policymakers and the public at large.

Users can do this via several tools. For example, scientists can search and track the occurrences of species that appear on the EASIN Catalogue of Alien Species, a comprehensive database of over 14 000 plant, animal and marine organisms that have found their way to European territories from other parts of the world, through human activities. Similarly, thousands of species factsheets can be consulted, containing comprehensive information to aid in identification and risk assessment.

'Citizen Science' aims to bridge science and the general public. The EU acknowledges the important role citizens play in reporting alien species in their environments. Open to students, families and anyone with a passion for nature, the EASIN Citizen Science initiatives facilitate the reporting of alien species for expert validation via an app and a dedicated web platform. Citizen awareness, literacy, and engagement can support early detection of IAS, which is crucial to controlling invasive alien species, the second leading cause of biodiversity loss.

 [Download the Invasive Alien Species app.](#)

## BEST PRACTICES



### Protecting environments, tracking actions

The United Nations reports that 16.6% of the world's land and sea surfaces are protected, and many governments are considering increasing this number as natural environments come under greater risk.

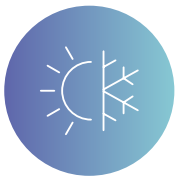
Developed and managed by the JRC, the Digital Observatory for Protected Areas (DOPA) allows users to monitor and assess information on protected areas and, more widely, to inform area-based conservation decisions at different scales. For over a decade it has delivered over 50 indicators to support policymakers, funding agencies and protected area agencies to support planning and development, and ultimately help governments in their decision-making.

Legally protecting 30% of Europe's land and sea mass is in fact part of the EU Biodiversity Strategy 2030 and of the Global Biodiversity Framework. Within the EU Strategy, Member States and EU institutions agreed to implement more than 100 actions, which can be tracked at the JCR-supported Knowledge Centre for Biodiversity website—a wide-reaching online knowledge base that helps policymakers and citizens to assess progress. Holding governments accountable is crucial to the success of these measures, safeguarding Europe's natural heritage for future generations.



[Discover the goals of the EU Biodiversity Strategy 2030.](#)





# Climate

## Setting pathways to a climate-neutral continent



*Atmospheric Observatory Tower  
JRC Ispra site (Italy)*

The Green Deal is the European Union's (EU) comprehensive strategy to make Europe the first climate-neutral continent by 2050. The JRC is at the forefront of supporting the EU to meet these goals.

With its integrated modelling toolbox, including the POTEnCIA model, the JRC helped define the regulatory initiatives for the 2030 climate objectives and pathways for emissions reductions for the recommended 2040 climate target. The JRC Emissions Database for Global Atmospheric Research (EDGAR) provides independent estimates of global greenhouse gases emissions and air pollution, underpinning the EU position in climate negotiations. Environmental protection brings co-benefits for climate mitigation. JRC also supports the Industrial and Livestock Rearing Emissions Directive which governs the environmental performance of over 75 000 EU industrial installations and farms. Relevant tools include the Sevilla Process, a structured exchange of information between the Member States and all relevant industry stakeholders and INCITE, which evaluates the environmental performance of innovative techniques for industrial transformation.

“ *The Industrial and Livestock Rearing Emissions Directive governs the environmental performance of over 75000 industrial installations and farms.* ”

### TOOLS

#### **EDGAR and the EC Atmospheric Observatory: monitoring and tracking emissions**

The EDGAR database, managed collaboratively by the JRC and the International Energy Agency (IEA), is a global reference for monitoring Europe's greenhouse gas (GHG) emissions. This independently managed database and information hub is a vital tool for Member States, facilitating the work of environmental departments in their preparation of GHG inventories at national and local levels. EDGAR is also widely used by EU institutions, such as DG Climate Action (CLIMA) and DG Regional and Urban Policy (REGIO), and provides a valuable resource for various international organisations.

The EC Atmospheric Observatory conducts continuous measurements of reactive gases, greenhouse gases, and forest canopy fluxes to study interactions between the atmosphere, biosphere, and climate change. This data supports the UNECE-EMEP programme by tracking air pollution trends and evaluating the effectiveness of emission reduction policies. Additionally, the JRC observatory monitors key atmospheric components like carbon monoxide, ozone, and particulate matter to assess changes in atmospheric composition.



*Get more detailed insights on EDGAR and its role in global climate monitoring [here](#).*

## INCITE: innovation insights for industrial transformation

As part of the evolution of the Sevilla Process, the JRC has launched INCITE, The European Innovation Centre for Industrial Transformation and Emissions. A key element of the Industrial and Livestock Rearing Emissions Directive to foster innovation, INCITE aims to become the EU's central reference point for identifying and evaluating the environmental performance of innovative industrial techniques for decarbonisation, depollution, or for increasing resource (e.g. water and energy) efficiency and circularity.

 [Learn more about INCITE and its impact on innovative industrial techniques here.](#)

## A reliable system analysis

The JRC's POTEnCIA model assesses the EU energy system, offering historical and projected energy pathways for sectors like industry, transport, and power generation. It represents each Member State individually, with options to analyse the entire EU system. Outputs cover 2000-2050 in annual steps, aligning with Eurostat data and the JRC's publicly available Integrated Database of the European Energy System (JRC-IDEES). POTEnCIA supports energy and climate policy development across the EU.

 [Learn more about the Integrated Database of the European Energy System \(JRC-IDEES\) here.](#)

## BEST PRACTICES



### Integrating climate risk assessments into EU policy


The JRC PESETA programme, launched in 2006, offers comprehensive science-based assessments of climate risks across Europe. Delivering high-resolution, quantitative data, it has shaped key EU climate policies, including the Green Deal and Climate Adaptation Strategy.

PESETA's findings emphasise the importance of understanding climate change costs and the

need for effective mitigation and adaptation strategies. Additionally, the programme has influenced disaster risk management, agriculture, and financial stability policies, demonstrating how robust climate models can enhance the resilience of European societies and economies.

Through the programme, the JRC cooperates closely with Member States. Its collaboration with Poland's KOBIZE (National Centre for Emissions Management) supported the design of Poland's National Energy and Climate Plans (NECPs). Through a series of seminars held in 2023, the JRC supported Poland in developing strategic responses to climate challenges, focusing on energy efficiency and emissions reduction in line with EU goals.

In Spain, the JRC partnered with the Bank of Spain and the Spanish Climate Change Office during Andalusia's International Congress on Climate Change. This collaboration facilitated discussions in integrating climate risk into economic planning and fostering climate resilience.

 [Read the latest PESETA programme findings here.](#)



### Collaborative environmental governance

Germany has played a key role in the Sevilla Process, through significant contributions from its Federal Environment Agency (UBA) and regional authorities. Over the past 20 years, 13 national experts have been seconded to the JRC's European IPPC Bureau, with two permanently stationed there. Germany's industrial data and expertise have been instrumental in developing BREFs, setting a benchmark in environmental governance and leading sustainable industrial initiatives in Europe.

 [Learn more about how the BREFs work here.](#)



# Data

## Leading data-driven policy and research



*Experimental Platform for Internet Contingencies  
JRC Ispra site (Italy)*

**“** *Development of new analysis tools and methodologies supports scientific research, while helping shape effective policy support.*

The JRC recognises the transformative power of data as the raw material for constructing new knowledge and generating science-based, anticipatory advice. It is at the forefront of supporting the European Union’s policies and activities through its comprehensive technical expertise and innovative approaches to data management. Development of new analysis tools and methodologies supports scientific research, while helping shape effective policy support. Thanks to the JRC’s support, EU Member States have overcome numerous technical challenges, leading to easily accessible, online data on geospatial matters, sustainability of resources, economy and food, societal resilience, health and safety, and nuclear security.

 *Leverage the JRC’s expertise and find out how to use data as a strategic resource [here](#).*

## TOOLS

### **Catchment Characterisation and Modelling (CCM)**

The open-access CCM database is a geographic database that tracks and monitors Europe’s rivers, lakes, dams and basins, from the Atlantic Ocean to the Ural Mountains in Russia. Developed by JRC, it gives valuable insight into the cause and effect of environmental factors that disturb our freshwater systems. With Europe’s water sources under pressure, CCM is a valuable tool that contributes to better water management. CCM has been particularly fundamental to the development of ECRINS, a dynamic set of watershed map layers that directly support environmental analysis and policymaking.

 *Read more about the [ECRINS](#) map project.*

## The EU Loneliness Survey

In 2022, the JRC collected comprehensive data on loneliness across all 27 EU Member States. The survey, which included established loneliness scales and socio-demographic details, also explored risk factors, consequences, and awareness of loneliness-related initiatives. Conducted in late 2022, it involved 25 646 respondents aged 16 and above. Research on loneliness interventions is still developing, but the JRC's [umbrella review](#) identifies psychological treatment and social support as promising approaches tailored to different cultural contexts, age groups, and risk levels.

 [Learn more about these findings here.](#)

## BEST PRACTICES



### Data mapping on radiological activity

Developed and maintained by JRC, the European Data Radiological Exchange Platform (EURDEP) is the EU's official tool for the exchange of radiological data between all European countries and, through specific voluntary agreements, other major national monitoring centres beyond Europe. This massive communal effort involves the collaboration of 39 national organisations and 500 measuring stations from the United Kingdom, Ukraine, France and Canada to name a few. The radiation level data EURDEP is collated into databases and displayed on a public map that denotes natural gamma ray activity, updated hourly. These actions identify contaminated areas and help minimise an emergency should it arise.

 [Check out EUDERP's Advanced Gamma Ray Map here.](#)



### Essential support for complex systems

The JRC also assists in the effective implementation of systems like the [INSPIRE](#) (Infrastructure for Spatial Information in the European Community) Directive. By providing vital resources including extensive guidelines, [specialised training](#), and a [dedicated helpdesk](#), EU Member States are better

equipped to share spatial information, supporting cross-border data exchange and interoperable services that are essential for managing environmental resources. The economic benefits of implementing the INSPIRE Directive are substantial, with estimates ranging from €700 million to €1.1 billion annually across the EU. On average, this translates to about €30 to €46 million per Member State per year, demonstrating a significant return on investment for effective implementation.



[Download a good practice template here.](#)



### Community of Practice (COP) on Artificial Intelligence and Data Science

The Community of Practice (COP) on Artificial Intelligence and Data Science is a space dedicated to discussion, sharing ideas and projects and addressing challenges. COP's members have engaged in discussion on various topics, including platforms, Large Language Models (LLMs), Multimodal AI for Digital Twins and the application of AI use for foresight. COP members are also offered the opportunity to participate in talks (comprising brief presentations and tutorials) and Journal Clubs, designed to encourage the exchange of insights from academic papers and articles.



[For more information about the COP on Artificial Intelligence and Data Science, contact us at \[jrc-cop-ai-ds@ec.europa.eu\]\(mailto:jrc-cop-ai-ds@ec.europa.eu\)](#)





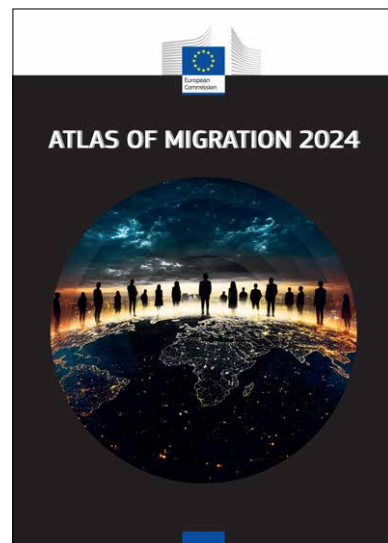
# Demography and Migration

## Anticipating trends and impacts on society



*Project co-funded by the European Commission for the integration of migrants in the European Union (Spain)*

“ *Demographic change is shaping the future of the EU, and the JRC is here to help you navigate it effectively.* ”




*Cover of the Atlas on Migration 2024*

As Europe faces profound demographic challenges—ranging from the ageing of the EU population, shrinking of the labour forces, and the increasing long-term care needs to migration, integration and social cohesion—the need for accurate data and informed policy responses has never been greater.

Understanding population dynamics, demographic changes and migration is critical, because they impact various EU policy areas, potentially affecting political stability and the EU’s global standing. The JRC analyses these factors and their effects on policies, including those linked to growth, regional disparities, employment and health. The JRC

provides tools and insights to help Member States navigate these challenges effectively. Through collaboration and innovation, the JRC supports a future where all European communities can thrive.


 *Discover more about population dynamics and migration [here](#).*

## TOOLS

### Tailored regional planning

*'Atlas of Demography—timely, robust, comparable demographic data and knowledge at the finest level of geographical detail.'*

The impact of demographic change is felt across towns, cities and villages throughout the EU. The European Commission offers a range of resources to help Member States understand and respond to demographic shifts in line with regional specificities and needs. Among them, the Atlas of Demography—an interactive knowledge management platform—provides unprecedented access to a vast array of data, including official statistics and projections from Eurostat, and new data at high spatial resolution produced by the JRC to help policymakers align policy areas such as health, labour, education, and regional planning with anticipated demographic trends.

 *Discover how the Atlas of Demography can enhance your local strategies [here](#).*

## BEST PRACTICES



### Practical demographic management

Demographic change is shaping the future of the EU, and the JRC is here to help you navigate it effectively. While many demographic challenges are shared across Member States, how they are addressed can vary significantly. In the context of an ageing European population for example, Eurostat estimates that the size of the working age population will decline from 65% to between 54% and 56% by 2070. Higher levels of migration could help to mitigate this decline and contribute significantly to sectors like health and agriculture, digital and green technology. Through its data gathering and analysis, the Atlas

of Demography shows to what extent different levels of migration could mitigate the decline of the labour force in each EU Member State. Austria, Spain, Italy, Slovakia, and Finland have integrated insights from the Atlas of Demography into their regional planning processes, leading to more targeted and effective policy interventions.



*Gain more insights by reading more thematic stories of the Atlas of Demography [here](#).*



### Access to key research, insights and knowledge sharing

The Knowledge Centre on Migration and Demography (KCMD) delivers independent scientific insights to enhance the European Commission's approach to the opportunities and challenges posed by demographic change and migration. The JRC synthesises existing knowledge, address gaps and promote the integration of science into policymaking. The JRC's work encompasses both the internal and external dimensions of migration and demography. Follow us to stay updated on the latest trends and developments in population dynamics across Europe. The KCMD Newsletter is an excellent resource for keeping stakeholders informed about new contributions and developments from the JRC.



*Stay informed with the KCMD Newsletter: [subscribe here](#).*





# Digital Transformation

## Harnessing emerging technology for resilience and growth



“ Many studies report the correlation between excessive use of social media and mental health, particularly in young people.

In April 2023, the European Centre for Algorithmic Transparency (ECAT) was established in Seville, Spain. This new JRC-supported service was set up to evaluate the risks associated with algorithms used by digital platforms and search engines. ECAT researches and promotes new practices to defend transparency and measure the impact of digital content and our ever-evolving digital practices and behaviours.

ECAT's core function is to provide technical assistance and guidance to comply with the Digital Services Act (DSA). This European law, which came into effect in February 2024, aims to create a safer digital space where the fundamental rights of all users are protected. The DSA is concerned with all categories of digital spaces, from social media to online marketplaces and content-sharing platforms. ECAT focuses on

research and enforcement for so-called very large online platforms (VLOPs) and very large online search engines (VLOSEs), which are those used by more than 45 million users within the EU.


 [Read more about ECAT's mission.](#)

## TOOLS

### European Digital Innovation Hubs

European Digital Innovation Hubs (EDIHs) are a network of 228 hubs dedicated to bolstering the digital capabilities of SMEs, acting as a one-stop shop that offers technical assistance and training. Thanks to a strong regional presence, the network can reach and support companies and public administration throughout all EU regions.


EDIHs have recently launched a new self-assessment tool for SMEs that measures the strengths and weaknesses of their digital transformation readiness. The Digital Transformation Assessment Tool is free to use, available in 32 languages and assesses six key criteria: digital business strategy, digital readiness, digital skills improvement, data management, automation and intelligence, and 'green' digitalisation.

 [Find out more about the Digital Transformation Assessment Tool here.](#)

### Improving the efficiency of public services with AI

Digital technologies have opened up a wide range of possibilities for the public sector, which can rely on those to enhance the quality, accessibility, and efficiency of public services.

The JRC has been at the forefront in researching the challenges and opportunities of the use of AI in the public sector. As part of its practical resources, the JRC is supporting the Public Sector Tech Watch, an observatory and knowledge hub on the use of emerging technologies, with a strong focus on artificial intelligence (AI). It includes a database of use cases of emerging technologies and examples of success stories, to which public administrations across Europe are invited to contribute.

 [Read more about the Public Tech Watch observatory here.](#)

## BEST PRACTICES



### Digital Services (h)Aked


In February 2024, ECAT co-hosted the first edition of Digital Services (h)Aked. Teams of young people from across Europe met at the French Center of Expertise for Digital Transformation (PEReN). The fifty participants were challenged with diving deep into the algorithms that affect our everyday lives and footprints and come up with innovative solutions to mitigate their negative impact.

 [Read the results of their challenge here!](#)



### EMM: powering security awareness and early warning

Europe Media Monitor, a high-quality, near real-time AI engine that extracts news events from publicly available news information on the internet, is key in powering security awareness and early warning systems. EIOS for example, powered by EMM, is an initiative of the World Health Organisation to use open-source intelligence for public health decision-making. The vision of EIOS is to aim for a world where threats related to health are identified and responded to so early and so rapidly that they have zero impact on lives and livelihoods. 27 organisations like the ECDC, UNICEF and MSF, and health organisations from 94 countries are now part of the EIOS community, for a total of about 4 600 users around the world. EMM is also an important partner of the African Union, providing a near real-time early warning system on crisis and disasters.

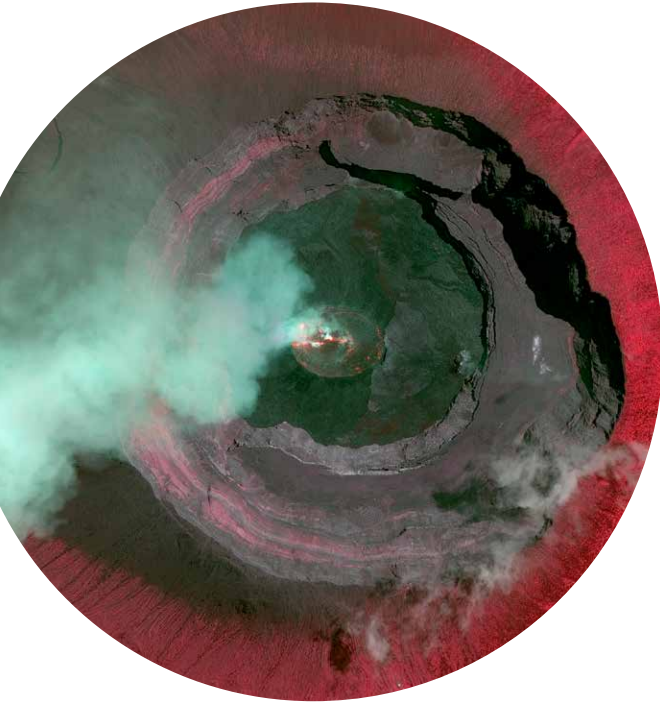
 [Read more about EMM's open-source intelligence here.](#)





# Disaster Risk Management

## Enhancing anticipation, preparedness and response



“ *Early prediction of natural hazards is vital to aid in preparation, assess risk and manage relief efforts.* ”

Europe is experiencing a surge in natural disasters, from floods to fires, to prolonged droughts and extreme heatwaves. These catastrophes not only negatively impact the environment but threaten human existence too.

Early prediction of natural hazards is vital to aid in preparation, assess risk and manage relief efforts. Data obtained on the back of these events also forms the framework for future preparedness and policy implementation. The JRC performs a vital role in providing early warning and crisis management tools and services, not only for Member States, but the world at large.

## TOOLS

### Real time alerts and daily updates

Based in Ispra, Italy, the European Crisis Management Laboratory is a science and policy

advisory facility on disaster risk management issues. Scientists and IT experts use it to develop and test new products and services that integrate data, tools and methods from different sources, including national authorities and the Copernicus Emergency Management Service.

One of the lab's most important tools is the Daily Maps or Daily Flashes. Prepared in close collaboration with the European Response and Coordination Centre, these maps give a comprehensive overview on real-time emergencies, both natural and man-made. The Global Disaster Alert and Coordination System is also maintained and operated from the Lab. This system provides real-time access to web-based disaster information systems and coordination tools, helping to fill information and coordination gaps after major disasters strike.

 [Read up-to-date Daily Flashes here.](#)

## Copernicus Emergency Management Service (CEMS)

For over a decade, the Copernicus Emergency Management Service (CEMS) has been offering the global community free emergency mapping and open-source data. Managed by the JRC, it offers geospatial products based on satellite and ground measurements that forecast, monitor and analyse disasters on-the-ground. CEMS consists of three components: early warning detection, on-demand mapping and exposure mapping. These tools provide governments, humanitarian agencies and field workers with vital information in order to respond to the disaster management cycle, be it through flood, fire or conflict.

 [Visit the CEMS website here.](#)

## BEST PRACTICES



### Learning from the past to prepare for the future

CEMS' vital role can be appreciated in recent, catastrophic events.

In 2021, the lava flow from Cumbre Vieja Volcanic ridge on the Spanish island of La Palma lasted 85 days—the longest eruption on record.

In the lead-up, JRC-supported tracking services reported 22 000 tremors in one week, triggering an evacuation of the immediate area. The vast plumes of sulphur dioxide were tracked by the Copernicus satellite as they made their way across the oceans, and mapping tools, which integrated aerial data from planes and drones, assisted Spanish authorities in their ongoing emergency response.

In the same year, Belgium, Germany, Luxemburg and the Netherlands saw record rainfall, leading multiple rivers to burst their banks. Subsequent flooding was unprecedented in terms of timing and magnitude. Working together with CEMS, the JRC-supported European Flood Awareness System (EFAS) provided no less than 25 warnings during these tragic events.

It is estimated that early warning flood alerts can reduce economic damages by up to 33%.

After the floods, a technical report on disaster response was published by JRC-EFAS. This is valuable information for assessing future flood risks and responses in similar scenarios.

 [Download the EFAS Technical Report on the 2021 Meuse and Rhine floods.](#)




### Risk management research, data and best practice

Under the philosophy of 'together we are stronger', the JRC-run Knowledge Centre for Disaster Risk Management (DRMKC) helps governments and humanitarian and health agencies better navigate this new era of risk.

Bringing together expertise and collective knowledge from scientific and technical authorities from both inside and outside the EU, it makes available innovative tools that cover the entire Disaster Risk Management (DRM) cycle: adaptation, mitigation, prevention, preparedness, response; recovery and reconstruction.

DRMKC's services range from technical analysis to practical assessment. They include the Data Risk Hub, a multi-hazard geo-portal that brings together scientific information with the aim of improving policymaking to INFORM GRI, a tool that measures the risk of humanitarian crises in developing countries.

 [Explore the complete suite of DRMKC services here.](#)



*Floods in southwestern France – Copernicus*



# Economy

## Monitoring the drivers of competitiveness

In a rapidly evolving global economy, the EU is facing significant challenges while seeking to maintain economic stability and fuel economic growth. As the European Commission's science and knowledge service, the JRC plays a vital role in supporting the EU's economic agenda.

Through cutting-edge research and tools, the JRC clarifies the implications of ongoing global trends and navigates current complex economic challenges. The JRC develops a wide range of tools for monitoring GDP, inflation and other macroeconomic trends. JRC models are also used for fiscal surveillance, forecasting and nowcasting. Through real-time data, including big data, the JRC zooms into real-time, real world economic activity.

 [Read about the JRC's scientific support for monitoring EU economic growth.](#)

## TOOLS


### Towards better corporate taxation

CORTAX is a Computable General Equilibrium (CGE) model designed to evaluate the macroeconomic effects of corporate tax reforms. By simulating different corporate tax policy scenarios, CORTAX enables the JRC to assess the impact of corporate taxation reforms on growth, investment, and profit shifting across borders. The insights from this model support key EU initiatives like the Head Office Tax System for SMEs (HOT), the Business in



Europe: Framework for Income Taxation (BEFIT) and reforms aimed at reducing the debt-equity bias in corporate taxation.

Both tools offer invaluable insights into how fiscal policies affect competitiveness and growth, helping the EU remain agile in an increasingly complex global economy.


 [Get more insights into the workings of CORTAX here.](#)

### Fostering and monitoring socio-economic resilience

The JRC offers a range of tools to help policymakers and researchers better understand and respond to economic challenges. One such tool is the newly enhanced version of EUROMOD, a powerful tax-benefit microsimulation model that helps assess the effects of tax-benefit policies on income distribution and poverty.

The 2024 release of EUROMOD introduces new functionalities, including the simulation of consumption taxes (VAT and excises) across all Member States. It enables governments to evaluate the impact of taxation and benefit policies, ensuring that interventions are fair and effective in reducing inequality and boosting economic stability.

EUROMOD has been widely used to assess tax-benefit reforms in Member States, and to provide analytical input for country-specific recommendations in the context of The European Semester for economic policy coordination.

 [Explore the features of the EUROMOD model here and its online simulation tool here.](#)

## Housing taxation

The JRC Housing Taxation Database provides for all 27 Member States, a time series (1995-2022) of data related to housing taxation (incl. transfer taxes, capital gain taxes, imputed rent taxation, recurrent property taxes, as well as housing financing conditions and its tax treatment). The data are used to estimate the User Cost of Owner-Occupied Housing (UCOH), which measures distortions exerted by the tax system on households' housing investment choices.

 [Explore the recently updated Housing Taxation Database here.](#)

## BEST PRACTICES



### Studying job trends for better insights

The JRC contributes to the EU's economic competitiveness through its research on occupational change. By monitoring shifts in job structures across different sectors and regions, the JRC identifies whether economies are moving towards higher-paid, higher-quality jobs or experiencing a more polarised labour market. This research reflects how global trends—such as technological advancements and demographic shifts—are affecting the EU's labour markets, providing crucial insights for economic planning.

 [Read about JRC's work in studying the EU's occupational structure here.](#)



### Harnessing data for evidence-based decision-making

A collaboration between the JRC and the Hellenic Ministry of Labour and Social Affairs demonstrates the benefits of leveraging research to develop stronger social policy frameworks. The partnership customises, adapts and updates the EUROMOD model, extending its functionalities to harness administrative data, enabling more accurate simulations of the fiscal and social impacts of employment, social insurance, and welfare policies. This timely approach supports evidence-based decisions by continuously updating tools that reflect


real-world conditions. It also provides an adaptable model that could serve other countries aiming to enhance the effectiveness of their social policies.

 [Read more about the collaboration here.](#)



### Collaborating for a sustainable financial future

The JRC Summer School on Sustainable Finance brings together academics, policymakers, and industry professionals to explore the latest trends in sustainable finance. The summer school highlights emerging challenges such as climate-related financial risks and the potential of digital technologies in promoting a green economy. The JRC facilitates collaboration among experts, to shape a sustainable financial future for Europe. The initiative highlights how knowledge-sharing and collaboration across borders can spur innovation, strengthen economies, and boost competitiveness.

 [Find out more about the JRC Summer School on Sustainable Finance here.](#)



### Bringing innovation to financial policymaking

The JRC also conducts valuable in-depth research on digital finance to better understand the challenges and opportunities for the financial sector posed by the digital transition. Specifically, it is working to monitor financial flows of crypto assets and understand the dynamic of specific assets such as stablecoins. The JRC supported EU policy development such as the EU Digital Finance Platform and its research helps guide regulatory frameworks, ensuring that digital finance innovations, like the digital euro, are secure, inclusive, and efficient while maintaining financial stability.

 [Explore the JRC's research into digital finance here.](#)



# Energy

Towards emission reduction,  
secure supply and efficiency



*European Solar Test Installation (ESTI)  
JRC Ispra site (Italy)*

“ *Addressing current and forthcoming energy challenges requires coordinated, cross-border efforts.* ”

In an era of geopolitical tension and the urgent need for an energy transition, securing a stable and sustainable energy supply is crucial for Europe. Natural gas remains a vital part of the EU's energy mix, but its security is threatened by reliance on a few supplier countries. Addressing current and forthcoming energy challenges requires coordinated, cross-border efforts within the EU.

The JRC provides expertise and tools to help Member States safeguard energy security and navigate the complexities of the current and future energy landscape.

## TOOLS

### **The European Interconnection for Research Innovation & Entrepreneurship platform**

The European Interconnection for Research, Innovation, and Entrepreneurship (EIRIE) platform unites the EU's research and innovation community

in smart energy systems and technologies, driving the energy transition and a low-carbon economy.

As a central hub, EIRIE connects researchers, entrepreneurs, and Member States, fostering collaboration and innovation in smart grids, energy storage, and local energy systems. By doing so, it contributes to the EU's goal of a carbon-free system by 2050, catalysing sustainable energy solutions in Europe.



*Discover the European Interconnection for Research Innovation & Entrepreneurship platform [here](#).*

### **The EU Energy Atlas**

The JRC's high-resolution EU Energy Atlas is a powerful tool for policymakers and infrastructure planners. Zooming in on areas as small as 1x1 km, the Atlas provides detailed data on energy demand and explores scenarios up to 2050. This tool is

essential for developing energy infrastructures that support the EU's transition to climate neutrality.

For instance, the atlas reveals that natural gas is heavily consumed in urban areas such as Barcelona, which accounts for around 12% of Spain's gas use. Similarly, oil and petroleum products are concentrated in areas near Rotterdam and Antwerp, which are critical hubs for refining and industrial processes. The atlas also highlights the consumption of energy along transport infrastructure, such as major road networks, and throughout industrial and urban areas across Europe.

These insights are vital for understanding current energy usage and planning for a future where energy demand aligns with decarbonisation goals. The atlas projects a decline in natural gas demand by 2050, indicating progress towards the EU's climate neutrality targets and a shift towards low-carbon energy carriers.

 [Explore the EU Energy Atlas and its applications for energy planning here.](#)

## The Photovoltaic Geographical Information System

The Photovoltaic Geographical Information System (PVGIS) provides information on solar radiation and photovoltaic system performance for any location in the world, except the North and South Poles.

Using satellite data and algorithms, this online tool estimates solar radiation and factors in cloud cover, temperature, and topography. This data supports solar energy projects' feasibility assessments, from residential to commercial developments. It offers features for policymakers, researchers, and professionals, including maps, data, and PV system simulations. Users can also overlay additional data, such as land use and population density, to identify potential solar energy sites and inform sustainable energy policies.

 [Visit the Photovoltaic Geographical Information System here.](#)


## BEST PRACTICES



### Securing gas supply

By modelling the EU's gas transmission network, including pipelines, storage facilities, and cross-border points, the JRC supports the development of Common Risk Assessments (CRA) as required by Regulation (EU) 2017/1938. These assessments enable Member States to design preventive measures to mitigate potential disruptions and decrease the impacts of crises.

As an example, in 2022, Germany, which is heavily dependent on imported natural gas, led the Baltic Sea Risk Group with the JRC's support. The JRC developed crisis scenarios, including the possibility of a complete disruption of Russian gas imports. These insights were crucial in shaping Germany's Preventive Action Plan and Emergency Plan, ensuring the country's preparedness for energy crises. Additionally, the JRC collaborated with German authorities to design gas storage refilling curves for 2023, further enhancing energy security.

 [Discover more about the JRC's recent accomplishments in energy security here.](#)



### Testing preparedness

The 2022 energy crisis highlighted the need for robust preparedness across the EU. In response, the JRC conducted the first-ever EU-wide 'dry run' exercise during the winter of 2022-2023 at its site in Ispra, Italy, testing operational readiness for a complete disruption of Russian gas supplies. A second edition of the dry run took place in November 2024, with representatives from 24 Member States—using also a JRC-developed dashboard that consolidates data on the EU's gas supply corridors and system constraints—, identifying gaps in the EU's energy security framework and informing strategies to enhance resilience.

 [Explore tools for monitoring and ensuring gas supply security here.](#)



# Food


## Towards more resilient and sustainable food systems



*Food Safety & Compliance Laboratory  
JRC Geel site (Belgium)*

“ *The JRC is working to help Member States verify honey authenticity, protecting both consumers and honest producers under the revised EU Honey Directive.* ”

The European Commission has implemented measures to combat fraudulent practices in the agri-food supply chain. Food fraud undermines consumer trust, threatens the integrity of the Single Market, and poses potential risks to public health by ignoring safety regulations designed to protect consumers. The JRC offers expert advice to prevent such fraudulent practices, in particular by the development of analytical methods to be used by Member States' competent authorities to detect food fraud. The main aim of the JRC is to protect producers from reputational damage and develop measures to prevent economic losses for consumers and it has been working tirelessly to restore and safeguard trust in the single market by ensuring that food products are of high quality and that no fraudulent processes are ongoing.

 *Read JRC's technical report on fighting fraudulent and deceptive practices in the agri-food chain.*

## TOOLS

### **Knowledge for policy on food and nutrition to promote public health**

The European Commission Health Promotion and Disease Prevention Knowledge Gateway (Knowledge Gateway) provides concise, reliable, independent and updated information on the promotion of health. In the area of food and nutrition, the knowledge gateway provides an up-to-date overview of food-based dietary guidelines in European countries as a basis for




policy action in this field. In addition, it offers data on exposure/intake of food (e.g., fruits, vegetables, whole grains, legumes) or nutrients of public health concern (e.g., salt, sugars), the health impact and burden of inadequate intakes as well as policies and measures on how to reduce risks in the population. Aimed at EU and MS policy makers, it offers a one-stop shop to key knowledge on Noncommunicable diseases (NCDs), and their main risk factors as well as policies and best practices to improve public health.

 [Explore the Knowledge Gateway here.](#)

### Ensuring food safety and integrity: the JRC's role in EU standards

The JRC plays a pivotal role in ensuring the safety and quality of food and feed within the European Union. It hosts three European Union Reference Laboratories (EURLs), specifically for genetically modified food and feed, food contact materials, and feed additives. Among other tasks, these laboratories provide scientific and technical support to national laboratories.

The JRC also provides guidance and harmonises testing methodologies, organising training and workshops, and fostering collaboration between EURLs and National Reference Laboratories (NRLs).

 [For more information on the EURLs and their role in food safety, head to EURL-FA, EURL-FCM and EURL-GMFF.](#)

### Improving the nutritional quality of the food offer in Europe

The JRC Food and Beverages Labels Explorer (FABLE) is an online tool to assess and monitor the nutritional quality of the food offer in EU countries. It provides open access to data for researchers, policymakers and the public on a website where users can interact with, explore and visualise data in an easy way. This is the basis for scientific assessments of nutritional quality of the food offer to identify best practices and follow progress towards improving the food supply across the EU and support public health objectives.

 [Find out more about FABLE here.](#)

## BEST PRACTICES



### Fighting honey fraud


One striking example of the JRC's work in food safety is its role in tackling honey fraud. Through the Coordinated Control Plan 'From the Hives' (2012-22), the JRC used advanced analytical methods to identify suspicious honey samples, leading to further investigations by law enforcement. The programme covered 16 EU Member States, Switzerland, and Norway, testing 320 honey consignments, with 46% found to be potentially non-compliant with the EU Honey Directive. The JRC is now working to harmonise these methods to help Member States verify honey authenticity, protecting both consumers and honest producers under the revised EU Honey Directive.

 [For more details on the JRC's role in honey market fraud detection, click here.](#)



### Cutting-edge methods for food safety and quality

The JRC employs advanced tools to detect and quantify antibiotic residues in animal feed. The JRC developed and validated cutting-edge analytical methods capable of detecting trace amounts of 24 target antibiotics in compound feed. These procedures empowers National Control Labs across the EU to detect and analyse antibiotics in compound animal feed to guarantee it meets safety requirements and does not endanger human health.

 [Read more about EU animal feed regulations here.](#)



Food Fraud Laboratory  
JRC Geel site (Belgium)



# Foresight

## Fostering an anticipatory culture for EU policymakers



“ *The JRC’s foresight work is crucial in guiding the EU towards more sustainable, resilient and competitive future(s).* ”

In an increasingly complex world, strategic foresight equips European leaders and policymakers with a structured framework to transform insights about the future into actionable knowledge. For the European Union, strategic foresight is particularly crucial in addressing pressing issues like climate change, economic transitions, and social equity, ensuring a future that is both sustainable and inclusive.

By looking at possible developments that could affect EU policies, through knowledge and imagination, the JRC’s foresight work helps policymakers to take smarter, future-oriented policy decisions that shape its long-term direction. Through its efforts, the JRC supports policymakers in navigating complex challenges while ensuring that Europe is prepared for the demands of tomorrow.

The JRC’s EU Policy Lab, with its Competence Centre on Foresight was established in 2018. Its overarching goal is to nurture anticipatory culture in the EU policymaking process.


 [Read more about the Competence Centre on Foresight here.](#)

## TOOLS

### Free tools and resources for policymakers


The Polycrises Exploration Workshop tool is based on the insights of the Risks on the Horizon foresight study, aimed at boosting preparedness of policymakers everywhere. The tool can be used to enhance risk awareness by exploring the broad spectrum of risks, map potential future polycrises and explore interconnected and cascading impacts, as well as to identify policy interventions to mitigate disasters and support policy goals.

Foresight can enhance traditional risk assessment by providing a holistic approach and systems thinking for navigating increasingly extreme, interconnected, and potentially global disaster risks.

 [You can explore the Risks report and engagement tool here.](#)

Also designed for group workshops, the FutureGov serious game stimulates debate and structured conversations about what the future may look like. Participants are asked to role-play scenarios

such as Over Regulation and DIY Democracy, and to think about emerging trends and future policy proposals in a rapidly changing society.

 [You can download the FutureGov game handbook and roleplay cards here.](#)

## BEST PRACTICES



### From theory to practice and policy shaping

The digital transition in agriculture and rural areas is complex and context-specific, requiring tailored solutions that take local needs, resources, and challenges into account. Developed by the Competence Centre on Foresight, along with input from Ireland, the Netherlands and Belgium, the Digital Transition Toolkit helps policymakers reflect on the implications of the digital transition for farmers and rural communities through structured conversations and helps them develop a vision framework for their policy. It can be used to discuss key issues for building vision and strategy for your digital transition, engage stakeholders to develop or improve an existing strategy and increase your anticipatory capacity and future-proof your strategy.

 [Download the Digital Action Toolkit for farmers and rural communities here.](#)




### Future thinking with the Scenario Exploration System (SES)

The JRC-developed Scenario Exploration System (SES) is an engagement tool for exploring possible paths towards the future, through the prism

of a specific topic. Numerous educators and policymakers have used SES in exercises to engage stakeholders and search for solutions in virtually any policy area. In an EU-funded project, the Political Science Faculty of the University of Gent adapted SES for workshops on nanotechnology, asking participants to step away from the polarising opinions surrounding it. Another example was under the Finnish presidency of the Council, where the Directorate-General for Taxation and Customs Union brought together representatives of customs authorities engaged in a foresight process to explore the Future of Customs and the strategic implications for today's policies.

The SES serious game is free to use and adapt. Numerous issue-specific editions have been developed, including SES for City Greening, SES for Space Tourism and SES for Future Mobility.

 [Discover and download the complete set of SES editions here.](#)

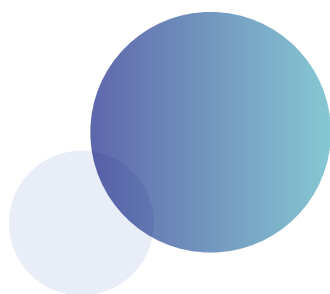


### Understanding the big picture through megatrends

Megatrends offer invaluable insight for policy shaping and future proofing. Also created by the Competence Centre on Foresight, you will find curated information on the long-term driving forces of change that are observable in the present and will continue to have a significant influence for a few decades into the future at The Megatrends Hub. Shifts in urbanisation, climate change, security and ageing populations are just some of the megatrends covered in the Hub.

The information the hub provides has already proven invaluable for policymakers of the Lithuania 2050 initiative—a vision and strategy for the country's economic, cultural, and societal future. Ireland, Italy, Greece and Czechia, have also harnessed megatrends to analyse the societal challenges they face.

 [Explore The Megatrends Hub here.](#)





# Forests

## Promoting sustainable management of vital resources

Forests are key to the health of the planet. They regulate the climate and maintain biodiversity. In Europe, forests are the dominant land cover class, and European society relies on its forests for a broad range of ecosystem services. Yet, deforestation and forest degradation are taking place at an alarming rate and are major drivers of global warming and biodiversity loss.

The deforestation free supply chain regulation (EUDR) entered into application at the end of 2024 whereas a proposal for a regulation on a monitoring framework for resilient European forests (FML) was published at the end 2023. Both the EUDR and forthcoming FML are part of a broader plan of actions within the [European Green Deal](#).

Through its unique technical know-how on geospatial and environmental sciences, the JRC is developing and deploying concrete European Observatory driven applications and monitoring systems in the European and global forestry

**“ Through its unique technical know-how on geospatial and environmental sciences, the JRC is deploying concrete European Observatory driven applications.**



policy areas for the next green transitions. The [JRC's EU Observatory on deforestation and forest degradation \(EUFO\)](#) aims to facilitate access to Global and European datasets and tools on status and changes in the world's forest cover linked to EU demand for commodities and to climate change.


## TOOLS

### Landscape pattern analysis

The JRC develops and maintains a series of software packages to help describe and analyse landscape patterns. They include [GuidosToolbox](#), a desktop application with spatial pattern analysis software, and [MSPA](#), a spatial analysis software to detect and describe the morphometric features of digital image objects.


These software packages are designed to analyse spatial properties of forest patches, connectivity and fragmentation at any scale, e.g. by the [Eurostat in the Regional Yearbook 2022, Forest Europe State of Europe's Forests](#), or by the [United Nations in their Global State of Forest Report 2020](#). Within the policy context, the JRC developed the indicator Forest Connectivity which

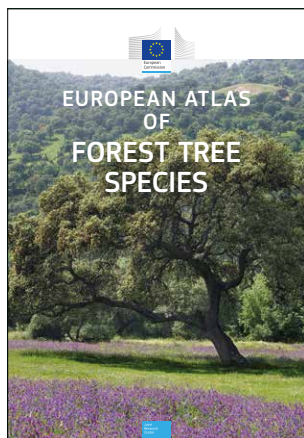
has been included in the [Nature Restoration Law](#) and the [8th Environment Action Programme](#).

 [Learn more about the Landscape Pattern Analysis tools here.](#)

## Forest tree species distribution in Europe

In 2016, the JRC published the [European Atlas of Forest Tree Species](#). The distribution of tree species and the composition of forests are highly dependent on climate conditions. Over the course of the 21st century, climate change will alter the bioclimatic conditions for tree growth in Europe, creating new habitats for species to grow in some places, while making existing habitats elsewhere unsuitable. The [EU-Trees4F data set](#) models the current and future potential distribution of 67 forest tree species in Europe and incorporates also a scenario in which trees disperse naturally.

 [Discover more about the Forest Tree Species distribution dataset here.](#)



## BEST PRACTICES



### A system to monitor deforestation and degradation

The JRC Tropical Moist Forest dataset provides information on changes in forest cover from 1990 up to the year 2023 in the humid tropics. The wall-to-wall maps at 0.09 ha resolution (30m) depict the tropical moist forest extent and the related disturbances (deforestation and degradation), and post-deforestation recovery. The data are used at national, regional

or zonal level to monitor and report forest cover changes, e.g. under the [Observatory for Central Africa](#) or for the [Amazon region](#).

 [Learn more about the TMF dataset here.](#)



### Mapping the absence and presence of forests


Recently, the JRC produced a [Global Forest Cover map for the year 2020 \(GFC2020\)](#). This map offers a harmonised and globally consistent view of forest presence and absence, specifically designed to meet the EUDR requirements. The GFC2020 adheres to the EUDR forest definition, ensuring its relevance for initial risk assessments especially in case of absence of alternative or more accurate sources of information. By the end of 2024 GFC2020 was improved and the JRC released a preliminary version of a forest type map, enabling an initial risk assessment of forest degradation.

 [Get more detailed insights on GFC2020 here.](#)



### Using remote sensing to fight illegal logging

The European Commission is committed to promoting the use of geospatial intelligence, including remote sensing, in Member States to assure environmental compliance. It is also increasing its own capacity to use the technology, including, when appropriate, in infringement procedures. The JRC organised, together with the European Space Agency, the first workshop on the use of remote sensing in the fight against environmental crime. Participants in the workshop discussed how Earth observation-based intelligence enhances the monitoring, inspection, and investigation capacity of national authorities. The JRC also enabled the Commission to use remote sensing to investigate and establish breaches of EU environmental law where forest logging deteriorated the habitat of protected species, such as in the [Białowieża Forest Natura 2000 site](#), and [Capercaillie habitats](#) in Slovakia.

 [More information about the 2024 environmental crimes workshop is here.](#)



# Health

Focusing on prevention and healthcare quality standards




*Nanobiotechnology Laboratory  
JRC Ispra site (Italy)*

“ *When it comes to our health, no entity is too big or too small to take action.* ”



Faced with an ageing population and a fluctuating socio-political landscape, Europe needs effective public health policies more than ever. Together, we must meet challenges such as equitable access to healthy environments and healthcare with an all-of-society approach.

Coordinated efforts across Member States and sectors will ensure a Health Union built on prevention of diseases, diagnosis, treatment, and care. The European Commission (EC) and its science and knowledge service, the JRC, actively collaborate with national authorities to protect people from health threats.

 [Find out how the JRC can support your public health programmes here.](#)

## **Towards better, longer lives**

JRC scientists are developing strategies to address cancer, rare diseases, and healthy ageing through healthier diets and lifestyles. In collaboration with regional, national and local stakeholders, our scientists monitor emerging public health threats and investigate important factors impacting health.


Established in 2020, the Knowledge Centre on Cancer provides independent evidence-based information to support EU cancer initiatives that enhance prevention, detection, treatment, and care.

 [Explore the JRC's Knowledge Centre on Cancer.](#)

## TOOLS

### Uniform high quality cancer care across the EU

JRC is providing Guidelines and a European Quality Assurance Scheme for breast, prostate, colorectal, cervical, lung and gastric cancer services. These evidence-based, patient-centric schemes are designed to ensure essential quality standards for screening, diagnosis, treatment and care across Europe. Implementation of these schemes will raise the bar of cancer healthcare in the EU thereby reducing its burden and inequalities across Member States and regions.

 [Explore the guidelines and quality assurance schemes here.](#)

### Leveraging cancer data to save lives

The European Cancer Information System (ECIS) provides up-to-date data on cancer indicators across Europe, enabling the analysis of trends in incidence, mortality, and survival. This comprehensive tool supports research and public health decision-making in the field of cancer and informs European citizens. Stakeholders can use this data to improve cancer prevention, diagnosis, and treatment policies, enhancing public health strategies across Europe.

 [Explore what ECIS can do for you here.](#)

## BEST PRACTICES



### Innovative strategies for airborne pathogen management

At the forefront of research and development, the JRC partnered with HERA (Health Emergency Preparedness and Response) to publish a study on promising technologies for tackling airborne respiratory infections. Gathering insights from over 50 experts, the study highlights emerging technologies for capturing airborne germs and decontaminating air to improve indoor air quality and reduce pathogen transmission: plasma-based inactivation, aerosol samplers, biosensors, and

physico-chemical property identification hold great promise for pathogen management.

It also heralds crucial advancements like rapid PCR testing, next-generation sequencing for tracking pathogen evolution, the development of universal vaccines targeting multiple viruses and the use of AI for early outbreak detection and management.



[Interested in innovating to strengthen preparedness and safeguard public health? Find out more.](#)



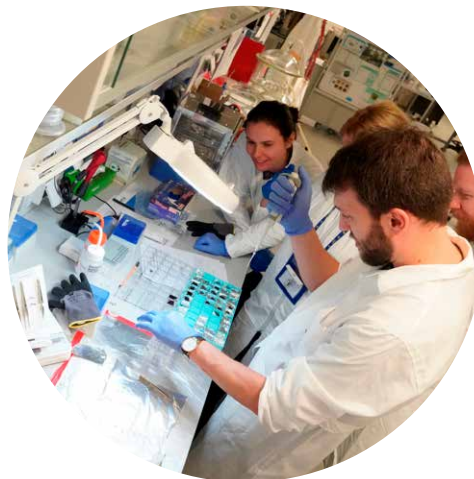
### Harnessing rare disease data for better patient care

Around 30 million EU citizens suffer from different rare diseases, but patient information is scattered across registries. [The EU Rare Disease Platform](#) consolidates this data into a comprehensive tool and offers training for researchers, healthcare providers, patients, and policymakers.

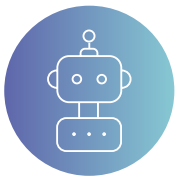
By making data searchable and findable at EU level it supports and standardises all rare disease registries, co-creating a valuable knowledge generation hub that can improve our understanding, diagnosis, and treatment of rare disease patients across Europe.



[Join the platform to make your data count and improve patient care.](#)



*Nanobiotechnology Laboratory  
JRC Ispra site (Italy)*



# Innovation in Science and Policymaking

## Innovative governance to deliver the green, digital and social transitions



Public administrations face increasing complexity as they address diverse societal challenges, from sustainability and health crises to technological transformations and economic shifts. The integration of scientific evidence into policymaking is vital. Bridging the gap between science and policy requires fostering collaboration, building mutual understanding, and ensuring that knowledge translates into actionable insights. By mobilising resources and expertise, the JRC promotes evidence-informed policymaking across Europe, supporting governments in adopting practices that align with the needs of people and the planet. This approach ensures that policy decisions are rooted in solid evidence while remaining adaptive to the challenges of our time.

## TOOLS

### Science for Policy Handbook


To help policymakers make the most of scientific knowledge, the JRC developed the Science for

Policy Handbook. This practical guide provides clear strategies on how to effectively use scientific evidence in policy development, offering tools for evaluating and applying research to specific policy contexts. The handbook covers everything from interpreting scientific data to managing uncertainty, giving public officials a structured approach to integrating science into their decision-making processes. It is a particularly valuable resource for those new to evidence-informed policy making, ensuring they can navigate complex research with confidence.

 [Access the Science for Policy Handbook here.](#)

### The Composite Indicators and Scoreboards Explorer


Understanding complex global issues —like climate change, food security, health, and inequality—needs more than just data; it requires smart tools to make sense of that data. The Composite Indicators and Scoreboards Explorer, developed by the JRC, offers policymakers a dynamic way to explore and visualise data from over 150 indices and scoreboards—with new ones added each year. This interactive tool helps authorities to track progress, assess and compare performance, and identify areas needing attention.

 [Discover how the Explorer is supporting policy decisions here.](#)

### A smarter way to build skills for evidence-informed policy

The Smart4Policy Tool is a dynamic, open-access platform designed to help researchers

and policymakers reflect on their competencies in evidence-informed policymaking. Built on the JRC's Competence Frameworks for Researchers (Science4Policy) and Policymakers (Innovative Policymaking), this interactive tool offers a personalised, actionable experience. Users respond to a tailored set of questions to receive a self-assessment report, along with targeted resources to support their professional development.

 *Find out how this tool can nurture the skills and competences for evidence-informed policymaking [here](#).*

## BEST PRACTICES



### Engaging citizens in all stages of policymaking

Citizen participation is central to designing public policies that are effective, inclusive, and responsive to real needs. The Competence Centre on Participatory and Deliberative Democracy (CC-DEMOS) provides national and local authorities with tailored guidance, coaching, and tools to integrate citizen engagement into all stages of policymaking—from defining challenges to evaluating solutions. In 2025, CC-DEMOS will offer a [multilingual training package](#) via the EU Academy, featuring basic, advanced, and Training of Trainers (ToT) levels to help public administrations adopt participatory approaches effectively. Its work has already supported impactful initiatives, such as [empowering citizens in 10 European cities to tackle urban biodiversity loss through collaboration](#).


 *Learn how CC-DEMOS helps shape policies built by and for the people [here](#).*



### Tailored evidence-informed strategies

Building capacity for evidence-informed policymaking (EIPM) starts with understanding strengths and addressing gaps. In a Technical Support Instrument project funded by the Directorate-General for Structural Reform Support (DG REFORM), the JRC and the Organisation for Economic Co-operation and Development

(OECD worked closely with seven Member States, delivering country-specific assessments designed to strengthen EIPM. The two-year project provided Greece, Belgium, Czechia, Estonia, Latvia, Lithuania, and the Netherlands, with tailored country analyses that included reform roadmaps, capacity-building workshops, and thematic symposia to promote exchange of practices. The project united public administrations, research institutes, and academia with the aim of enhancing knowledge exchange and improving policy coordination. It fostered collaboration, developed competences, and promoted the uptake of evidence and evaluation, in order to optimise governance systems across Europe.

 *Find out how these assessments can work for you [here](#).*

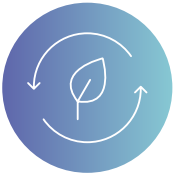


### Strengthening Spain's science-policy ecosystem

On 8 February 2024, Spain's Prime Minister announced the creation of the National Office for Science Advice (*Oficina Nacional de Asesoramiento Científico, ONAC*). This development follows the release of a report on "[The Spanish Scientific and Technical Advisory Ecosystem for Public Policy](#)", commissioned by the JRC and conducted by the [Spanish National Research Council \(CSIC\)](#) and the [University of Almería](#). The report highlighted the opportunities and gaps in Spain's science-policy interface, laying the groundwork for this new initiative.

ONAC represents a significant step in consolidating Spain's developing ecosystem for science-informed policymaking. The office serves as a crucial institutional link between scientific knowledge and government decisions, promoting evidence-based governance across all sectors. It builds on recommendations from the JRC report, reinforcing collaboration among public institutions, research organisations, and academia. This initiative is a prime example of how targeted institutional reforms can strengthen evidence-informed policymaking and drive sustainable, knowledge-driven public policy.

 *Read more about ONAC [here](#).*



# Land and Air Resources

## Preserving key natural elements




*European Reference Laboratory for Air Pollution (ERLAP) – JRC Ispra site (Italy)*

“ *The JRC’s expertise and data-driven insights are essential for ensuring that the EU’s resources are used responsibly and efficiently.* ”

Europe faces increasing pressures to manage its natural resources sustainably while promoting economic growth. Balancing resource use and environmental protection is crucial as the EU moves towards a greener, circular economy. The JRC uses innovative tools and best practices to help the EU meet its sustainability goals and remain competitive in global markets.

The JRC’s expertise and data-driven insights are essential for ensuring that Europe’s resources are used responsibly and efficiently.

 [Find out more about the JRC’s Directorate of Sustainable Resources and the Directorate for Energy, Transport and Climate.](#)


## TOOLS

### **Information System: a pillar of EU sustainability**

The JRC plays a crucial role in providing data and guidance to support sustainable raw material sourcing. One of its key tools is the Raw Materials Information System (RMIS), a comprehensive platform designed to support EU policies on resource management.

RMIS 3.0, its latest version, provides stakeholders with wide-ranging data on raw materials across their life cycle from extraction to recycling, with a strong focus on sustainability. By delivering insights on supply risks and circularity, RMIS helps stakeholders anticipate challenges and opportunities in securing raw materials for Europe’s green and digital transformations.

By supporting policy frameworks, such as the 2024 Critical Raw Materials Act, RMIS enables the EU to maintain access to vital resources, particularly those critical to its digital and green economy transitions. The system also promotes circularity by highlighting the importance of recycling and secondary sources for these materials.

 [Explore the RMIS and its benefits for resource management here.](#)

### The EU Soil Observatory (EUSO)

In recent years, there has been a fundamental shift in policy focus in relation to soil. Healthy, functional soils are key for implementing several of the political priorities that emerged out of the European Green Deal. The EU Soil Observatory is tasked with providing robust data and knowledge to policy makers and other stakeholders on the state of soils across the EU and beyond. The EUSO supports the implementation of the EU Soil Strategy for 2030 through a dedicated set of dashboards. The EUSO is also tasked with supporting Member States in the implementation of the Soil Monitoring and Resilience Directive.

 [Explore the EUSO Soil Degradation Dashboard here.](#)

### Reducing consumer food waste

Food waste is a significant sustainability challenge, with vast amounts of edible food being discarded across the EU annually. The JRC's work on consumer food waste prevention is crucial to creating more sustainable food systems and reducing environmental impacts. The European Consumer Food Waste Forum has developed an interactive toolkit to help policymakers, businesses, and schools reduce waste.

This toolkit includes video tutorials, a food waste action planner, and a food waste prevention calculator, which allows users to assess the environmental and economic benefits of waste reduction. By providing actionable insights, the JRC is enabling EU stakeholders to minimise food waste and contribute to a more sustainable future.

 [Discover the toolkit to tackle food waste here.](#)

## BEST PRACTICES



### Key networks: AQUILA and FAIRMODE

The European Reference Laboratory for Air Pollution (ERLAP) organises interlaboratory comparisons (ILC) several times per year, based on artificial or ambient test samples. These ILCs are part of quality assurance programmes carried out in collaboration with the network of European Air Quality Reference Laboratories ([AQUILA](#)), the WHO Collaborating Centre for Air Quality Management and Air Pollution Control and under research infrastructure projects like the [ACTRIS project](#).

[The Forum for Air quality Modelling \(FAIRMODE\)](#) was launched in 2007 as a joint response initiative of the European Environment Agency (EEA) and the JRC, who currently chairs it.

It promotes the harmonised use of models by Member States, supporting model users at all administrative levels—national, regional, urban, and local—in their policy-related model applications under the European Air Quality Directives. The network is dedicated to fostering effective communication and promoting best practices in modelling by providing a comprehensive framework for exchanging expertise, and offering tools such as electronic interfaces, databases, and software solutions. FAIRMODE also facilitates knowledge sharing through workshops, seminars, and collaborative projects.



### Support to the implementation of air quality policy

The JRC's ERLAP provides technical and scientific input to policymakers and Member States authorities and laboratories regarding air pollution measurements. ERLAP carries out research on new measurement methods and supports the development of reference methods to measure emerging pollutants. Its main role is related to the organisation of quality assurance programmes for European National Air Quality Reference Laboratories. Those programmes are an integral part of the Air Quality Directive's requirements and tackle gaseous and particulate air pollution.



[Read more about ERLAP here.](#)



# Mobility

Safe, sustainable, competitive transport and infrastructure




Vehicle Market Surveillance Laboratory  
JRC Ispra site (Italy)

A strong mobility network, transporting both people and goods, is essential for economic growth and prosperity.

Greenhouse gas emissions, accessibility issues and security are some of the challenges facing those working on mobility policy and innovation. From achieving climate neutrality to increasing safety and access to public space, the strategic implementation of innovative mobility solutions is essential for a greener, fairer, more competitive and safer EU.


The JRC supports the foresight, design and implementation of EU policies on transport and mobility in collaboration with various stakeholders in and beyond the EU to set standards in smarter and more sustainable mobility

 [Read more on how EU cities are striving towards green goals with innovative mobility strategies.](#)

 *The strategic implementation of innovative mobility solutions is essential for a greener, fairer, more competitive and safer EU.*

## Analysing vehicle emissions data

The JRC has developed EMROAD, a tool for analysing vehicle emissions data collected through Portable Emissions Measurement Systems (PEMS). EMROAD has been applied to emissions legislation for heavy-duty vehicles, non-road mobile machinery, and light-duty vehicles. It serves as the reference calculation tool for Real Driving Emissions (RDE) tests and is used to benchmark the commercial calculation software that accompanies PEMS. The tool is freely available as a Microsoft Excel add-in.


 [Discover the user manual and download the tool here.](#)

## TOOLS

### Vehicle energy consumption calculation tool (VECTO)

VECTO is software that allows manufacturers to determine CO<sub>2</sub> emissions and fuel consumption from heavy duty vehicles (such as lorries, buses and coaches). A key component of the CO<sub>2</sub> and

fuel consumption certification methodology, it is the official tool used in Europe to certify and monitor the fuel consumption and CO2 emissions from heavy duty vehicles. This certification is mandatory, and adherence to it helps the EU reduce carbon emissions in urban areas, meeting goals such as ensuring that 90% of new city buses are zero-emission by 2030. Emissions and consumption data determined using VECTO must be made publicly available as well as monitored and reported to the Commission.

 [Find out more about VECTO here.](#)

### Transport Research and Innovation Monitoring and Information System (TRIMIS)

TRIMIS provides open-access information on transport research and innovation. Its work is oriented around the seven thematic research areas of the EU's Strategic Transport Research and Innovation Agenda (STRIA). Focusing on STRIA, TRIMIS maps and analyses technology trends and R&I capacities in the transport sector. The system helps Member States develop and monitor programmes and policies on topics including transport infrastructure, management systems, vehicle design, among others. For example, the TRIMIS dashboard offers detailed data on funding and organisations involved in transport research and innovation, on the innovation capacity of the transport sector as well as STRIA Roadmap filtered information.

 [Discover how TRIMIS could help you make an impact here.](#)



EU Interoperability Centre for Electric Vehicles and Smart Grids – JRC Ispra site (Italy)

## BEST PRACTICES



### Advancing battery research

Batteries are vital to reducing carbon emissions in the transport sector, driving the electrification of vehicles and enabling a more sustainable future.

The JRC's Battery Testing Laboratory supports Member States with innovative battery research to ensure safe and efficient transportation. The JRC's state-of-the-art research infrastructure at Petten (Netherlands) specialises in testing battery cells under various environmental conditions, evaluating battery packs and modules in real-world scenarios, and conducting in-depth, in-situ X-ray tomography along with rigorous safety testing.


The insights generated by the JRC's lab create a solid framework for the entire battery value chain, supporting the development of advanced research in rechargeable energy storage systems—critical for shaping European and international standards and regulations.

 [Visit JRC's Battery Testing Laboratory with a virtual tour.](#)



### Boosting vehicle inspection capabilities

Located in Ispra (Italy), the Vehicle Emissions Laboratories (VELA) enable pre-normative research on innovative vehicle technologies, tests and inspections to verify that vehicles, systems, components and separate technical units comply with relevant environmental and safety requirements. To this extent, JRC supports Member States with state-of-the-art testing set-ups, expert guidance, and collaborative networks. JRC shares its findings and expertise through the Enforcement Forum, helping Member States to design their own effective detection programmes. By partnering with JRC, they can enhance their market surveillance capabilities, boost compliance, and help protect the environment.

 [Find out more about how vehicle inspections help the EU meet its emissions reduction goals.](#)



# New European Bauhaus

Beautiful,  
sustainable,  
together:  
the future  
of our homes  
and lifestyles


In 2020, the European Commission announced the launch of the New European Bauhaus (NEB): an EU policy and funding initiative that fosters sustainable solutions for transforming the built environment and lifestyles in line with the European Green Deal.

The NEB's mission is to nurture ideas and create synergies born of our collective and cross-cultural thinking. Built on the core values of 'sustainable', 'beautiful' and 'together,' it strives for tangible change on the ground—both small and big scale—that improves the lives of citizens and supports business through transformation. By bridging innovation, ambition and creativity, the NEB turns current challenges into opportunities and strengthens Europe's competitiveness on the global stage.

There are numerous ways for Member States and indeed everyone to partner with NEB, from application for funding and activation of ideas to helping steer the direction of the movement itself.

 [Find out how to get involved with the NEB here.](#)



 *The NEB's mission is to nurture ideas and create synergies born of our collective and cross-cultural thinking.*

## TOOLS

**Are you ready to embrace NEB's pillars? Evaluate your project with this special tool.**

The NEB self-assessment tool is designed to promote sustainability, beauty, and inclusiveness in the built environment of Europe and beyond. The self-assessment method is explained in a [handbook](#) supported by an online tool which promotes dialogue among stakeholders and aims to establish the grounds for the definition of minimum performance levels. It is adaptable to different project types and scales, allowing flexibility across new builds, renovations, and various geographical contexts. Importantly, the tool fosters continuous improvement rather than competition, encouraging users to strive for high performance while balancing all three NEB pillars.

 [Download the NEB self-assessment tool here.](#)

## Guidelines for better-built environments

In partnership with Joint Assistance to Support Projects in the European Region (JASPERS), NEB has published a new set of investment guidelines. This publication holds general advice and best examples that will help urban planners, architects, private investors and community

leaders make informed decisions, and how the principles of NEB make economic sense and can add positive impact for everyone.

 [Download the new NEB Investment Guidelines here.](#)

### Discover NEB projects and initiatives on interactive maps

From a start-up that converts orange peel waste into an alternative to plastic in Seville (Spain), to urban habitats for wildlife in Tartu (Estonia) the world is full of exciting, transformative and innovative ideas!

The JRC has developed a dashboard to track and learn about NEB projects across Europe and beyond. You can search by location, type of funding, and type of project.

As the global NEB community grows, so will the database.

 [You can access the NEB dashboard here.](#)

## BEST PRACTICES



### Learning through sharing with the NEB toolbox

Aligned with the objectives of the NEB, twenty small and medium-sized municipalities benefited from technical assistance and tailored support to shape their initial concepts for sustainable and inclusive transformations of the local built environment. Projects ranged from conversion of an ex-Soviet military base in Alūksne (Latvia) into a tourism and entrepreneurship site, to the transformation of an old ironworks museum in Ravne na Koroškem (Slovenia) into a community space of industrial heritage and creativity.

The knowledge, experiences and insights gained from these projects were consolidated into an NEB toolbox. By telling the stories of these twenty projects, it gives valuable insights and nurtures the development of new ideas.

 [Discover the NEB toolbox here.](#)



### The pathway to action. NEB actions support reconstruction in Ukraine

Since the onset of the war in Ukraine, the NEB and its local partners have been collaborating on solutions for emergency housing for refugees and how best to tackle long-term construction. The best solutions are those that Ukrainians can implement themselves. With that in mind, the NEB lab has provided expert, tailored training to help local professionals and academia create a framework for urgent housing needs in the context of sustainable design and engineering and rebuilding cities, towns and villages.



[Get inspired by NEB's actions in Ukraine here.](#)



### The New European Bauhaus Academy launches!

The New European Bauhaus Academy (NEBA), launched at the April 2024 NEB Festival in Brussels, aims to accelerate the upskilling and reskilling of workers in sustainable construction, supporting the industry's green transition. Collaborating with leading education and training providers, the academy offers accessible, high-quality training—both online and in-person. This aligns with the EU's goal to upskill 25% of the construction workforce (3 million workers) over the next five years.

The NEBA Alliance, a consortium of 14 partners, was selected to establish the Academy's regional hubs. Partners in sustainable construction are invited to join as Pioneer Hubs, strengthening the Academy's reach and impact.



[Register for the NEBA Alliance here.](#)





# Nuclear

## Enhancing Nuclear Safety and Security in Europe




*GELINA particle accelerator  
JRC Geel site (Belgium)*

“ *The JRC offers education and training support, as well as technical expertise and Open Access to nuclear infrastructures, to support the development of EU nuclear experts.* ”



The JRC has over 60 years of experience in nuclear research addressing complex challenges related to energy, health, environment and other key areas, under the Euratom Research and Training programme. Its expertise in the safe and secure use of current nuclear technology is more relevant than ever, as various Member States look at nuclear energy with renewed interest. By developing and implementing effective solutions, the JRC ensures that Europe remains at the forefront of nuclear safety and security, while offering critical support in decommissioning and waste activities, monitoring environmental radiation, or developing radionuclide technologies to contribute to the fight against cancer, and treatment of other severe diseases.

 [Learn more about what the JRC can do for you in the nuclear area.](#)  
[Find out how EU policies on radioactive waste and spent fuel can help you here.](#)

## TOOLS

### **Structural Materials Performance Assessment (SMPA) laboratories**

The JRC's Structural Materials Performance Assessment (SMPA) laboratories support nuclear safety by researching and testing materials to predict their lifespan and reliability. A recent collaboration with the Belgium Nuclear Research Centre focused on the inverse estimation of tensile flow curves for reactor pressure vessel steels using the Small Punch Test. This miniature test, now standardised in Europe (EN-10371), has provided valuable insights into the material properties essential for nuclear safety.

 [Learn more about the European Commission Joint Research Centre.](#)

## BEST PRACTICES




### Advancing nuclear safety and skills

The JRC works to continuously improve safety standards while supporting technological innovation related to the safety of reactors, structural materials, fuels and radioactive waste management. JRC research also focuses on the safety of long term operation of existing reactors. The research covers operation as well as accident conditions, and is applied to conventional, evolutionary and advanced systems.

For example, in collaboration with CEA Cadarache, the JRC has been instrumental in improving neutron absorption cross-section measurements, which are critical to the “Burn up credit” (BUC) nuclear safety concept. Burn-up credit is a safety approach that accounts for the reduction in the reactivity of configurations with spent nuclear fuel due to the change in their composition after irradiation. This concept, which ensures accurate knowledge of neutron behaviour for safe nuclear operations, has been at the centre of the JRC’s work at the GELINA laboratory. These collaborations have led to significant advancements in nuclear safety and improved the validation benchmarks for key fission products.

The JRC offers education and training support, as well as technical expertise and Open Access to nuclear infrastructures, to support the development of EU nuclear experts for the present and future. Member States can count on JRC’s experience in support of nuclear workforce national assessments.

Through its actions, the JRC ensures the maintenance of the EU’s leadership in the safety of nuclear technologies, which contributes to the overall autonomy of energy supply.


 [Learn more about how the JRC’s innovative work in nuclear safety here file:///C:/Users/pinilma/Downloads/report\\_eur\\_29301en.pdf.](file:///C:/Users/pinilma/Downloads/report_eur_29301en.pdf)



### Response to global security challenges in Europe and abroad

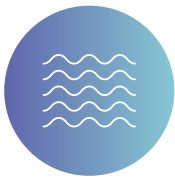
Looking for hands-on training for first responders who intercept radioactive scrap, illicit trafficking, or operate in potentially contaminated crime scenes? The JRC European Nuclear Security Training Centre (EUSECTRA) provides advanced training to EU customs, law enforcement and security officers using a wide variety of radioactive and nuclear materials, as well as a broad selection of measurement instruments for the detection of nuclear and radioactive materials out of regulatory control. Our experts have trained over 2 000 EU first responders since 2010.

EUSECTRA was established specifically to address concerns about the theft and trafficking of radioactive materials, which could be used in crimes such as acts of terrorism. These concerns, from the widespread use of radioactive materials for medical and industrial applications, are acknowledged by the international community in numerous international commitments and resolutions.

 [Discover what the JRC security experts can do for you.](#)

*Nuclear research facilities in Ispra, 1960 (Italy)*





# Oceans and Water

## Solutions for the sustainable use of water resources


Oceans play a crucial role in regulating our climate and are indispensable to sustain life on Earth. And yet much remains unknown about how ocean systems work. Understanding them, as well as freshwater bodies such as lakes and rivers, is an urgent need. Water scarcity and increased competition for water resources among regions, countries and sectors are becoming pressing issues: agriculture for example is often the largest water user, meaning food production and security are tightly intertwined.

The JRC is at the forefront of addressing these challenges, focusing on solutions “from source to sea” to achieve water resilience through enhanced monitoring and sustainable solutions.

### TOOLS

#### Tackling water scarcity

Water scarcity is a growing concern across Europe, especially where climate change and agricultural demands place intense pressure on water resources. The JRC develops transboundary solutions for the restoration of water quality and the management of water-related risks. Its scenario analysis tools predict trends in water availability and simulate the effectiveness of various water management strategies such as improving wastewater treatment or promoting water reuse for agricultural irrigation. The JRC supports the implementation of the European Strategy for the Danube Region in close cooperation with the countries and national science academies of the region and the International Commission for the Protection of the Danube River (ICPDR).

 [Find out more about water scarcity solutions here.](#)



*Water Laboratory – JRC Ispra site (Italy)*

#### Measuring microplastics

While microplastics are known to be present in food and drinking water, their impact on human health remains unclear due to limited understanding of their distribution. The JRC supports the EU’s Drinking Water Directive on monitoring new pollutants, by developing methodologies that measure microplastics, collect accurate data and provide robust analysis. Future monitoring will be guided by this framework, ensuring better protection for public health and the environment.


 [Read more here.](#)

#### Analysing drought risk

The JRC has developed the European Drought Risk Atlas to better understand and manage the complex risks associated with droughts. It provides detailed insights into the frequency, severity and impact of droughts, assesses risks in critical sectors such as agriculture, water supply and energy, and develops effective drought management strategies. Combined it is an invaluable resource for policymaking aimed at mitigating the future impact of drought.


The JRC’s More Water More Life project finds water in some of the driest places on earth. Since

2017, UNICEF has collaborated with the JRC to develop this new way of mapping groundwater using geospatial imagery and data. Together, they have found a way to use satellite images in conjunction with conventional exploration techniques to reduce the time and resources required for groundwater feasibility studies.

 [Learn how our drought data can help you here.](#)


### **Making the best of ocean resources in a sustainable way: the blue economy**

Oceans, seas and coastal regions provide many opportunities to build a stronger and more competitive EU economy. But the marine realm is fragile, remains largely unknown and it is indispensable to sustain life on Earth. Together with DG MARE the JRC has built the European Union Blue Economy Observatory to monitor and analyse economic activities related to oceans, seas, and coasts across and between Member States to harness the potential of our oceans while ensuring long term health and sustainability of the marine environment.

 [Explore the observatory here.](#)

### **The eye in the sky**

Working closely with Copernicus, a European Union programme that monitors the Earth via satellites, The JRC's focus is on satellite-based monitoring of oceans, lakes and rivers. This data provides critical insights into water bodies and allows decision-makers to track climate-induced changes, pollution and water use patterns across Europe.

 [Discover more about satellite monitoring here.](#)

## **BEST PRACTICES**



### **Sustainable water management**

*Exploring Water Resilience with Labs across the EU* is a design-driven, participatory initiative that brings together national labs, local stakeholders,

and EU policymakers to co-create solutions for water resilience. By engaging national labs and integrating local knowledge with scientific research, it aims to develop actionable insights and practical solutions to improve water resilience across diverse regions. Under the remit of the EU Policy Lab, JRC collaborated with five participant labs from various Member States (Portugal, Lithuania, etc.), with each laboratory bringing different experiences and perspectives to the table. This helps to bridge the gap between the multiple insights on water resilience at municipal, regional, national, and EU-level.

 [Get involved here.](#)



### **Blue2 modelling framework**

The Blue2 freshwater-marine modelling framework assesses status and trends of both marine and freshwater systems. By simulating various climate change scenarios, the JRC offers you crucial policy guidance that enables more agile water management strategies, while considering the complex interaction between climate change, water scarcity and food security.

 [Discover how it works here.](#)



### **Surveillance to support public health**

The JRC is promoting a groundbreaking approach to monitoring public health: analysing wastewater to track diseases and pollutants. This method, known as wastewater-based surveillance, has shown great promise in detecting SARS-CoV-2, antimicrobial resistance, and other emerging health threats. The [International Cookbook for Wastewater Practitioners](#) is a practical guide developed through the collective efforts of over 50 institutions worldwide, including universities, research centres, and public health organisations. It brings together experts from diverse backgrounds and fields of expertise from over 20 countries, showcasing the breadth of international cooperation involved in creating this valuable resource.

 [Find out more about WBS and public health here.](#)



# Research Infrastructures

Disseminating knowledge through shared facilities




European Laboratory for Structural Assessment (ELSA) – JRC Ispra site (Italy)

“ *The JRC operates a network of 53 physical laboratories and research infrastructures.* ”

Access to advanced research infrastructures is essential for fostering innovation and tackling complex societal challenges. The JRC’s Open Access initiative promotes knowledge-sharing among researchers, policymakers, and professionals, supporting evidence-based policymaking.


The JRC’s open access research infrastructure programme serves a wide range of users—including Member State institutions, Horizon Europe partners, SMEs, industry, research institutes, and academia—who gain access to world-class labs and equipment in fields like nuclear, chemistry, biosciences, physical sciences, and ICT. This access strengthens research capacity, supports EU strategic goals, and drives scientific progress.

 [Explore upcoming opportunities for the Open Access research programme here.](#)

## TOOLS

### A network of cutting-edge onsite labs

The JRC operates a network of 53 physical laboratories and research infrastructures, most of which are unique at European and international level. JRC’s research infrastructures are located in four sites: Geel (Belgium) Karlsruhe (Germany), Ispra (Italy) and Petten (Netherlands). Of these, 36 are open access. These labs enable experiments, technology testing, and expertise-sharing. Under the JRC Strategy 2030, access to these facilities will expand, fostering transparency, fairness, and meeting diverse stakeholder needs.

 [Find out what your nearest JRC lab is doing here.](#)

## BEST PRACTICES



### Securing structural safety at the ELSA Reaction Wall

The ELSA Reaction Wall is a top-tier facility for full-scale experimental testing, primarily assessing the safety of structures against natural

and human-made hazards, such as earthquakes. It is essential in updating the Eurocodes, the European standards for structural design. Key research areas include seismic performance of full-scale buildings, post-earthquake fire resilience in steel structures, and automated construction technology for tunnels. In 2023–2024, 28 researchers from universities in Czechia, Greece, Italy, Ireland, Slovenia, Spain, Albania, North Macedonia and Serbia joined training programmes at ELSA. Projects like The Horizon 2020 SERA and Horizon Europe ERIES project have brought 80 users from 20 universities and six industrial partners from Belgium, Denmark, Germany, Italy, Portugal, Romania, Slovakia, Spain, Switzerland and the United Kingdom to ELSA, promoting collaboration in structural and seismic engineering.



*Learn how ELSA is redefining boundaries [here](#).*



### **Advancing nuclear research through EUFRAT**

The JRC's European Research Infrastructure (EUFRAT) initiative grants open access to four cutting-edge nuclear laboratories, supporting both emerging and established nuclear scientists and engineers. Facilities like the GELINA high-resolution neutron time-of-flight facility and the HADES enable in-depth studies of neutron-induced reactions and radioactivity. EUFRAT also offers valuable training opportunities for researchers and SMEs. Over 100 projects from Member States have participated, with young students making up 25% of participants. Scientists from France and Romania have used the GELINA facility to study inelastic neutron scattering, which is crucial for developing advanced nuclear reactors, which promise to increase energy efficiency and reduce nuclear waste. Researchers at the Belgian Nuclear Research Centre (SCK-CEN) report that GELINA's results are supporting their work on future reactor technologies, nuclear waste transmutation, and producing medical isotopes.



*Explore EUFRAT's four open-access nuclear labs [here](#).*



### **Tackling environmental and public health challenges at the Nanobiotechnology Laboratory**

Part of the JRC's Open Access framework, the Nanobiotechnology Laboratory focuses on critical projects on micro(nano)plastics, advanced materials, and nanomedicines. The flagship laboratory has hosted numerous collaborative projects, including investigating nanoplastics leakage from PET water bottles with the University of Milan and monitoring plastic abundance in Lake Maggiore with the CNR. These collaborations have resulted in significant research outcomes to inform future standardisation and support the European Commission in developing methodologies for detecting microplastics in various water systems. In addition to research, the laboratory engages in training and capacity-building initiatives, collaborating with networks like CERIC and NFFA to promote knowledge-sharing and innovation across Europe.



*Take a virtual tour of the Nanobiotechnology Lab [here](#).*



### **Actinide User Laboratory: building vital knowledge of fission technologies**

The Actinide User Laboratory (ActUsLab) specialises in heavy elements at the end of the periodic table, essential for nuclear fission technologies in electricity, water management, space exploration and healthcare. Actinides have complex properties and understanding them is crucial to safely use civil nuclear technology. ActUsLab includes 3 world-class facilities, PAMEC (Properties of Actinides in Extreme Conditions), FMR (Fuel Material Research) and HC-KA (Hot cells) and collaborates with institutions across EU Member States. In partnership with Italy's Istituto Nazionale di Fisica Nucleare (INFN) and universities, the European Organization for Nuclear Research (CERN) in Geneva and Portugal's Centro de Ciências e Tecnologias Nucleares (C2TN), it developed optimised targets for medical radioisotopes with great potential in treating metastatic cancer. Unique in Europe, ActUsLab supports critical nuclear research and trains future scientists in this field.



*Discover ActUsLab's cutting edge research [here](#).*



# Security

## Supporting a secure, resilient, and prepared Europe

The JRC plays a vital role in safeguarding the EU's land, seas, airspace and cyberspace. By investigating existing and emerging threats and developing innovative solutions, it promotes coordinated responses to shared challenges across Member States. From tackling the rising risks posed by civil drones to employing space technologies for disaster prevention and exploring the intersections between climate change, energy, and defence, the JRC takes a future-forward approach to supporting Member States in protecting their citizens, infrastructure and assets.



### TOOLS

#### Global Human Settlement Layer

The JRC has developed the *Global Human Settlement Layer (GHSL)*, a powerful open tool for disaster risk reduction and urban planning. Harnessing evidence-based analytics and knowledge using new spatial data mining technologies, the GHSL takes the form of built-up population density and settlement maps that generate crucial information on human settlements, all derived from satellite imagery. By offering a detailed understanding of these patterns and their changes over time, it helps policymakers design sustainable urban areas and assess risks more effectively. This pioneering tool is instrumental in disaster preparedness and

management, aiding local authorities in managing response efforts to natural disasters.

The GHSL data was crucial to help the UN Statistical Commission promote a new definition of city and rural areas. This, in turn, will allow countries to report in a more transparent way on Sustainable Development Goals. The JRC provided training to 43 countries to implement the new science-based method.

 [Access the GHSL's free data and tools here.](#)

#### Supporting law enforcement agencies

JRC supports law enforcement agencies in their efforts to combat cybercrime through two key initiatives: the Digital Forensics Laboratory (DFL) and the Europol Decryption Platform (EDP). The first initiative develops innovative tools and methodologies for analysing digital evidence, providing research and development, technical support, and collaboration services to EU institutions and law enforcement agencies. The Europol Decryption Platform, designed and hosted by the JRC, is a secure platform that enables law enforcement agencies to decrypt and analyse

**“ JRC takes a future forward approach to supporting Member States in protecting their citizens, infrastructure and assets.**

encrypted data related to criminal investigations. The JRC contributes to the development of the EDP by providing expertise in cryptanalysis and data security, conducting research on innovative decryption techniques, and offering training and support to Europol and its partners.

### **Aviation security: ensuring that the security equipment performs as expected at the airports**

The Commission has established common rules in the field of aviation security aimed at protection of persons and goods from unlawful interference with civil aircrafts, which includes technical requirements for security screening equipment. The JRC has developed a harmonised explosive trace detection (ETD) test kit with standardised test materials and training courses to support aviation authorities and airports to monitor whether aviation security equipment at passenger checkpoints, continues to meet the regulatory performance requirements during its operational lifetime.


 [Learn more about aviation security here.](#)

## **BEST PRACTICES**



### **Countering the threat of illicit drones in civil society**

The increase illicit use of Unmanned Aircraft Systems (drones) presents new challenges to public safety and security. As support to EC initiatives, the JRC has released two comprehensive handbooks that offer expert guidance for Member States stakeholders. The handbooks offer detailed instructions on initiating Counter-Unmanned Aircraft Systems efforts, assessing drone-related risks, designing and implementing physical hardening measures. Furthermore, JRC supports the EC initiatives in implementation of the [EC DRONE 2.0 strategy](#) and EC communications on how to protect against maliciously used drones with expert knowledge in the EC expert group, dedicated online tools and the implementation of the [JRC C-UAS living lab](#).

 [Learn more about how the JRC can help you protect your skies here.](#)



### **Joining the dots on climate change, energy, and defence**

As a crucial step towards enhancing EU defence, the JRC has made significant strides in exploring the climate change-energy-defence nexus. A groundbreaking 2023 report reveals vulnerabilities in EU defence and energy systems, including data gaps, interdependencies, and risks to military infrastructure. To drive climate resilience and energy sustainability, the report recommends integrating climate resilience into defence strategies and securing energy sources. By capitalising on these insights, Member States can improve their preparedness for climate-related threats and bolster EU defence against climate-induced risks. To this end, JRC supports Ministries of Defence in the [Climate and Defence Network](#) led by EEAS.



[Explore the proposed defence strategies for climate change here.](#)



### **Counteracting hybrid threats**

The JRC has developed a comprehensive approach to strengthen EU resilience against hybrid threats, including cyberattacks, disinformation, and infrastructure sabotage. Its [flagship report](#) promotes a collaborative model to build robust and adaptable systems, ensuring Europe remains prepared for modern security challenges.

The report has been utilised to conduct a joint study with the [European Defence Agency](#) (EDA) to enhance the resilience of critical energy infrastructure for the defense sector. The study's findings were applied in a table-top exercise with Ministries of Defence from various Member States, promoting civil-military collaboration and raising awareness on defence energy resilience.

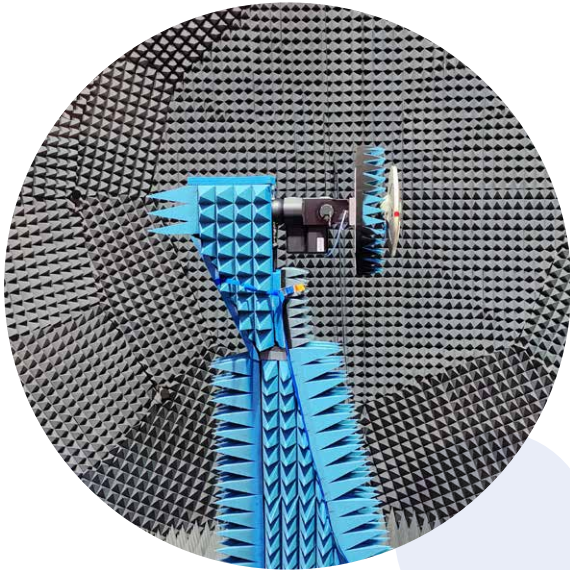


[Click here to protect your networks and secure a safer future.](#)



# Space

## Exploring space, security and defence



European Microwave Signature Laboratory (EMSL) – JRC Ispra site (Italy)

Europe's reliance on Global Navigation Satellite Systems (GNSS) is central to sectors such as transport, finance, and telecommunications. As space traffic increases and technological threats grow, the resilience of these services becomes ever more crucial. To safeguard its space infrastructure and foster future growth, the EU must embrace cross-border collaboration and adopt cutting-edge tools for space-based service protection.

The JRC, in close partnership with the Directorate-General for Defence Industry and Space (DG DEFIS) and the Agency for the EU Space Programme (EUSPA) and in collaboration with the European Space Agency (ESA), provides critical expertise and tools to bolster Europe's space security. Together, they are ensuring Europe remains at the forefront of global space capabilities. The JRC tools and facilities will be brought together in the Space and Connectivity Living Lab to be launched in 2025.

**“** To safeguard its space infrastructure and foster future growth, the EU must embrace cross-border collaboration and adopt cutting-edge tools.

## TOOLS

### Advancing Europe's GNSS capabilities

The JRC has established the European Global Navigation Satellite System (GNSS) Testing and Demonstration Hub to advance satellite positioning, navigation, and timing technologies.

This network of state-of-the-art laboratories and testing facilities allows users to develop satellite-based equipment and navigation platforms that harness both current and future services from the Galileo and European Geostationary Navigation Overlay System (EGNOS) programmes.

An inventory of all available testing capabilities at the hub has been compiled through a cooperation agreement with DG DEFIS and EUSPA.




Consult the inventory of GNSS testing capabilities within the JRC Testing and Demonstration Hub [here](#).

## Optimising satellite performance

The Galileo Reference Antenna Pattern (GRAP) is a highly precise technical model developed by the JRC in collaboration with DG DEFIS and ESA. It provides detailed insights into the behaviour of Galileo satellite antennas.

This model helps to map and understand the signal patterns emitted by Galileo satellites, focusing on critical factors such as side lobes, which are essential for missions that rely on accurate and consistent signal reception beyond Earth's atmosphere. Unlike broader initiatives aimed at improving satellite navigation resilience, this tool specifically targets optimising satellite operations in space.


By offering highly accurate data on antenna performance, it ensures that satellite-based missions whether for scientific research, navigation, or communications achieve superior precision in positioning and timing.

 [Discover the technical advantages of GRAP here.](#)

## Boosting infrastructure security

In response to increasing threats to satellite navigation services, the JRC is performing substantial work to assess Complementary Positioning, Navigation, and Timing (C-PNT) technologies. These systems act as a backup in case of disruptions, ensuring that essential infrastructure such as transport systems and communication networks remains operational. This is particularly critical for Member States looking to enhance the resilience of their national infrastructure in the face of outages or cyber threats.

By integrating these complementary technologies, Member States can safeguard vital services, protect economic stability, and ensure public safety. These innovations represent a significant step forward in securing Europe's strategic autonomy and security in space.

 [Find out more about JRC work on C-PNT technologies here.](#)

## BEST PRACTICES



### Building future-ready space capabilities

The JRC is providing critical inputs to strengthen the resilience of Europe's satellite navigation infrastructure. One of its initiatives focuses on refining the Interoperable Space Service Volume, which ensures that satellite signals are reliable for navigation in space. This is particularly important for high-demand users, such as satellites in low or highly elliptical orbits.

By addressing these unique challenges, the collaboration is not only improving the accuracy and dependability of satellite services but also preparing Europe for future space missions, including lunar exploration. The JRC's efforts are key in enhancing the interoperability with other global systems like GPS, securing Europe's competitive edge in space services.

 [Explore more about efforts to strengthen satellite navigation resilience here.](#)



### Training future space professionals

To maintain leadership in space, the JRC and ESA are dedicated to training the next generation of space professionals. Initiatives such as the ESA-JRC International Summer School on GNSS equip graduate students, researchers, and young professionals with practical skills in satellite navigation. These itinerant programmes take place in different Member States, including past editions held in countries like Italy, Germany, and Czechia. In 2024, the programme was hosted in Slovenia, offering hands-on experience in cutting-edge GNSS technologies and covering both technical aspects and commercialisation strategies for space innovations.

By fostering young talents across the EU, this initiative ensures that Member States like Slovenia, Italy, and others in the GNSS community have the expertise needed to drive space innovation, keeping Europe competitive in the global space industry.

 [Learn more about the ESA-JRC Summer School here.](#)



# III. Resources for Scientific Development

A list of additional resources  
and opportunities that JRC can offer

# The European Commission's Knowledge and Competence Centres

## The JRC hosts the Commission's Knowledge and Competence Centres.

Knowledge Centres are virtual entities, bringing together experts and expertise from various locations in and outside the European Commission. Their aim is to inform policymakers in a transparent, tailored, and concise manner about the status and findings of the latest scientific evidence. They are designed to be a 'one-stop shop' in their respective areas and include communities of practice.

Competence Centres, on the other hand, focus on analytical tools applicable across various policy areas, while uniting extensive expertise in the field in a single platform. They offer training courses in the use of the tools for policymaking, advise on the choice of tools and work directly with the Commission Directorates-General to apply them to the policy problems at hand.



# EC Knowledge Centres (KCs)



**KC for Biodiversity** develops tools that support the implementation of the EU Biodiversity Strategy. It presents relevant information and makes it accessible; brings together researchers, policymakers, NGOs, industry, and citizens; analyses available evidence, and communicates it in a transparent, tailored, and concise manner.



**KC on Bioeconomy** supports policymaking by gathering relevant information, fostering collaboration among researchers, policymakers, and field experts; and providing precise, comprehensive, and succinct evaluations and summaries of existing evidence.



**KC on Cancer** fosters independent scientific alignment, coordination and support to EC cancer-related policies and activities. It is built on the European Cancer Information System (ECIS)—cancer burden; European Cancer Inequalities Registry (ECIR)—cancer inequalities; Health Promotion and Disease Prevention—cancer prevention; European Guidelines and Quality Assurance Schemes—cancer screening, diagnosis and care; and the EU Platform on Rare Disease Registration (EU RD Platform)—rare cancers.



**KC for Disaster Risk Management** brings together policymakers and experts dealing with disaster risk at the Commission, EU countries and around the world to build networks and partnerships to transfer science into policy; integrate, merge, and share knowledge across sectors and co-develop innovative solutions for the mitigation of disasters and their impact.



**KC on Earth Observation (EO)** helps EU policymakers to fully exploit the growing amount of EO data, products, and applications by assessing needs of EU policies and translating these into technical requirements for EO products and services; analysing research needs and priorities for innovating in EU Earth Observation programmes and bringing together an active community of scientists, policymakers, and specialists.



**KC for Food Fraud and Quality** provides and shares up-to-date scientific knowledge on food fraud and food quality issues. It coordinates market surveillance activities and employs early warning and information systems for food fraud.



**KC for Global Food and Nutrition Security** contributes to better policy making by offering a one-stop source of curated information. It gathers, organises, and makes accessible the most relevant information, data, and tools. It also analyses and synthesises available knowledge. Furthermore, it builds a shared understanding of facts through the creation of new knowledge according to policy needs and the promotion of networking between experts and policymakers.



**KC on Migration and Demography** deepens the understanding of opportunities and challenges related to demographic change and migration. It supports evidence-informed EU policymaking in areas related to demography, migration, and mobility.

# EC Competence Centres (CCs)



**CC on Behavioural Insights** is part of the EU Policy Lab, a space for cross-disciplinary exploration and innovation in policymaking. Its goal is to use behavioural insights to help design better policies; bridge the gap between policymakers and behavioural researchers and increase the use of behavioural insights for policy, when relevant.



**CC on Composite Indicators and Scoreboards.** Under the banner of ‘*Good policies start with good measurement*,’ its mission is to develop and apply statistical methods and data visualisation tools to provide insights on complex multidimensional policy phenomena, monitor performance, and help steer policy interventions at national, regional, and local levels.



**CC on Foresight** supports EU policy making by providing strategic and future-oriented input, developing an anticipatory culture inside the European Commission, continuously experimenting, and developing different methods and tools to make foresight useful for decision-making processes.



**CC on Microeconomic Evaluation** contributes to better EU regulation and spending through evaluation and data-driven microeconomic analysis of EU policies; provides causal evidence on which policy measures work in different areas including social, industrial, and environmental policies; advises EU institutions and Member States on the use of good quality impact evaluations; brings together researchers, policymakers and other experts in the field of impact evaluation; and builds capacity among policymakers on impact evaluation.



**CC on Modelling and Decision Analysis** promotes a responsible, coherent, and transparent use of modelling to support the evidence base for EU policies. It pools the Commission’s competencies and best practices in building and using models. It further helps finding common approaches to quality and transparency of model use and eases dialogue between policy makers and modelling teams across the Commission. Main activities: corporate modelling inventory and knowledge management; sensitivity analysis of models; peer review of models; transparency and coherence in science for policy.



**CC on Participatory and Deliberative Democracy** supports EU policymaking by enriching the EU knowledge base on participatory and deliberative practices; providing guidance for researchers and policymakers; building capacity on methodologies; developing dedicated public spaces for citizen engagement; experimenting with new methodologies.



**CC for Technology Transfer** is the single reference point for expertise and services in technology transfer (TT) at the European Commission. It aims to deepen and share competencies and knowledge on technology transfer in capacity building, financing, and innovation ecosystems.



**CC on Text Mining and Analysis** is a focal point for text mining at the European Commission. Examples of recent challenges include using multilingual topic mining to understand citizens’ concerns in public consultations; developing targeted sentiment analysis for news and social media; refining automated event detection from news for crisis awareness purposes; and following the propagation of narratives during the COVID-19 crisis.

# JRC Standards and Reference Materials

## JRC Certified Reference Materials (CRMs)

JRC is one of the major developers and producers of reference materials (RMs) in the world. JRC has unique RM production facilities, including specialised laboratories for material processing. JRC's RMs support EU policy needs by ensuring reliable measuring results critical for healthcare, environmental protection, food safety, and economic competitiveness. These state-of-the-art RMs also play a vital role in emerging areas such as biotechnology and health crisis preparedness.

 [Browse the catalogue of JRC RM.](#)

## JRC Standardisation Workshops

Standards play a crucial role in turning scientific research into actionable policies. The JRC actively shapes standards across various fields, including physical sciences, chemistry, health, life sciences, and nuclear safety.

The JRC further supports standardisation by providing reference materials (RMs) and conducting validation and certification work in its labs.

To stay ahead of future needs, the JRC organises 'Putting Science Into Standards Workshops' (PSIS) with the European Standardisation Organisation CEN-CENELEC.

These workshops serve as a tool to identify areas where standards are needed and bring together researchers, industry leaders, policymakers, and experts to discuss current trends and shape future policies.

Past workshops have addressed hydrogen, AI data needs, organ-on-chip technology, quantum technologies, circular technologies in constructions and molten-salt reactors (MSRs)

 [Find out more here.](#)

**“ Standards play a crucial role in turning scientific research into actionable policies. The JRC actively shapes standards across various fields, including physical sciences, chemistry, health, life sciences, and nuclear safety. ”**



Reference Material Production Laboratory  
JRC Geel site (Belgium)

# Tools for Sustainable Territorial Development



“ *There is a need to provide robust data and knowledge to help design future-proof policies that could counter the effects of demographic decline and rising economic inequality across EU territories.* ”

The EU is increasingly facing territorial inequalities in multiple dimensions; income, innovation, welfare, health, education, service accessibility, labour market and the brain drain, to name a few.

These inequalities have differing impacts according to the type of territory, for example, in border regions. Addressing these challenges is key to building a fairer and more resilient society, and strengthening links between citizens and the democratic institutions that serve them.

There is a need to provide robust data and knowledge to help design future-proof policies that could counter the effects of demographic decline and rising economic inequality across EU territories. Territorial and sectoral dimensions are a fundamental part of designing, monitoring, and assessing the impact of policies.

JRC has developed a group of tools to support developing and implementing integrated strategies in territorial urban and non-urban settings.

- **Innovation for place-based transformations.** **ACTIONbook, practices and tools**, a comprehensive hands-on resource set to empower local, regional, and national stakeholders across Europe to drive societal well-being and climate-resilient development through strategic partnerships and purpose-driven actions. To download the ACTIONbook and read inspiring projects, visit [this site](#).
- **A self-assessment tool for territorial and local development strategies**, designed for local authorities and national and regional managing authorities under the EU Cohesion Policy 2021-2027. The authorities handle building or updating integrated territorial development strategies, or more precisely to Integrated Territorial Investment (ITI) or Community Led Local Development (CLLD) and other types of territorial tools in non-urban settings.

 [Explore SAT4TER here.](#)

- **Self-Assessment Tool for Sustainable Urban Development strategies (SAT4SUD):** designed for local authorities and national and regional managing authorities of the EU Cohesion Policy in charge of building or updating sustainable urban development strategies.

 [Explore SAT4SUD here.](#)

- **Dashboards**  
Discover a world of data and how your place city, province, district, region or country is performing, thanks to this unique collection of official and experimental indicators covering socio-economic and environmental aspects.

On top of the 360-degree overview, find out about trends in cities, regions and local areas in Europe and beyond, including overtime evolution and projections from the latest and most advanced modelling frameworks.

- **The Demography-Economy-Land use interaction (DELi) model** relies on a set of linked equations that integrate empirically derived assumptions on future regional growth, and estimate regional levels of GDP, employment, population and land use recursively and in an integrated manner, thus capturing demography-economy feedback as well as ongoing, expected or assumed processes of divergence and convergence across regions. The model can be configured to generate different regionalisation scenarios based on the same or different input country-level projections. DELi was built as a modular, flexible structure that allows to expand or substitute any of its components by alternative methodological approaches or assumptions.

 [Get more information here.](#)


- **Territorial Economic Data Viewer (TEDv)** offers users an easy way to: monitor the territorial and sectorial concentration of R&I funds; compare the contribution of different R&I funds to the total Research and Development (R&D) expenditures of a territory; perform regional benchmarking in terms of the use of different R&I funding; assess the

evolution of the socio-economic performance of a region compared to country and European Union averages. See the [TEDAM Working Paper](#) for more details about the data and methods behind TEDv.

- **Territorial Data Analysis and Modelling (TEDAM)** provides quantitative economic analyses and policy impact assessments with a focus on the European territorial dimension (up to the NUTS 2 regional level). TEDAM'S work is organised along two pillars:

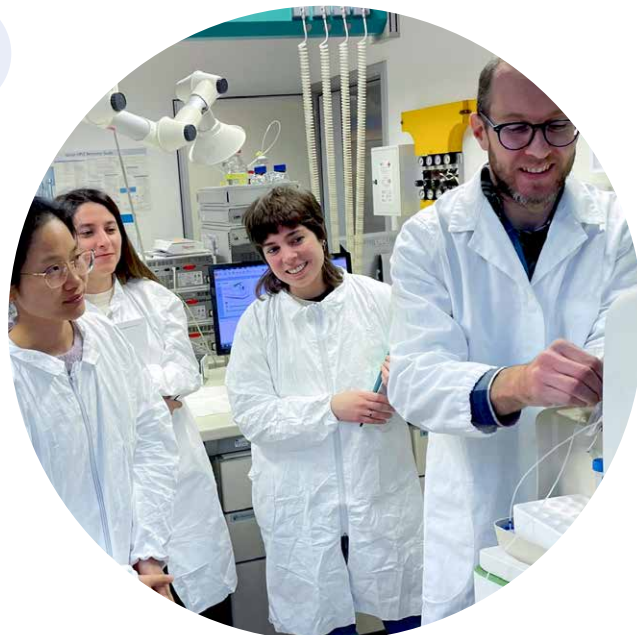
**RHOMOLO (Regional Holistic Model)**, used for policy impact assessment and provides sectoral, regional and time specific results based on scenario analysis.

**REMO (Regional Economic Monitoring)** focuses on the mapping, monitoring, and analysis of key regional and micro-level data.

 [Subscribe to the TEDAM newsletter.](#)



# Open Access to JRC Research Infrastructures




*Open Access Training and Capacity Building Week at the JRC Nanobiotechnology Laboratory JRC Ispra site (Italy)*

Through its programme for open access to research infrastructures (RIs), JRC gives leading researchers from across Europe and beyond access to its world-class facilities and laboratories, enabling state-of-the-art experimental research, collaboration and capacity building within a European dimension.

## The JRC's unique facilities across Europe

The JRC maintains a wide range of laboratories and research infrastructures across five EU countries and six sites, most of which are unique at European and international levels.

Out of these, 36 are open-access to external users, offering scientists, academics, and industry professionals a chance to work with cutting-edge equipment they might not have in their own country. This open-access model doesn't just fuel innovation—it fosters knowledge sharing and contributes to bridging the gap between research and industry.


 [Discover more about the JRC open access initiative and see the full list of nuclear and non-nuclear RIs here.](#)

## Training and capacity building under the JRC

The JRC provides free training and capacity building to researchers and technicians from institutions in Member States and countries associated to Horizon Europe in their RIs through open calls for proposals.

**“** *The JRC maintains a wide range of laboratories and research infrastructures across five EU countries and six sites, most of which are unique at European and international levels.*

Successful proposals allow users to visit JRC research infrastructures for short periods to be trained by JRC staff on the operation, use and capabilities.

 [Read more about the training and programmes.](#)

## Accessing JRC research infrastructures

Applications to access JRC research infrastructures fall under two modes:

**Relevance-driven.** These applications are primarily open to academic institutions and SMEs in response to open calls for proposals published by the JRC.

Proposals are peer-reviewed by a User Selection Committee composed of experts from European academia and research institutions. They are valued on their strategic value for Europe, scientific implementation, collaboration and access to new users. Successful applicants benefit from reduced fees and commit to sharing their findings publicly after 18 months.

**Market-driven.** These proposals are mostly generated by the industrial sector, do not need to respond to a specific open call and can be submitted at any time. Applicants cover the full cost of access. Public data sharing of their projects is not required.

**Exceptions to costs and fees.** The JRC may waive access costs to their research infrastructures under certain conditions and to institutions located in countries eligible for actions under the Horizon Europe aim of “Widening participation and spreading excellence”.

Access to nuclear research infrastructures is free of charge to users from institutions located in Members States and countries associated with the Euratom Research Programme.

In addition, the JRC may be able to support travel and subsistence costs of users visiting JRC research infrastructures, subject to the availability of funds, personnel and other resources.

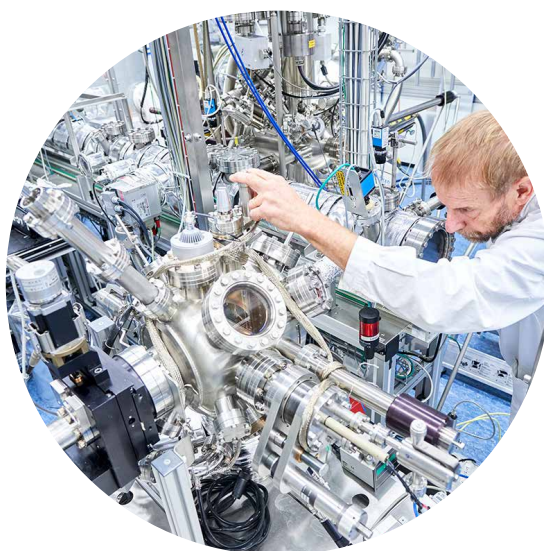
Every open call is carefully designed to support European policymakers in addressing critical challenges.

 [Find a complete list of open calls here.](#)

**“ Access to nuclear research infrastructures is free of charge to users from institutions located in Members States and countries associated with the Euratom Research Programme.**

### Benefits of the JRC Open Access to RIs programme.

- Open calls allow users not traditionally engaged with the JRC to enjoy access to its facilities.
- Research infrastructures attract talent and stimulate innovation and development.
- The programme boosts competitiveness, through pre- and co-normative research, and contributes to bridging the gap between research and industry.
- Access to JRC research infrastructures contributes to the dissemination of knowledge, improves methods and skills, and provides education and training.
- Granting access within a structured framework maximises the return on taxpayer funded investment that the JRC has made on its research infrastructures.
- Making Research Infrastructures (RIs) accessible to external users helps address the scarcity of such resources in Europe.



Actinide User Laboratory ActUsLab  
JRC Karlsruhe site (Germany)

# JRC Scientific Development Programmes



The JRC offers PhD students several opportunities to advance their career and knowledge through its Collaborative Doctoral Partnerships and Marie Skłodowska-Curie Action programmes.

## Collaborative Doctoral Partnerships

The JRC Collaborative Doctoral Partnerships (CDPs) programme was established to foster strategic cooperation with institutions of higher education that have excellent research credentials and an international reputation. The programme is designed to train a new generation of doctoral students in specific scientific fields, with a focus on the science-policy interface.

CDPs provide candidates and their respective institutions with hands-on experience in research for policymaking processes. Students

gain valuable insights and transferable skills in policy support, science communication and knowledge management.


Applications for a CDP placement falls into thematic areas aligned with the JRC's work-programme. Past themes have included digital governance, artificial intelligence for earth observation, smart connected and clean mobility, and behavioural insights applied to policymaking.

## Applying for a CDP

Individual students cannot apply for a CDP. Applications are only accepted from universities or higher education institutions. After the institution has been accepted into the programme, doctoral students can apply for the placement.

Screening processes are carried out jointly by JRC and the university. Placements are either for one or two years. During this time, doctoral students are offered a grant holder employment contract, and training and travel-for-work costs will be covered.


**“** *The JRC Collaborative Doctoral Partnerships (CDPs) programme was established to foster strategic cooperation with institutions of higher education that have excellent research credentials and an international reputation.*

 [Read more about the JRC's Collaborative Doctoral Partnerships.](#)

## Marie Skłodowska-Curie Doctoral Networks

JRC is also open to applications for fellowships and funding for research and innovation projects under the Marie Skłodowska-Curie Action Doctoral Networks (MSCA- DN) programme, an initiative that supports highly-skilled doctoral candidates, to stimulate their creativity and enhance their innovation capacity.

MSCA participants receive hands-on exposure to the science-to-policy cycle at the JRC. They benefit from unique training in world-class facilities, as well as, access to JRC datasets and methodology. Ultimately, they form part of the planning and implementation of important policies that steer the advancement of the European Union.

 [Find out more about applying for doctoral fellowships or funding with Marie Skłodowska-Curie Action.](#)

## Centre for Advanced Studies (CAS)

Established in 2016, the JRC's Centre for Advanced Studies (CAS), strengthens the science-policy interface to address emerging societal challenges. By fostering innovative, interdisciplinary research and offering a creative space for collaboration, CAS generates insights and solutions for issues like demography, big data, and digital transformation. It enables external researchers to work with the JRC on strategic topics beyond its usual scope.

Projects are typically led by a senior scientist with an established reputation in the research area and have a limited duration of a maximum of three years, after which they may be integrated into the JRC's core research activities.

 [Find out more about CAS here.](#)

**“** *MSCA participants receive hands-on exposure to the science-to-policy cycle at the JRC. They benefit from unique training in world-class facilities, as well as, access to JRC datasets and methodology.*





## A Research Career at JRC

The JRC is an open research organisation that collaborates globally. In recent years, the volume of JRC publications available through open access has steadily risen. Currently, it is at 95% for articles where a JRC researcher is a first or corresponding author.

The work of JRC scientists is highly collaborative, with 82% of JRC scientific articles co-authored by external experts from over 3200 organisations across 134 countries. These scientists rely on robust networks within policy and scientific communities to map, review, analyse, and synthesise the best available evidence to support EU policies.

### Why is this significant?

The JRC's commitment to scientific excellence underpins its reliability as a partner for policymakers. Its researchers are dedicated to anticipating emerging challenges and adopting a forward-looking approach to connect insights and address complex societal issues. By doing so, they enable more targeted and effective policymaking.

Researchers enjoy the JRC's world-class facilities and laboratories to enhance experimental research, collaboration, and capacity-building with a European perspective.

From the heart of Europe, JRC researchers contribute to evidence-based policymaking, advancing societal improvement through science.



*For more information, visit [Career Opportunities at the JRC website](#).*

**“** *The JRC is an open research organisation that collaborates globally.*



*Check out current vacancies at: [recruitment.jrc.ec.europa.eu](https://recruitment.jrc.ec.europa.eu)*

# What are you looking for?

## WANT TO DO RESEARCH FOR POLICY?

- **as a researcher**  
up to 6-year contract  
as contract staff FGIV\*
- **as a research assistant or lab technician**  
up to 6-year contract  
as contract staff FG III\*
- **as a grantholder / PhD student**  
check out the Collaborative Doctoral Partnership Programme (CDP)  
as a seconded national expert (SNEs)  
up to 4-year contract

## NOT A RESEARCHER? THE JRC HAS OTHER OPPORTUNITIES!

- **as an administrative / auxiliary staff**  
in fields such as finance / budget, communication, security, safety, legal affairs, ICT and more  
up to 6-year contract  
as contract staff FGII-IV\*

## WANT A TASTE OF WORKING FOR EU INSTITUTIONS?

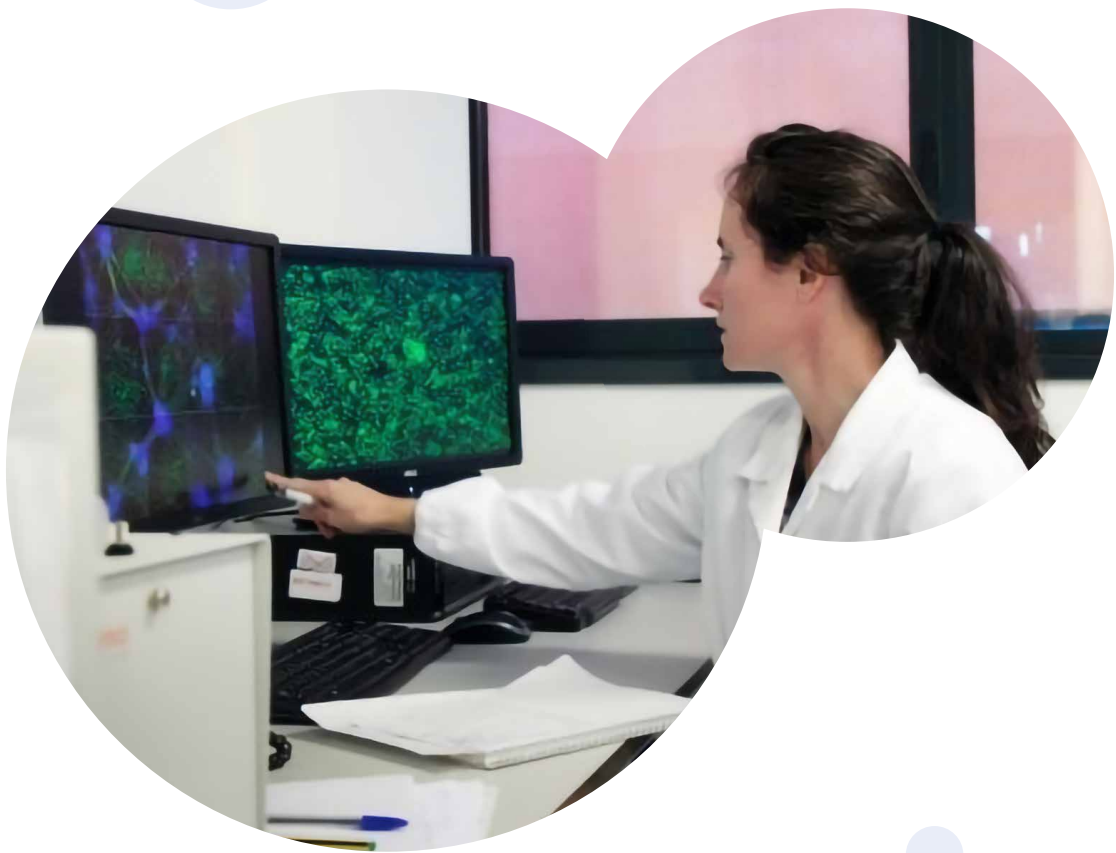
- **as a JRC scientific trainee**  
in Geel, Karlsruhe, Ispra or Petten  
3-5 month contract  
apply in May to start in October  
apply in November to start in March\*\*
- **as a European Commission bluebook trainee**  
in Brussels or Seville  
3-5 month contract  
apply in January to start in October  
apply in July-August to start in March\*\*

## WANT TO BUILD A CAREER IN THE EU INSTITUTIONS?

- **as a civil servant of the European Union**  
to become a permanent civil servant for the JRC and the European Commission,  
apply for open competitions organised by the European Personnel Selection Office

\*At the EU institutions, temporary jobs are organised into function groups (FG).  
Find out more here: <https://epso.europa.eu/en/help/faq/2037>

\*\*This time frame is indicative, please check the specific call you are applying for.



# The JRC in your Inbox

## Country Leaflet Repository

The JRC actively collaborates with a diverse network of public and private organisations, research institutions, universities, regulatory bodies, and local and national authorities across all Member States.

By fostering these partnerships, the JRC is dedicated to building stronger connections between the European scientific community and the Commission, driving innovation and collective progress.

With JRC's [Country Leaflet Repository](#), you can download detailed reports on JRC activities in each Member State.

## JRC Data Catalogue

This [online catalogue](#) offers a comprehensive overview of data and resources to develop scientific applications and design data visualisations.

Regularly updated and prepared to complement the JRC Policy on Open Access to Scientific Publications, the Data Catalogue is organised into dataset collections. Each one groups together metadata records for datasets linked by a common theme or criterion.

Search the Data Catalogue [here](#).

## Science Flash for You



**Science Flash For You**

България и Службата на Европейската комисия за наука и знания

Следвайте ни

Новини

**Системата на JRC за управление на извънредни ситуации по програмата „Коперник“ помогна на българските органи при овладяването на горските пожари в планината Славянка**

На 24 юли 2024 г. в граничната зона между България и Гърция, в планината Славянка — труднодостъпна планинска местност на височина над 2 000 метра — възниква горски пожар. След 5 дни бушуват на горски пожари в близост до границата и силен вятър пожарът се разпространява към България.

Science Flash for You informs policy makers and citizens of each Member State about the JRC's activities, including events, data, reports, that are most relevant to their country. They are published twice or three times per year in the national language. To sign up for quick insights into timely science news and developments, click [here](#).



## Follow us!

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# Get in touch with the EU

## In person

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest to you online ([european-union.europa.eu/contact-eu/meet-us\\_en](https://european-union.europa.eu/contact-eu/meet-us_en)).

## By phone or in writing

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696,
- via the following form: [european-union.europa.eu/contact-eu/write-us\\_en](https://european-union.europa.eu/contact-eu/write-us_en).

# Finding information about the EU

## Online

Information about the European Union in all the official languages of the EU is available on the Europa website ([european-union.europa.eu](https://european-union.europa.eu)).

## EU publications

You can view or order EU publications at [op.europa.eu/en/publications](https://op.europa.eu/en/publications). Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre ([european-union.europa.eu/contact-eu/meet-us\\_en](https://european-union.europa.eu/contact-eu/meet-us_en)).

## EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex ([eur-lex.europa.eu](https://eur-lex.europa.eu)).

## EU open data

The portal [data.europa.eu](https://data.europa.eu) provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

# Science for policy

The Joint Research Centre (JRC) provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society



**EU Science Hub**

[joint-research-centre.ec.europa.eu](https://joint-research-centre.ec.europa.eu)



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