



2019 Annual Activity Report

Joint Research Centre

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THE DG IN BRIEF

As the science and knowledge service of the Commission, the Joint Research Centre's (JRC) mission is to **support EU policies with independent scientific evidence** throughout the whole policy cycle.

The JRC supports EU policies in a variety of key areas

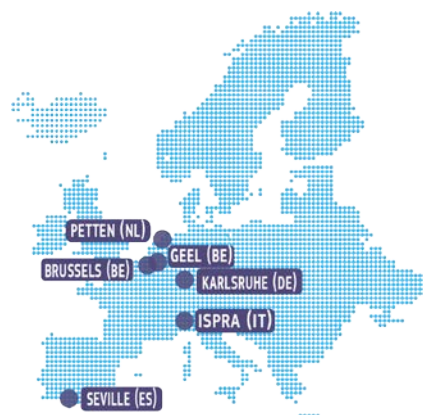
from agriculture and food security to the environment and climate change, nuclear safety and security, innovation and growth. As a boundary organisation at the interface between science and policy, it combines the cross-sectoral support required by policymakers to tackle increasingly complex societal challenges, with the capacity to respond rapidly to policy needs, all in close collaboration with the other European Commission Directorates-General (DGs). The JRC's work has also a direct **impact on the lives of citizens**, contributing with internationally recognised research outcomes for e.g. a healthy and safe environment, secure energy supplies, sustainable mobility and consumer health and safety. The **JRC creates, manages and makes sense of scientific knowledge and anticipates emerging issues**, which are better addressed at EU level. The Knowledge Centres bring together experts and knowledge from within and outside the European Commission. The Competence Centres provide policymakers and the research community with analytical tools that can be applied to any policy area.

The JRC provides independent scientific evidence for the EU

The JRC was established following the Treaty on the European Atomic Energy Community (Euratom) and now draws on over 60 years of scientific experience, continually building its expertise and sharing know-how with EU countries, the scientific community and the world. It works in collaboration with over a thousand organisations worldwide.

The EU's framework programme for research and innovation, **Horizon 2020**, and the **Euratom** Research and Training Programme in the nuclear field are the main sources of **funding for the JRC**. During the past five years, the JRC has contributed to the overall objectives of these programmes, while having been fully aligned with the political guidelines of President Juncker's Commission.

The JRC is organised in two Directorates with corporate responsibilities¹ and eight scientific Directorates, of which two are cross-JRC Directorates for knowledge management and competences. The JRC is spread across six sites in five different EU countries. In autumn 2019, the Director-General and the Deputy Director-General responsible for the Directorates 'Energy, transport & climate', 'Support services' and 'Nuclear safety and security' left the JRC. The Deputy Director-General Charlina Vitcheva, that was responsible for the Directorates 'Growth and innovation', 'Sustainable resources', 'Space, Security and Migration', and 'Health, consumers and reference materials', is currently covering all (Deputy) Director-General positions.



Unlike other Directorates-General of the Commission, the **JRC also manages scientific infrastructures and nuclear facilities**. The JRC has an integrated management system certified to the ISO 9001. The JRC is also certified to other standards such as that for occupational health and safety (OHSAS) and for environment (EMAS).

¹ Directorate for Strategy, Work programme and Resources; Directorate for Resources

EXECUTIVE SUMMARY

This Annual Activity Report is a management report of the acting Director-General of the Joint Research Centre to the College of Commissioners. Annual Activity Reports are the main instrument of management accountability within the Commission and constitute the basis on which the College takes political responsibility for the decisions it takes as well as for the coordinating, executive and management functions it exercises, as laid down in the Treaties².

a) Key results and progress towards the achievement of the Commission's general objectives and DG's specific objectives (executive summary of section 1)

As the science and knowledge service of the European Commission the JRC contributes to the Commission's political priorities with independent evidence throughout the whole policy cycle. The JRC works with a collaborative, multidisciplinary approach, which is necessary for the increasing complexity of societal challenges. In 2019, as in previous years, the JRC fulfilled its science and knowledge functions through analytical, anticipatory and innovative approaches.

In 2019, the JRC supported a wide range of policy priorities to help achieve a more competitive, fair, sustainable and influential Europe, producing more than 1100 studies, technical systems, data sets and databases, standards and operational services. The JRC is slightly below the targets for policy-related outputs. The target for peer-reviewed publications was met, with 695 peer-reviewed articles published in scientific journals.

Since adopting its long-term Strategy 2030, the JRC has adapted to its new role as manager of scientific knowledge for EU policies by developing the skills needed for more effective interaction with policymakers and new ways of working across the whole Commission. The new orientations of the JRC, such as behavioural research, stakeholder and citizen engagement and policy design thinking, are now effectively contributing to develop and monitor the EU policies.

2019 has been a year of concrete application of knowledge management expertise throughout the Commission and beyond, sowing the seeds of a new approach to evidence-based policymaking. This is testified by the success of the new #Facts4EUFuture flagship report series, of which seven new issues were published. The JRC took several initiatives to engage citizens on societal and economic issues, including the launch of the new community of practice for citizen engagement, the 'Science meets Parliament/Science meets regions' pilot project, citizen engagement on artificial intelligence and the JRC art and science programme, with several successful exhibitions.

The centre for advanced studies (CAS), the exploratory research programme (ER) and the collaborative doctoral partnerships (CDP) contributed to scientific excellence. The JRC also opened its research infrastructures to research institutions and industry in the Member States and launched the new initiative 'Living labs'

The main challenge for the JRC is maintaining and developing the right competencies to fulfil its mission. Exposure to external factors such as changing political priorities and social context can have a significant impact on the take-up of the JRC's research results. The JRC therefore closely collaborates with the policy DGs and adapts its work programme when needed.

² Article 17(1) of the Treaty on European Union.

In addition to providing the Commission with technical knowledge and independent evidence for policies, the JRC generates EU added value by supporting the Member States on a variety of technical issues, such as regional development crisis management and nuclear safety, saving administrative costs at Member State level. JRC supports the single market, for example through EU-wide and global harmonisation of standardisation in key areas such as health, security, environment and competitiveness.

Some highlights with EU added value:

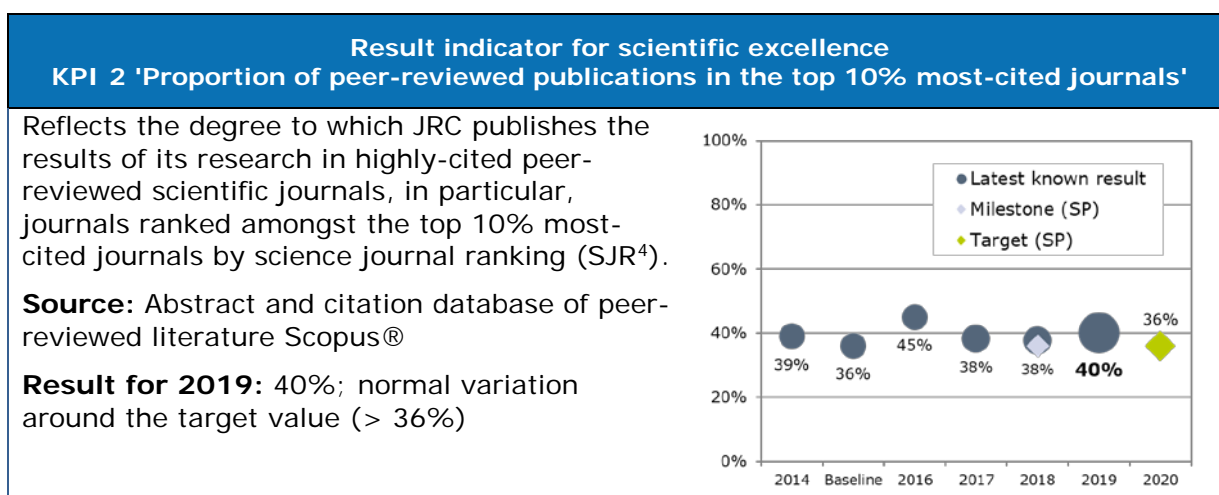
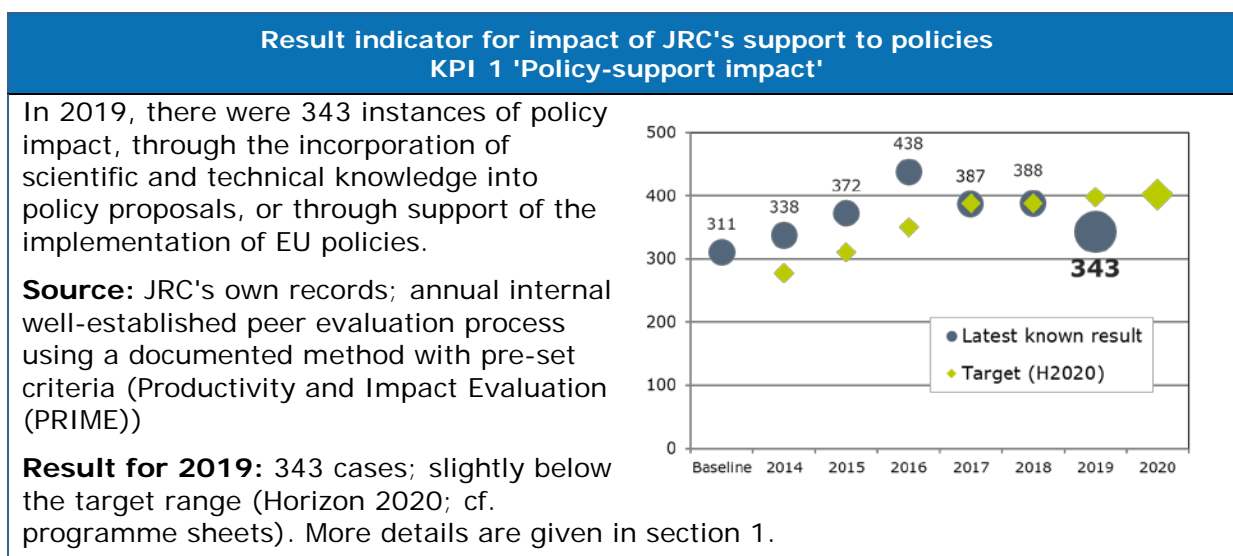
- **Policy work linked to climate change:** The JRC supported the European Union's global leadership in tackling climate change, climate change resilience and adaptation efforts and helped fighting NO₂ pollution in Europe's cities. It also published a #FACTS4EUUTURE flagship report on the future of road transport and is monitoring agricultural resources to assist farmers affected by drought.
- **Foresight:** The Competence centre on Foresight supports the building of anticipatory knowledge for policymaking and for developing long-term strategies. Issues covered were e.g. on farmers, customs, block chain for social and public good, migration, anticipatory innovation. The JRC also published its first Future of Government 2030+ report, with policy implications and recommendations for the future.
- **The EU as a global actor:** the JRC analysed in a global perspective how the production and consumption of non-energy, non-agricultural raw materials affect or contribute to each of the 17 Sustainable Development Goals (SDGs); supported the fight against forest fires worldwide, provided hands-on training to protect public spaces from terrorist attack and monitored sudden sea level changes for early Tsunami warnings.
- **International cooperation:** several new agreements were concluded with international partners; collaborations with African partners continued successfully and cooperation was strengthened with China and Japan.
- **A fairer single market:** The JRC analysed food labelling practices for the same product in different Member States in order to ensure that consumers are not misled by inconsistent food packaging ('dual food'), helped the police detect explosives, helped customs authorities detect counterfeit tobacco products and psychoactive substances, contributed to setting standards for waste incineration and analysed the potential for extracting raw materials from landfills and mining waste.
- **Public health:** The JRC presented new European recommendations for breast cancer screening in order to tackle disparities and inequities across Europe, played an important role supporting the introduction of a legal limit on trans-fatty acids in food in 2019 and developed a new online platform that improves rare diseases diagnostic and treatment prospects.
- **Nuclear safety and security:** The JRC-operated European Nuclear Security Training Centre (EUSECTRA) continued serving as platform for professional advancement and for highly specialised training, complementing national level trainings. The JRC continued its work as the technical representative of Euratom in the Generation IV International Forum (GIF).
- **Digital development:** One year after its launch, nearly 500,000 students, teachers and school leaders in 45 countries had used SELFIE³, a tool developed by the JRC and the Directorate-General for Education, Youth, Culture and Sport.

³ Self-reflection on Effective Learning by Fostering Innovation through Educational technology - https://ec.europa.eu/education/schools-go-digital_en

b) Key Performance Indicators (KPIs)

The JRC maintains a comprehensive indicator framework to monitor the performance and evolution of the organisation. The framework is built around three perspectives measuring output and impact, organisational efficiency and aspects of the working environment. A bi-monthly dashboard enables continuous performance monitoring and supports the monitoring of progress towards the objectives defined in JRC's Strategic and Management Plans. For an overview, see Annex 14.

The Strategic Plan 2016-2020 sets out five indicators as JRC's key performance indicators (KPIs).



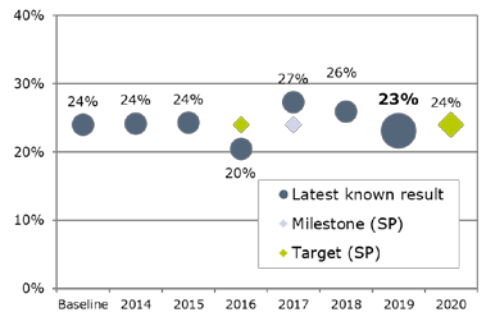
⁴ Scimago Journal & Country Rank

**Result indicator for scientific collaboration and networking
KPI 3 'International collaborations'**

The proportion of peer-reviewed scientific articles jointly produced with scientists from non-EU countries.

Source: JRC own records; internal review process

Result in 2019: 23%; normal variation within the target range (24% ± 3%)

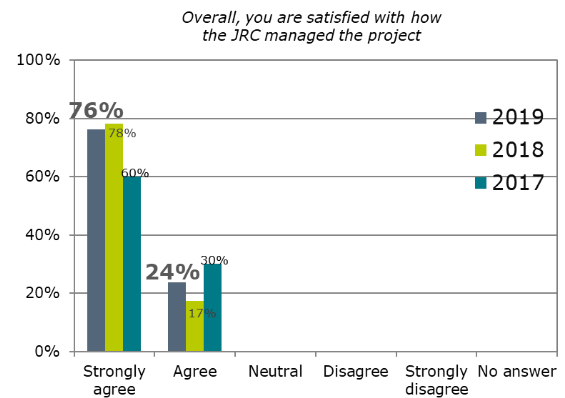


**Result indicator for partner satisfaction
KPI 4 'Weighted average of overall customer satisfaction'**

The JRC has designed a new approach to collecting feedback from the beneficiaries of its work/partners replacing a decentralised approach by a standardised survey. A pilot survey was carried out in 2017, extended to 2018 and 2019.

Source: JRC survey 2019

Result in 2019: 100% of respondents very satisfied or satisfied. As this is a pilot survey, no values for the indicator nor targets are available yet

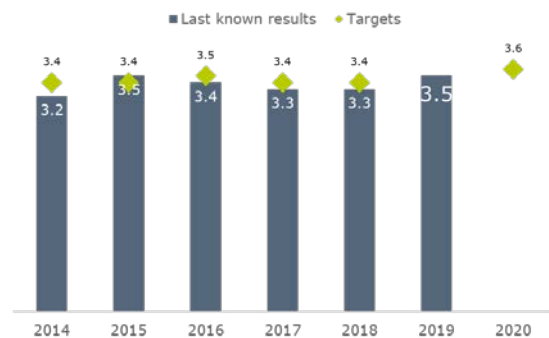


**Result indicator for effective and reliable internal control system
KPI 5 'Implementation of internal control principles in the JRC'**

The indicator numerical value represents the average of scores, range between 1 (Fully disagree) and 5 (Fully agree), derived from the annual survey that was carried out to assess the staff perception of the state of internal control in the JRC and to appraise if the internal control systems are effective.

Source: JRC Internal Control survey

Result in 2019: The value 3.5 is in line with the developments to reach the 2020 target of 3.6. The staff perception on the degree of implementation of the ICF remains stable. The JRC adopted the revised Internal Control Framework (ICF) in 2018.



c) Key conclusions on Financial management and Internal control (executive summary of section 2.1)

In accordance with the governance arrangements of the European Commission, the JRC conducts its operations in compliance with the applicable laws and regulations, working in an open and transparent manner and meeting the expected high level of professional and ethical standards.

To ensure the achievement of policy and management objectives, the Commission has adopted a set of internal control principles, based on international good practice. The financial regulation requires that the organisational structure and the internal control systems used to implement the budget be set up in accordance with these principles. The JRC has assessed its internal control systems during the reporting year and has concluded that it is effective and the components and principles are present and functioning well overall, but some improvements are needed as minor deficiencies were identified. Please refer to AAR section 2.1.3 for further details.

In addition, the JRC has systematically examined the available control results and indicators, including those for supervising entities to which it has entrusted budget implementation tasks, as well as the observations and recommendations issued by the internal auditor and the European Court of Auditors. These elements have been assessed to determine their impact on management's assurance about the achievement of the control objectives. Please refer to Section 2.1 for further details.

In conclusion, management has reasonable assurance that, overall, suitable controls are in place and working as intended; risks are being appropriately monitored and mitigated; and necessary improvements and reinforcements are being implemented. The Acting Director-General, in her capacity as Authorising Officer by Delegation has signed the Declaration of Assurance.

d) Provision of information to the Commissioner(s)

In the context of the regular meetings during the year between the JRC and the Commissioner on management matters, the main elements of this report and assurance declaration have been brought to the attention of Commissioner Mariya Gabriel, responsible for Innovation, Research, Culture, Education and Youth.

1. KEY RESULTS AND PROGRESS TOWARDS THE ACHIEVEMENT OF THE COMMISSION'S GENERAL OBJECTIVES AND DG'S SPECIFIC OBJECTIVES

As the science and knowledge service of the European Commission, the JRC's mission is to support EU policies with independent evidence throughout the whole policy cycle. As defined in its legal basis⁵, the JRC contributes to the Commission's political priorities and Europe 2020 goals **helping the policy departments to achieve their goals**. The operating principles of the JRC are illustrated in Figure 1-1. The JRC also makes a direct contribution to achieving the Commission's general objectives by ensuring that tools, research, knowledge and services are available to the Member States and globally, as well as to the research community at large.

The JRC's carries out the majority of its knowledge-production and management work in a collaborative, multidisciplinary approach, which is necessary as EU policies are growing ever-more complex and intertwined.

In 2019, as in previous years, **the JRC fulfilled its science and knowledge functions** through analytical, anticipatory and innovative approaches. Working with almost all Commission services, the JRC supported a wide range of policy priorities to help achieve a more competitive, fair, sustainable and influential Europe, producing more than 1100 studies, technical systems, data sets and databases, standards and operational services.

The **JRC achieved the targets for policy-related outputs** set out in the Horizon 2020 programmes and defined under the specific objectives for JRC direct actions (see Horizon 2020 programme statements⁶), and positively contributed to the implementation of the Horizon 2020 programme and the Euratom Research and Training Programme. In 343 cases during 2019, the scientific and technical knowledge of the JRC was used for policy proposals and directly helped in implementing EU policies (key performance indicator – KPI 1). This value is slightly below the target, mainly due to longer than expected harmonisation and standard setting procedures at international level; once these procedures are completed, the effects of JRC's actions will become tangible. At the same time, the JRC is taking action to increase the take-up of its results by emphasising planning for impact in its work programme.

Since adopting its long-term **Strategy 2030**, the JRC is progressing in its new role as manager of scientific knowledge for EU policies by developing the skills needed for effective interaction with policymakers and developing new ways of working across the whole Commission. The new orientations of the JRC such as behavioural research, stakeholder and citizen engagement and policy design thinking are now clearly contributing to develop and monitor EU policies.

Following consolidation of its new organisational structure in 2017-18, 2019 has been for the JRC a year of concrete application of its **knowledge management expertise** throughout the Commission and beyond, sowing the seeds of a new approach to evidence-based policy making. This is corroborated by the success of the new

⁵ Specific objective 17 of Horizon 2020: the JRC provides demand-driven scientific and technical support to Union policies, while flexibly responding to new policy demands. Euratom Research and Training Programme (specific objectives 9-13): the JRC has the objective to improve nuclear safety, security and radiation protection, and to contribute to the long-term decarbonisation of the energy system in a safe, efficient and secure way.

⁶ <https://ec.europa.eu/info/strategy/eu-budget/documents/annual-budget/>

#Facts4EUFuture flagship reports, of which seven new issues were published (see list in annex 15). The flagship report 'Understanding our Political Nature' attracted particular attention, setting the basis for new initiatives in connecting evidence and policy. The flagship report 'China' has fed ongoing discussions of EU-China relations, recognising China both as a partner and a competitor. Another report sheds light on how the digital age is 'changing the nature of work' and skills by underpinning recent policy documents in this area and a fourth report analyses 'the future of road transport'. The knowledge and competence centres portfolio enlarged further with the launch of a **new competence centre on behavioural insights**.

In the context of the **better regulation** and the inter-institutional agreement on **better law-making**, a subset of the JRC modelling inventory and knowledge management system (MIDAS) was made available to the European Parliament.

Developing a permanent **dialogue with citizens** is key for the EU to communicate effectively in times of increasing fragmentation and disinformation. The JRC took several initiatives to engage citizens on societal and economic issues, including the launch of the new **community of practice for citizen engagement**. Citizen engagement on artificial intelligence (AI) and its societal implications has led to several transversal collaborations in 2019, for instance an exhibition on AI and on competences and skills in the governance of a digitally transformed society. Another highlight of the year is the setting-up of the **AI Watch**⁷, which monitors the development, uptake and impact of AI for Europe.

The JRC art and science programme illustrated, with a novel approach, the fruit of interdisciplinary research to the public and policy makers. Particularly successful was the one-year **ARTEFACTS exhibition**⁸ at the Museum für Naturkunde Berlin, see further in chapter 2.2.4. Another successful art-science collaboration was the Resonances III exhibition held both at the JRC in Ispra and at the BozarLab in Brussels.

Together with the Secretariat-General, and DGs Human Resources and Security and Informatics, **the JRC led the 'One-Stop-Shop for Collaboration'**, a new advisory service for staff at the European Commission on all aspects of collaboration and knowledge sharing. See further information in chapter 2.2.3.

The JRC is also opening two of its research sites, Ispra and Petten, to host **Living Labs**. The purpose is to co-create with citizens, high-quality and people-oriented solutions, in particular with relation to smart cities, thus bringing added value and innovation to the policy making process. The first call for expression of interest to co-create the living labs is open until 31 December 2020⁹.

As shown in several examples in the following sub-chapters, the JRC has actively contributed to the improved monitoring of **resilience of the EU** and its Member States (risk, vulnerability and capacity to cope). The JRC is also building a knowledge base on **fairness** to support policies aimed at building a society that people feel is fair (see the RHOMOLO-EIB model in the example box further below).

⁷ https://ec.europa.eu/knowledge4policy/ai-watch_en

⁸ <https://ec.europa.eu/jrc/en/artefacts>

⁹ <https://ec.europa.eu/jrc/en/research-facility/living-labs-at-the-jrc/call-expression-interest-future-mobility-and-digital-energy-solutions>

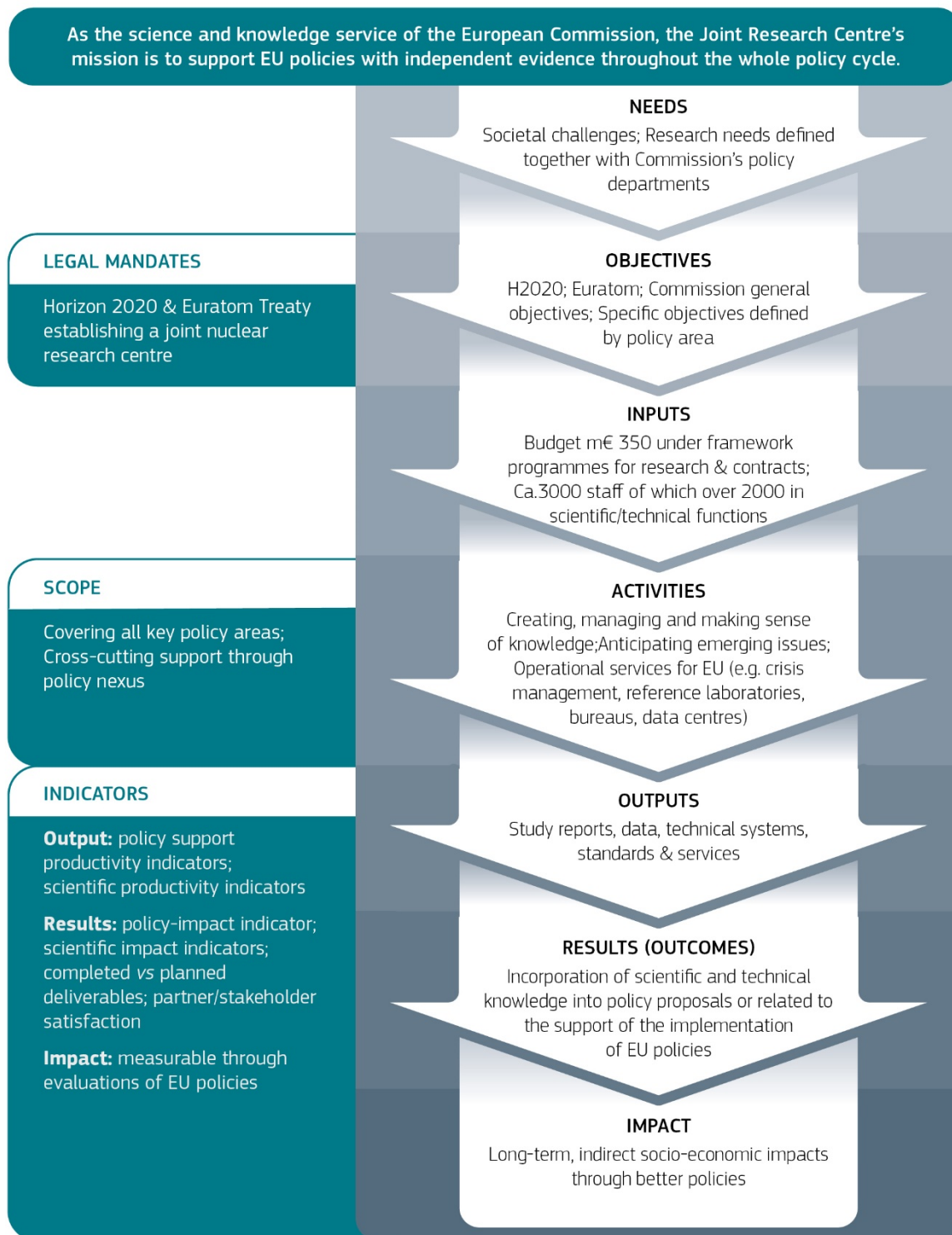


Figure 1-1. JRC's intervention logic, illustrating the operating principles of the JRC.

The added value of investing in research and innovation at EU level is very large. Research and innovation are public goods with a strong European dimension. Due to their scale, speed and scope, EU-funded projects would not have proceeded with national funding alone. For example, a key part of the European added value of the Euratom programme is the EU's ability to mobilise a wider pool of excellence, expertise and multidisciplinary in nuclear research than individual Member States could.

Examples of **EU added value** directly linked to the JRC:

- providing the Commission with the required independent evidence for formulating, monitoring and evaluating policies, including in nuclear safety, security and safeguards,
- positioning the Commission on equal footing with stakeholders and Member States regarding technical knowledge,
- providing critical support to member states on a variety of issues, e.g. energy security, capacity building activities, where no other source of assistance was available,
- leading EU-wide processes defined in the legislation, saving administrative costs at Member State level, such as the Integrated Pollution Prevention and Control (IPPC) Bureau for industrial emissions,
- EU-wide and global harmonisation and standardisation, contributing to the health and safety of citizens, security, protection of the environment and EU's competitiveness,
- coordinating research efforts, sharing knowledge, enabling the Member States and Candidate Countries to tap into best practices and rich data sources, such as through the JRC Smart Specialisation Platform, which, together with the Directorate-General for Regional and Urban Policy, supports EU regions in pursuing innovation-driven economic transformation agendas, in the context of EU structural funds cycles,
- operational services that allow the EU to take action in e.g. crises situations.

As a research organisation, the JRC also faces **challenges** related to keeping pace with rapid development in science, maintaining and developing the right competencies to fulfil its mission. The new emphasis on cross-cutting research and delivering integrated syntheses builds on excellent scientific credentials that need to be retained to ensure that scientific advice is based on the best available evidence. Several mechanisms are in place to replenish the excellence base and to adapt to new challenges such as the exploratory activities and staff development programmes. For statistics on **scientific excellence**, see specific objective 11 in chapter 1.5.

JRC needs to be flexible enough to be able to deal with **external factors, such as changing political priorities and social context**, that can have a significant impact on the take-up of the its research results. Some examples in which the JRC showed resilience and reacted to various external situations and requests of the Commission in 2019 are listed below.

- The JRC needed to provide an immediate response to the request of vice-president Šefčovič to support the work of the Coal Regions in Transition (CRiT) platform. JRC provided estimates on potential job losses arising from the decommissioning of coal power plants and coal mines.
- The preparation of the EU's strategic autonomy of 5G study caused an urgent need to understand the EU position in 5G technologies and its strategic dependencies throughout the whole value chain. This work was accommodated mainly by reducing the launching of new initiatives in the field of border management and cybersecurity.
- In order to provide support to the Directorate-General for Communications Networks, Content and Technology, both for the pilot projects on the Cybersecurity Competence Network and Centre, as well as support for steering the discussions with Member States on the Digital Europe Programme, JRC deprioritised work devoted to anticipatory research activities.

- JRC was requested to provide support on the 'Critical raw materials for strategic sectors' report. Similarly, unexpected support was requested by the Directorate-General for Competition on technical assessment of the IPCEI¹⁰ application for batteries. In order to accommodate these requests, JRC had to deprioritise some deliverables of the contractual work for the Directorates-General for Internal Market, Industry, Entrepreneurship and SMEs and Eurostat, notably on mapping of raw material flows and stock for batteries.
- Upon request of the Commission in 2019, JRC is leading the fitness check on endocrine disruptors. The results are foreseen to be delivered in the second half of 2020. In turn, some activities on chemical safety for sustainable development have been reprioritised for 2020.

The JRC has also actively contributed to the joint work of the EU research family to address the challenges identified in the mid-term evaluation of Horizon 2020, in particular through participation in the strategic programming, reflecting the highest possible level of ambition.

Sections 2.1 and 2.2.6 describe the efficiency gains achieved in resource management this year. In addition, following the Commission policy on information and communications technology (ICT) security, the new JRC ICT governance structure and architecture are being implemented. This is expected to create important synergies in the coming years, and provide protection against cyber threats. As a result of having an effective management system, with a well-functioning quality management and control systems, **no critical risks materialised in 2019** (cf. materiality criteria, Annex 4).

The next two pages show some concrete examples of how the JRC has contributed to the **added value for the European Union** during the year. The following sub-chapters provide a series of **examples of what the JRC has achieved in 2019** through the prism of the Commission priorities, with focus on four of them in chapters 1.1-1.5.

Future supply of raw materials must not repeat the sustainability problems of the past

It is essential to ensure sustainable management of raw materials supply, re-use, and recycling.

Raw materials play a fundamental role in achieving the Sustainable Development Goals (SDGs). As our modern economies grow, so does the demand for the raw materials needed to develop technologies for various sectors.

Taking a global perspective, a fresh JRC report analyses how the production and consumption of non-energy, non-agricultural raw materials affect or contribute to each of the 17 Sustainable Development Goals (SDGs) established in the 2030 Agenda for Sustainable Development.



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¹⁰ IPCEI – European Cluster Collaboration platform

RHOMOLO-EIB model highlights the impact of investment in strategic projects

The European Fund for Strategic Investments (EFSI) is the central pillar of the Investment Plan for Europe. It tackles the post-crisis investment gap in the EU and aims to revive investment in strategic projects in all EU Member States. EFSI was launched jointly by the European Investment Bank (EIB) Group and the European Commission. Every year, policy simulations are carried out using the JRC-developed RHOMOLO-EIB Computable General Equilibrium (CGE) model to assess the macroeconomic effects of EIB Group-supported operations (both EFSI and non-EFSI) and of EFSI operations on their own.

New European recommendations for breast cancer tackle disparities and inequities across Europe

On the occasion of breast cancer awareness month in October 2019, the JRC presented new, evidence-based recommendations for breast cancer healthcare on an enhanced website of the European Commission Initiative on Breast Cancer (ECIBC).



Recommendations include staging interventions prior to treatment, training healthcare professionals in communication skills, the optimal number of readings for radiologists in screening programmes, and inviting women to screening programmes through digital means. The new website also provides the first release of an online catalogue of trustworthy guidelines for all breast cancer processes after screening and diagnosis (i.e. treatment, rehabilitation, survivorship and follow-up, palliative and end-of-life care).

Great disparities and inequities persist across Europe when it comes to breast cancer prevention, early-detection, care and outcomes (i.e. survival). To address this situation, the EU is spearheading many initiatives on cancer, including the ECIBC.

To know more: <https://healthcare-quality.jrc.ec.europa.eu/>

Foresight and anticipatory work

Foresight is a systematic participatory process, creating collective intelligence about the medium to long-term future. The Competence Centre on Foresight is actively running foresight projects in various fields to support Directorates-General in building anticipatory knowledge for policymaking and developing long-term strategies. In 2019 the issues covered were e.g. on farmers, customs, block chain for social and public good, migration, anticipatory innovation.

In 2019, the JRC also published a Future of Government 2030+ report with policy implications and recommendations, which focuses on the shifting power relations in society with a specific focus on potential citizen-government relationships. The wider project aimed at understanding how political decision-making, from local to EU level as well as public service provision, could be improved. This project had a citizen centric perspective and organised workshops in six Member States involving more than 100 students of design at six leading European design schools into the process. The project has developed four different scenarios that represent the world in which we may live in 2030 and beyond.

Other major pillars of the JRC's anticipatory work are the Horizon Scanning – an early warning process for emerging issues - and the Megatrends Hub – a dynamic collective intelligence system assessing a set of 14 global megatrends. Megatrend workshops were rolled out in 2019 on various issues in collaboration with Member States and regional policymakers.

To know more: <https://ec.europa.eu/jrc/en/research/crosscutting-activities/foresight>

Avoiding trans-fatty acids

Dietary *trans* fatty acid intake in the EU has decreased over the last decades

A new European regulation setting a legal limit for industrially-produced *trans* fatty acids (iTFA) came into force in 2019. JRC's scientific work has played an important role supporting the introduction of a legal limit to these fats in our food.

A high intake of iTFA increases the risk of heart disease, the leading cause of death in the European Union. This limit on their use will protect the consumer and benefit public health throughout the EU.



@starush

EUSECTRA – A unique platform for enhancing nuclear security preparedness

The JRC-operated European Nuclear Security Training Centre (EUSECTRA) continued serving as platform for professional advancement and for highly specialised training, complementing national level trainings. EUSECTRA's main stakeholders include services of the European Commission, international organisations (International Atomic Energy Agency, Europol) and global initiatives, Member States authorities and the US Department of Energy (US-DOE).

In 2019, trainings covering areas such as nuclear detection, mobile detection and train-the-trainers were held, as well as workshops on securing major public events and on competency analysis of front line officers. In support of the Global Initiative to Combat Nuclear Terrorism, a workshop on reach back capabilities took place.

To know more: <https://ec.europa.eu/jrc/en/european-nuclear-security-training-centre-eusectra>

The Global Covenant of Mayors for climate and energy

This Global Covenant of Mayors is the largest global alliance for city climate leadership and a shared vision towards a resilient and low emission society. It helps local authorities worldwide to translate their commitments into action, through the implementation of Sustainable Energy and Climate Action Plans (SECAPs), while taking into account their diverse needs.

JRC provides scientific and technical support, ensuring the scientific quality of the initiative by developing regionally adapted methodologies for the Sustainable Energy and Climate Action Plans implementation; evaluating the SECAPs and providing a complete feedback to the participating cities; supporting local authorities in designing and implementing their plans by providing training to local actors and stakeholders through technical workshops; and assessing the overall impact of the initiative worldwide.

To know more: <https://www.globalcovenantofmayors.org/>

1.1 Commission General Objective 1 'A New Boost for Jobs, Growth and Investment'

Specific objectives 1.1 to 1.9 (contributing to H2020 Specific Objective 17):

A well-informed European policy-making, appropriately and timely supported by the JRC through the provision of high quality and innovative scientific and technical studies, tools, data, materials, models and standards, in the following areas:

(Specific objective 1.1)	Agriculture and rural development
(Specific objective 1.2)	Education, culture, youth and sport
(Specific objective 1.3)	Environment
(Specific objective 1.4)	Maritime affairs and fisheries
(Specific objective 1.5)	Health and food safety
(Specific objective 1.6)	Regional policy
(Specific objective 1.7)	Research, science and innovation
(Specific objective 1.8)	Transport
(Specific objective 1.9)	Employment, social affairs, skills and labour mobility

Collective and coordinated efforts at European level continue to be required to put Europe on the path to renewed economic prosperity. Commission's work in this area covers a variety of policies, a number of which the JRC contributed to in 2019.

Assisting farmers affected by drought, improving diagnosis and treatment of rare diseases, promoting European cultural vibrancy, exploring non-power nuclear applications, tackling breast cancer treatment inequities, and highlighting critical raw materials supply challenges are just a few examples of Commission activities which the JRC backed with its expertise in 2019.

Annex 15 gives short descriptions of how the JRC contributed to the general objective 3, with some examples listed below:

- technical evaluation of state aid requests forming part of an Important project of common European interest (IPCEI) for battery manufacturing in Europe,
- monitoring agricultural resources to assist farmers affected by drought,
- new online platform improves rare diseases diagnostic and treatment prospects,
- second edition of the Cultural and creative cities monitor launches with digital improvements,
- JRC best practices on non-power and novel applications of nuclear technology,
- addressing bottlenecks in supply of materials for emerging dual use technologies.

Reports on outputs identified in the 2019 Management Plan and the indicators defined in the Strategic Plan 2016-2020 are available in Annex 12.

Best Available Techniques (BAT) Reference Document for the food, drink and milk industries

The Best Available Techniques (BAT) Reference document (BREF) are legally binding documents which set the minimum requirements (regarding emissions) for the granting of operating licenses of the industrial installations concerned. They are an important tool for reaching EU environmental goals. The BAT for the Food, Drink and Milk Industries covers the treatment and processing, other than exclusively packaging, of the animal and/or vegetable raw materials, whether previously processed or unprocessed, intended for the production of food or feed.



1.2 Commission General Objective 3: 'A Resilient European Energy Union with a Forward-Looking Climate Change Policy'

The EU's energy and climate policy aims to promote the transition towards a competitive low-carbon and resilient economy that helps to slow down and mitigate warming while ensuring affordable, secure and sustainable energy for businesses and households.

In 2019, the JRC's contributions to climate change policy covered both mitigation and

Specific objectives 3.1 to 3.3 (contributing to H2020 Specific Objective 17 and to Euratom Research & Training Programme Specific Objectives 9, 10, 11, 12 and 13): **A well-informed European policy-making, appropriately and timely supported by the JRC through the provision of high quality and innovative scientific and technical studies, tools, data, materials, models and standards**, in the following areas:

- | | |
|--------------------------|---------------------------------------|
| (Specific objective 3.1) | Climate Action |
| (Specific objective 3.2) | Energy |
| (Specific objective 3.3) | Safe and secure use of nuclear energy |

adaptation efforts, notably through economic and climate modelling/assessments, monitoring and analysing emissions from different sources, for example, at the JRC Vehicle Emissions Laboratory's (VELA) testing facilities, helping fight NO₂ pollution and supporting the safe management of spent nuclear fuel and radioactive waste.

The Emissions database for global atmospheric research (EDGAR) developed by the JRC provides global past and present day anthropogenic emissions of greenhouse gases and air pollutants by country and on spatial grid. The EDGAR 2019 report shows that global CO₂ emissions from fossil fuels combustion and processes further increased by 1.9% in 2018 compared to the previous year. The world's largest CO₂ emitters in 2018 remain China, the United States, India, the EU28, Russia and Japan. However, the EU28 and Japan reduced their fossil CO₂ emissions by 1.9% and 1.7%, respectively.

Annex 15 gives short descriptions of how the JRC contributed to the general objective 3, with some examples listed below:

- supporting the European Union's global leadership in tackling climate change,

- support in assessing the costs of inaction in the frame of the publication of the Green Deal strategy,
- supporting climate change resilience and adaptation efforts,
- contributing to assessing the national energy and climate plans submitted by the MS,
- support to the Risk Preparedness Regulation in the electricity sector,
- helping fight NO₂ pollution in Europe's cities,
- energy poverty through the lens of EU research and innovation projects,
- implementing the Council Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste.

Reports on outputs identified in the 2019 Management Plan and the indicators defined in the Strategic Plan 2016-2020 are available in Annex 12.

Supporting climate change resilience: Tracking how a hotter planet could put pressure on our plants

Failure to limit global warming will lead to a less resilient supply of the 'green water' that plants and crops need to thrive, according to new climate modelling from the JRC.

Under a scenario where we fail to limit global warming below 2°C by the end of the century green water resilience could drop by 40% in some region of the tropics, the Mediterranean, South Africa, Australia, and regions of coniferous forests circling the northern hemisphere.



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1.3 Commission General Objective 4: 'A Deeper and Fairer Internal Market with a Strengthened Industrial Base'

Specific objectives 4.1 to 4.3 (contributing to H2020 Specific Objective 17):

A well-informed European policymaking, appropriately and timely supported by the JRC through the provision of high quality and innovative scientific and technical studies, tools, data, materials, models and standards, in the following areas:

(Specific objective 4.1)

Internal market, industry, entrepreneurship and SME

(Specific objective 4.2)

Customs risk management policy and the fight against fraud

The internal market is key to boosting growth and jobs. The areas with the highest growth potential are services, networks and the digital economy. Industry accounts for over 80% of Europe's exports and private R&I and almost 25% of jobs in the private sector. The EU's internal market policy focuses on helping to turn the EU into a smart, sustainable and inclusive economy by implementing the industrial and sectoral policies under Europe 2020.

In 2019, the JRC notably explored the relationship between trade and jobs for the EU and

its Member States, supported the EU Action Plan for Sustainable Finance, helped tracking tax mismatches of giant Web-based companies, and assessed the macroeconomic effects of EIB Group-supported operations.

Annex 15 gives short descriptions of how the JRC contributed to the general objective 3, with some examples listed below:

- preventing consumers being misled by inconsistent food packaging-composition link,
- JRC and Belgian police join forces to detect explosives,
- helping customs detect counterfeit tobacco products and identify new psychoactive substances,
- setting standards for the waste incineration and food, drink and milk sectors,
- new standard for small punch test supports the safety of nuclear installations and more.

Reports on the outputs identified in the Management Plan 2019 and the indicators defined in the Strategic Plan 2016-2020 are available in Annex 12.

Supporting EU strategic independence: Recovering critical and other raw materials from landfills and mining waste

Extracting raw materials from waste streams can enhance the sustainability of mining activities in the EU

There is untapped potential to extract strategic raw materials from mining waste and landfills in Europe. A new report from the JRC presents information on the policy context, and the latest knowledge and technologies in use – identifying good practices and challenges to overcome – to enhance the development of these practices.

As well as being essential to industry, raw materials permeate our daily lives and livelihoods - from the dozens of metals, minerals and compounds inside the latest smartphone to the rare earth elements used in electric vehicles, medical devices, solar panels and aerospace technologies.



©Strategic Minerals

1.4 Commission General Objective 9: 'A Stronger Global Actor'

Specific objectives 9.1 to 9.3 (contributing to H2020 Specific Objective 17 and to EURATOM Research & Training Programme Specific Objectives 9, 10, 11, 12 and 13):
A well-informed European policymaking, appropriately and timely supported by the JRC through the provision of high quality and innovative scientific and technical studies, tools, data, materials, models and standards, in the following areas:

(Specific objective 9.1)	Global safety and security
(Specific objective 9.2)	International cooperation and development

Our interconnected and interdependent societies are facing unprecedented global challenges and transnational security threats, such as climate change, extreme poverty and instability. However, this also opens up new opportunities for more sustainable development, equity and peace. For Europe, it also represents the opportunity to show leadership and promote its values and vision on current and future global challenges.

To that effect, in 2019 the JRC continued expanding its forest fire monitoring expertise at a global scale, explored global urbanisation trends through satellite imagery, provided training on securing public spaces from terrorist attacks, developed capabilities for early warning of Tsunami events, investigated security risk associated with drones and expanded international cooperation on nuclear safety with EU and neighbouring countries.

Annex 15 gives short descriptions of how the JRC contributed to the general objective 3, with some examples listed below:

- supporting the fight against forest fires worldwide,
- supporting the monitoring of the SDGs with a global definition of cities and rural areas,
- hands-on training to protect public spaces from terrorist attacks,
- monitoring sudden sea level changes off-shore for early warning of Tsunami events,
- evaluating the security risk associated with drones,
- international cooperation improves nuclear safety in the EU and neighbouring countries.

Reports on outputs identified in the 2019 Management Plan and the indicators defined in the Strategic Plan 2016-2020 are available in Annex 12.

Supporting the fight against forest fires worldwide

The JRC has pioneered the development of international platforms for the assessment and monitoring of wildfires through the development of the European Forest Fire Information (EFFIS). EFFIS serves equally citizens (for information and awareness) fire managers (for up-to-date wildfire information) and policy makers (provision of data relevant to support science-based policy). In October 2019, EFFIS published the 'Forest Fires in Europe, Middle East and North Africa 2018' report.



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The JRC has embarked on the development of a Global Wildfire Information System (GWIS), which will mirror the development of EFFIS in Europe to provide insights on fire regimes globally and policy relevant information at global scale.

To know more: <https://gwis.jrc.ec.europa.eu/>

1.5 Commission General Objectives¹¹ 1, 3, 4 and 9

Specific objective 10:

In order to ensure the most relevant and timely scientific support to the European policymaking, the JRC will effectively and efficiently coordinate its activities related to the management of the JRC WP cycle, of the relations with policy DGs and other policy and scientific stakeholders and knowledge management.

Coordinated **actions**, cooperation and stakeholder relations help to ensure that the JRC can address complex issues and deliver its services effectively and efficiently.

In 2019, **several new agreements with international partners were concluded**. This included, for instance, the participation in the MEDICIS project established by CERN (European Organization for Nuclear Research) regarding key radioactive isotopes for medical use; the cooperation with the Directorate-General for International Cooperation and Development on activities on **smart specialisation** with Mexico, Peru and Chile; and the cooperation with the European Institute of Innovation and Technology (EIT) and its Knowledge Innovation Communities (KICs).

In the context of the various **cooperation agreements with China** that are in place, several meetings with the Chinese partners covered different areas such as Earth observation, innovation, energy and vehicle emissions. **Collaborations with African partners** continued successfully in 2019. In the framework of the Knowledge Centre on Global Food and Nutrition Security and based on activities implemented by the JRC in a number of African countries, the JRC PANAP network (Pan Africa Network on Agri-Food Policies analysis) was launched. During the EU-South African Dialogue on Circular Economy the JRC identified with its South African counterparts specific joint initiatives to be further developed. **Cooperation with Japan** was also further strengthened in 2019 with active involvement of JRC scientists in several high-level events organised by Japanese institutions.

¹¹ The JRC specific objectives 10 and 11 relate to the following four Commission General objectives: 1 - A New Boost for Jobs, Growth and Investment; 3 - A Resilient Energy Union with a Forward-Looking Climate Change Policy; 4 - A Deeper and Fairer Internal Market with a Strengthened Industrial Base; 9 - Europe as a Stronger Global Actor

As the **technical representative of Euratom** in the Generation IV International Forum (GIF), JRC coordinates the agreements established with several international institutions¹². The JRC participates in the joint steering committee (JSC) and other international coordination meetings. For the most efficient and effective implementation of the next Euratom research programme 2021-2025, JRC and DG Research and Innovation are developing new ways of collaboration and in 2019, three pilot projects were set up for the exploration of the collaboration.

The '**Science meets Parliament/Science meets regions' pilot project** started in 2017 and came into full swing in the course of 2019, with many inspiring and engaging events, showing a clear need for this type of instrument in the process of promoting evidence-informed policymaking at all levels of governance.

In 2019, the **Centre for Advanced Studies (CAS)**, the **exploratory research programme (ER)** and the **collaborative doctoral partnerships (CDP)** contributed to scientific excellence with five new CAS projects, 32 new two-year ER projects and 17 CDP collaboration agreements signed.

The JRC opened its research infrastructures to 56 users from 23 institutions in Europe. It also completed the first project under the training and capacity building programme, giving access to 19 users from JRC Enlargement and Integration Action countries.

An example of improved **networking with policy DGs** was the decision to build an **EU Academy** under the lead of JRC, which is a big step towards promoting innovative learning methods for policy DGs, Member States and the public in areas ranging from nuclear decommissioning, to science for policy, behavioural insights, air quality monitoring and nanomaterials in the EU legislation.

The targets for indicators related to scientific publishing were met. 76% of JRC scientific publications were published in peer-reviewed journals and proceedings.

Specific objective 11:

To ensure the highest quality of its policy support, the JRC will effectively and efficiently maintain scientific excellence in its core competences.

In line with the Horizon 2020 target for 2019, the JRC had 695 peer-reviewed publications. Any variation in the number of publications between publication years is inherent with the nature of scientific publication. The JRC currently has more than 40 large-scale research facilities and more than 110 databases are available online.

Worth to note is also that six JRC colleagues made in the 2019 Highly Cited Researchers list. This is an all-time record for the JRC, worldwide only one in 1000 researchers gets on that list. The JRC scientists listed are active in different research fields and engaged in cross-disciplinary research, showing the breadth of JRC excellence and the flexibility of our researchers.

Reports on the outputs defined in the 2019 Management Plan and the indicators defined in the Strategic Plan are available in Annex 12.

¹² The JRC is coordinator of the Community's participation in GIF and thus represents Euratom as its 'implementing agent', legal mandate given in COM(2015) 547 final

2. ORGANISATIONAL MANAGEMENT AND INTERNAL CONTROL

This section explains how the JRC delivered the achievements described in the previous section. It is divided into two subsections.

The first subsection reports the control results and other relevant information that supports management's assurance on the achievement of the financial management and internal control objectives¹³. It includes any additional information necessary to establish that the available evidence is reliable, complete and comprehensive. It covers all activities, programmes and management modes relevant to the JRC.

The second subsection deals with the other components of organisational management: human resources, better regulation principles, information management and external communication.

2.1 Financial management and internal control

Assurance is an objective examination of evidence for the purpose of providing an assessment of the effectiveness of risk management, control and governance processes.

This examination is carried out by management, who monitors the functioning of the internal control systems on a continuous basis, and by internal and external auditors. The results are explicitly documented and reported to the acting Director-General. These are:

- management reports from sub-delegated authorising officers,
- the reports from authorising officers in other DGs managing budget appropriations in cross-delegation,
- the contribution of the Director in charge of Risk Management and Internal Control (RMIC), including the results of internal control monitoring at DG level,
- the reports of the *ex post* supervisory controls performed on a sample of the JRC's financial and procurement transactions,
- the limited conclusion of the internal auditor on the state of control, and the observations and recommendations reported by the Internal Audit Service (IAS),
- the observations and the recommendations reported by the European Court of Auditors (ECA).

These reports result from a systematic analysis of the evidence available. The approach provides sufficient guarantees as to the completeness and reliability of the information reported and results in a complete coverage of the budget delegated to the acting Director-General of the JRC.

¹³ Art 36.2 FR: a) effectiveness, efficiency and economy of operations; b) reliability of reporting; c) safeguarding of assets and information; d) prevention, detection, correction and follow-up of fraud and irregularities; and e) adequate management of risks relating to the legality and regularity of underlying transactions

2.1.1 Control results

This section reports the assessment of the elements identified by management which support the assurance on the achievement of the internal control objectives¹⁴. The JRC's assurance building and materiality criteria are outlined in Annex 4. Annex 5 outlines the main risks together with the control processes to mitigate them and the indicators used to measure the performance of the relevant control systems. Annex 10 provides comprehensive reporting on the components of the financial management and internal control.

The JRC finances its research activities through the voted budget and supplementary credits as presented in Figure 2.1.1-1. More information on the JRC's financing sources for 2019 are in Annex 10.2.

In addition, the JRC finances its research activities through the following activities:

- contractual activities¹⁵ (up to 15% of the institutional budget¹⁶). The reader is referred to Annex 10.3 for more information on the JRC's 'revenue operations',
- scientific support activities to other Commission services may be implemented by means of 'cross-subdelegations' under which the JRC receives the right to use budgetary resources of other Directorates-General and Services of the Commission. The reader is referred to Annex 10.1 for more details on cross-sub delegations received and co-delegations.

In 2019, the JRC had EUR 29,000,000 (representing 6.7% of its total financing sources in payments) allocated to **decommissioning activities**. Chapter 2.2.5.2 and Annex 13 of this report provide more information on the Decommissioning and Waste Management Programme (D&WP) managed by the JRC.

During 2019, the JRC received **cross-sub-delegated authority** to use the budgetary resources of other DGs and services of the Commission. Such authorisations are linked to specific research projects or actions. The JRC has also provided cross-subdelegations to other Commission DGs. In addition, the JRC has put in place horizontal and vertical co-delegations¹⁷ (Article 3.2 of the Internal Rules) with other DGs. The services and amounts concerned for subdelegations (both cross and co-delegations) are summarised in Annex 10.2, subsection 1. Being a Commission service itself, the JRC is required to implement the appropriations subject to the common rules, responsibilities and accountability arrangements and therefore payments related to the subdelegations received are subject to the same financial circuits and controls in place. Statements of assurance on the effective and sound use of these funds were received or provided to the Directors-General concerned. Around 55% of the JRC's financing sources are dedicated to staff costs. It is important to note that the salary payments are authorised and carried out by the Paymaster's Office (PMO) as part of vertical co-delegations.

¹⁴ 1) Effectiveness, efficiency and economy of operations; 2) reliability of reporting; 3) safeguarding of assets and information; 4) prevention, detection, correction and follow-up of fraud and irregularities; and 5) adequate management of the risks relating to the legality and regularity of the underlying transactions, taking into account the multiannual character of programmes as well as the nature of the payments (FR Art 36.2). The 2nd and/or 3rd Internal Control Objective(s) (ICO) only when applicable, given the DG's activities.

¹⁵ Council Decision C126 of 26 April 1994

¹⁶ The institutional budget means 'budget for JRC (direct actions) under the Framework Programme for Research'.

¹⁷ In accordance with Art. 3.2 of the Internal Rules (Decision C(2015) 1423 final of 05/03/2015 on the Internal Rules on the implementation of the general budget of the European Union (European Commission section) for the attention of the Commission department).

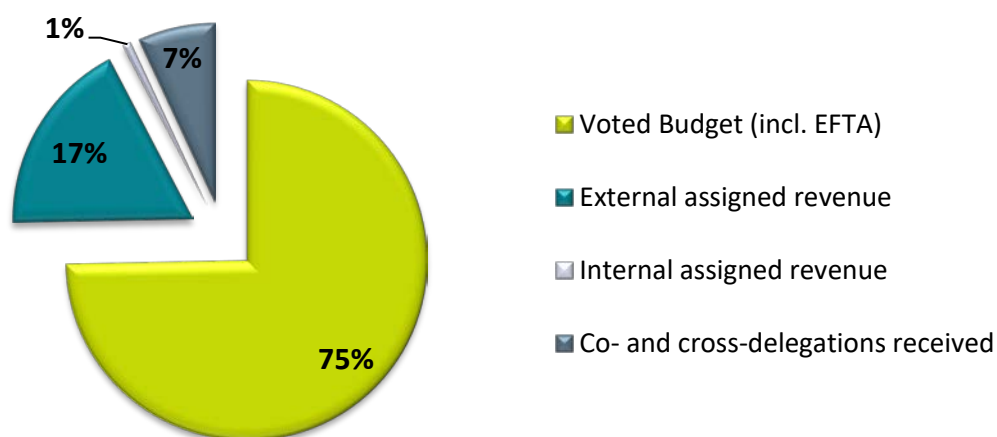


Figure 2.1.1-1. Financing sources in payment appropriations.

All **JRC's operational activities**, both expenditure and revenue, are carried out under **direct management mode** which has been assessed as having a relatively low inherent risk. The risks are effectively mitigated by means of controls as detailed in Annex 5.

The JRC carries out its expenditure operations through procurement operations. The relevant control system (RCS) for budget implementation covering the JRC's procurement is available in Annex 5. The type of procurement procedures carried out by the JRC during 2019 is described in Annex 10.2.2.

The JRC has a mandate to carry out revenue generating operations through contractual activities (formerly called competitive activities), which may be defined as the provision by the JRC of scientific and technical services to other bodies both within the European Institutions and for third parties. Annex 10.2.3 provides details on the JRC's mandate, the type of such contracts and information on the contracts signed during 2019.

The additional income generated through contractual activities is used for purchasing scientific equipment and services, hiring temporary staff, and for financing part of the JRC's infrastructure used for these tasks. A RCS covering the JRC's income from contractual activities is available in Annex 5.

The financial circuits in the JRC are based on the 'four eyes principle' and the type of financial circuits chosen is determined by the nature of the financial transaction undertaken, as well as by geographical considerations. Circuit 1 is the model used for the majority of transactions at the JRC, in which there is a clear segregation between the operational and financial roles, respectively, and financial agents are hierarchically independent from the authorising officer. Annex 10.2.4, provides detailed information on JRC's financial circuits.

The main indicators and/or conclusions on each control objective for the JRC's operational activities are summarised in the overall control results conclusion table (Table 2.1.1-2). Based on these results the JRC concludes that the control results are factual, complete and reliable.

Table 2.1.1-1. Overall control results conclusion table.

Internal control objectives	Procurement in direct management mode	Revenue operations through contractual activities	Non-current assets & inventories
Legality & regularity	Average error rate ¹⁸ below 0.5%	Average error rate below 0.5%	Positive conclusion
Cost-effectiveness of controls	Positive conclusion (Costs/total payments executed) = 4.52%)	Positive conclusion (Costs/total contractual project proposal) = 0.22%	N/A
Anti-fraud strategy (AFS)	Area covered by the AFS	Area covered by the AFS	N/A
Other control objectives: safeguarding of assets	N/A	N/A	Positive conclusion
Totals coverage	EUR 237,275,315¹⁹	EUR 78,582,725²⁰	EUR 261,731,323
<i>Links to Annex 3</i>	<i>Table 2 – Payments made</i>	<i>Table 7 – Revenue cashed</i>	<i>Table 4 - Assets</i>

2.1.1.1. Effectiveness

2.1.1.1.1. Legality and regularity of the transactions

The JRC has set up internal control processes aimed to ensure the adequate management of the risks relating to the legality and regularity of the underlying transactions, taking into account the multiannual character of programmes as well as the nature of the payments and revenue concerned.

The control objective is to ensure that the JRC has reasonable assurance that the total amount of any financial operation authorised during the reporting year, which would not be in conformity with the applicable contractual or regulatory provisions, does not exceed 2% of the authorised payments or revenue concerned. To reach this conclusion, the JRC reviewed the results of the key controls in place (as described below). For each item, materiality is assessed in accordance with Annex 4.

The main risks together with the control processes aimed to mitigate them and the indicators used to measure the performance of the control systems, are outlined in Annex 5.

¹⁸ For the estimation of the average error rate the reader is referred to Table 2.1.1.1-2.

¹⁹ For the purposes of cost of controls the total amount includes all payments initiated and verified at JRC level. This is different from the figure for payments in the 'summary key data' which only considers payments authorised by the JRC.

²⁰ This value represents the revenue cashed from contractual activities in 2019, which is an amount different from the total revenue and income cashed reported in Annex 3 Table 7. The latter includes other revenue sources (such as HFR related) and other contributions and refunds received.

a. Procurement in direct management mode

Financial management and control of 'Procurement in direct management mode' (Annex 5 RCS No 1) is grouped around three main stages: 1) procurement (from the assessment of needs to the selection of the suppliers - award decision), 2) financial transactions (from establishing the financial commitment to payment and contract monitoring) and 3) supervisory measures (including *ex-post* controls and management checks). In addition to the controls performed during the financial circuits, the JRC has made use of five main supervisory measures (including associated indicators) to assess the legality and regularity of its work:

- exception reporting,
- the Public Procurement Advisory Group (PPAG),
- accounting controls,
- *ex post* supervisory controls,
- the assurance statements from sub-delegated authorising officers.

Exception reporting

Control overrides or deviations from standard policies and procedures are tracked and recorded in the register of exceptions.

In total 94 exceptions and non-compliance events were recorded in the central register in the JRC in 2019, 31 of which were classified as exceptions. The exceptions were linked to deviations from standard financial and procurement procedures which cannot be directly associated with a material loss. They were mainly associated with decisions to deviate from the original contract provisions i.e. extension of contract duration or derogation to procedures. Decisions taken by the management which led to exceptions were justified in terms of operational objectives, e.g. business continuity or efficiency. The non-compliance events were in their vast majority associated with *saisine a posteriori* situations where the budgetary commitment was made after the legal commitment.

To put the exception reporting into context, the JRC dealt in 2019 with 32,282 transactions and 19,841 of them were payments. The exceptions and non-compliance events amount to 0.29% of the total number of transactions, meeting the target set in the Management Plan (less than 1% of transactions subject to exception).

The Public Procurement Advisory Group (PPAG)

The Public Procurement Advisory Group is a consultative body providing *ex ante* controls on the correct application of tendering procedures. The PPAG must be consulted on procurement files for high value contracts (\geq EUR 500,000) and for most contracts procedure negotiated that are based on the Financial Regulation 2018 (hereafter FR), Annex 1, point 11²¹.

In 2019, 170 files were submitted to the PPAG; 104 files were screened by the PPAG, representing a value of approximately EUR 185 million²². In the vast majority of cases (101 files, representing the 97% of all), the scrutiny resulted in a favourable opinion

²¹ Contracts between EUR 60,001 and EUR 499,999 and contracts deriving from some negotiated procedures (repetition of similar services/works, additional deliveries, for some cases based on FR, Annex 1, point 12 and cases based on FR, Annex 1, point 14(2)) are also submitted to the PPAG for advice on the basis of a sampling system using a risk-based method.

²² 66 were not selected by the sampling system (representing a value of roughly EUR 13 million)

being issued, which maintains the positive trend in the past years. 3 procedures were or will be relaunched after having received unfavourable opinions or because they were withdrawn before the formal opinion.

This demonstrates that the PPAG is an effective *ex ante* instrument for avoiding procedural errors and ensuring the respect of the procurement principles, thus preventing complaints by tenderers in those procedures.

Accounting controls

The main aim of accounting controls is to assure the quality and reliability of the accounts and underlying transactions through methodical checks on the accounting records (data) and timely communication and correction of the errors. The errors found are of accounting reclassification and do not lead to irregular payments. Considering the correction of errors carried out and that the sample has been taken using a risk-based methodology, the overall estimated error rate is less than 1.2% thus confirming the reliability of the JRC's accounts. More information on the accounting controls is presented in Annex 10.2, subsection 5.

There are no more open recommendations in the context of Directorate-General for Budget's validation of local systems as these have been satisfactorily closed during 2019.

Ex-post supervisory controls

As part of its control strategy, to determine whether there had been material losses (e.g. due to errors) and whether financial rules and procedures were respected, the JRC periodically carries out checks on the accuracy and regularity of its *ex ante* controls, via *ex post* controls on a sample of financial transactions.

The JRC's detected error rate from the *ex post* controls is 0%, confirming absence of issues concerning its procurement and payment activities.

Whilst a variety of formal errors were noted, neither systematic errors nor weaknesses in the JRC's control system were observed and no procurement issues were identified. More information on the *ex post* controls is presented in Annex 10.2.6.

Table 2.1.1.1-1. Results of 2019 *ex post* controls.

Sampled transactions	Sample size: number	Sample size: value (EUR)	% of total value of transactions	Detected error rate (% of total)
Payments	120	28,672,294	12.1%	0%
Procurement	69	10,510,116	3.8%	0%

Since the detected error rate is 0%, the JRC estimated its **average error rate (AER)** by taking a most conservative and prudent approach to be at **0.5%**.

Management reports from sub-delegated authorising officers

The authorising officer by delegation (AOD) has the overall responsibility for the budget execution. In these duties, s(he) is assisted by competent authorising officers by subdelegation (AOSD).

In accordance with paragraph 4.8 of the Charter of tasks and responsibilities of authorising officers by subdelegation, all 135 assured the JRC Director-General that during the reporting period they:

- effectively managed the risks associated with their activities,
- did not raise any matter of importance which might compromise the sound management of appropriations or prevent the attainment of objectives,
- filed the appropriate exceptions/non-compliance events linked to not respecting standard procedures, rules and regulations, where necessary,
- no request for written confirmation has been formulated,
- concluded that no incidents which could have damaged the reputation of the organisation occurred.

b. Revenue operations through contractual activities

The JRC generates income through providing, under contract, scientific and technical services to customers both within and outside the European Institutions. All income and expenses for contractual activities are subject to ex ante controls and to the JRC financial circuits, involving a segregation of duties between the initiating and verifying functions.

Financial management and control of the JRC's revenue operations through contractual activities (Annex 5 RCS No 2) is grouped around three phases: 1) contract proposal (assessment and valuation of proposal), 2) contract preparation (from signature of contract to forecast of revenue²³) and 3) contract implementation (including financial management of the contract).

Revenue operations are also subject to the same legality and regularity indicators which are applied to payment and procurement transactions. None of these controls unveiled errors with impact on compliance of the revenue transactions.

During 2019, as a result of the JRC's financial circuits, 12% of the forecast of revenue transactions and 7% of recovery orders²⁴ (i.e. invoices) have been subject to correction. These errors did not materialise due to the effectiveness of the *ex ante* controls carried out.

Support to Commission services is the main source of income and recovery orders issued to these services are subject to verification and approval. Furthermore, the paying Commission services can perform additional verification or audits on financial reports submitted by the JRC. With respect to indirect actions an independent auditor verifies the financial statements prior to submission for reimbursement. During 2019, the independent auditor certified 5 financial statements submitted to the policy DGs, for a total amount of EUR 2.05 million. None of these independent controls unveiled errors with impact on legality and regularity of the revenue transactions.

According to the Financial Regulation, the commitment appropriations inscribed for administrative arrangements with other Commission Services are valid for 5 years. In 2019, EUR 83.4 million have been generated in commitment appropriations. During the same period EUR 78.6 million has been used. The remaining appropriations have to be used within the next 4 years and any unspent appropriation will be cancelled at the beginning of 2024. The JRC monitors the annual utilisation of these funds through a specific reporting tool.

It can be concluded that the controls carried out on the contractual activities contribute to the legality and regularity of the JRC's revenue operations.

²³ Forecast of revenue (FOR) transactions are estimate of amounts receivable in the context of the JRC's contractual activities, resulting in provision of commitment appropriations (FR Art. 183.2).

²⁴ The term 'recovery orders' for the JRC contractual activities refers to the issuing of invoices to its customers and it is not related to the recovery orders issued to recover erroneous amounts due.

c. Conclusion on the assessment as regards legality and regularity

In conclusion, based on the analysis of the results of the above-mentioned control sources, no significant weakness has been unveiled which could have a material impact as regards the legality and regularity of the procurement and revenue operations. Therefore, it is possible to conclude that the internal controls systems implemented by the JRC provide sufficient assurance to adequately manage the risks relating to the legality and regularity of the underlying transactions.

The JRC concludes that the internal control systems it implements provide sufficient assurance to adequately manage the risks relating to the legality and regularity of the underlying transactions.

In the context of the protection of the EU budget, at the Commission's corporate level, the DGs' estimated overall amounts at risk and their estimated future corrections are consolidated. For the JRC, the estimated overall amount at risk at payment²⁵ for the 2019 expenditure is EUR 1.2 million, despite the fact that the detected error rate was 0%, the JRC estimated its average error rate (AER) to be 0.5%, the latter being a more conservative and prudent approach. This is the AOD's best, conservative estimation of the amount of relevant expenditure²⁶ during the year (EUR 237 million) not in conformity with the applicable contractual and regulatory provisions at the time the payment is made.

This expenditure will be subsequently subject to *ex post* controls and a sizeable proportion of the underlying error will be detected and corrected in successive years. The conservatively estimated future corrections²⁷ for the 2019 expenditure are EUR 0.1 million. This is the amount of errors that the JRC conservatively estimates to identify and correct from controls that it will implement in successive years. The difference between those two amounts leads to the estimated overall amount at risk at closure of EUR 1.1 million.

Details of the JRC's estimated overall amount at risk at closure and estimated future corrections can be found in Table 2.1.1.1.1-2 and its accompanying notes below.

²⁵ To calculate the weighted average error rate (AER) for the total relevant expenditure in the reporting year, the detected error rate has been used.

²⁶ 'Relevant expenditure' during the year = payments made, minus new pre-financing paid out plus previously paid pre-financing which was cleared in the reporting year.

²⁷ Even though to some extent based on the 7 years historic average of recoveries and financial corrections (ARC), which is the best available indication of the corrective capacity of the ex-post control systems implemented by the JRC over the past years, the AOD has used historic average. The JRC did not consider it necessary to do an adjustment due to the nature and insignificance in terms of the amount of the coding error.

Table 2.1.1.1.1-2. Estimated overall amount at risk at closure

JRC	Payments made in 2019 (EUR)	Minus New ²⁸ prefinancing (EUR)	Plus Cleared ²⁹ prefinancing	= 'relevant expenditure' ³⁰ for 2019 (EUR)	Average Error Rate (weighted AER; %) ³¹	estimated overall amount at risk at payment (EUR)	Average Recoveries and Corrections (adjusted ARC; %)	estimated future corrections (EUR)	estimated overall amount at risk at closure (EUR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Programme Budget line, or other relevant level		As per ABAC DWH BO report on prefinancing	As per ABAC DWH BO report on prefinancing	= (2)-(3)+(4)	Detected error rates, or equivalent estimates	= (5) x (6)	based on 7Y-avg historic ARC (as per ABAC DWH BO report on corrective capacity) ³²	= (5) x (8)	= (7) – (9)
EDF ³³	117,726	(n/a)*	(n/a)*	117,726	0.5%	589	0.05%	59	530
Total EU excl. EDF, contributions to EUTFs, if any	237,275,315	0	0	237,275,315	0.5%	1,186,376	0.05%	118,638	1,067,738
Total EU (and EDF), excl. contributions to EUTFs, if any	237,393,041	0	0	237,393,041	0.5%	1,186,965	0.05%	118,697	1,068,268

²⁸ New PF actually paid by out the DG itself during 2019 (i.e. excluding any PF received as transfer from another DG)

²⁹ PF actually having been cleared during 2019 (i.e. their 'delta' in 2018 'actuals', not their 'cut-off' based estimated 'consumption')

³⁰ For the purpose of equivalence with the ECA's scope of the EC funds with potential exposure to L&R errors, also our concept of 'relevant expenditure' includes the payments made, subtracts the new pre-financing paid out and adds the previous pre-financing actually cleared during 2019. This is a separate and 'hybrid' concept, intentionally combining elements from the budgetary accounting and from the general ledger accounting.

³¹ Since the detected error rate is 0%, the JRC estimated its average error rate (AER) by taking a most conservative and prudent approach and estimating it to be at 0.5%.

³² Even though to some extent based on the 7 years historic average of recoveries and financial corrections (ARC), which is the best available indication of the corrective capacity of the *ex-post* control systems implemented by the JRC over the past years, the AOD has used historic average. The JRC did not consider it necessary to do an adjustment due to the nature and insignificance in terms of the amount of the coding error.

³³ Only one programme was funded under the EDF – 'Gestion du programme African Peace Facility (APF) – 4^{ème} phase de coopération avec AU – Continental Early Warning System (AU CEWS)'

2.1.1.1.2. Fraud prevention, detection and correction

The JRC has developed and implemented its own anti-fraud strategy since 2013, on the basis of the methodology provided by the European Anti-Fraud Office (OLAF). It is normally updated every three years and was last updated in 2017. A new revision is envisaged for 2020 to align it with the new Commission anti-fraud strategy.

The implementation of the JRC's anti-fraud strategy is monitored periodically with reports to management and as part of the internal control system assessment. All necessary actions planned for 2019 have been completed by reinforcing and integrating the anti-fraud component in the design of each relevant business process within the integrated management system (IMS). The risk assessment exercise was further developed focusing more on fraud prevention and detection.

Ethics & integrity courses tailored for the JRC were delivered across the JRC sites and a presentation on ethics has been included in the welcome session for newcomers. In addition, two large initiatives were launched to promote a culture of scientific integrity together with an online scientific integrity quiz and a scientific integrity roadshow, in the form of conversations, with groups of staff in all JRC sites. The scientific integrity quiz provided useful information on which issues of scientific integrity may be most relevant for the JRC such as negligence/refusal of authorship, double publishing, or self-plagiarism. Finally, a specific communication campaign on scientific integrity was launched.

The annual survey on the implementation of the internal control framework indicates an improved perception of staff on the ethical climate. The indicators linked to this topic show that the anti-fraud strategy is an effective tool and that fraud awareness has increased within the JRC. Indicators are detailed in Annex 10.3.

Since 2019, JRC has one ongoing OLAF case linked to possible external fraud, which does not have an impact on the JRC assurance. OLAF assigned no financial recommendations to the JRC.

In conclusion, the anti-fraud measures already in place, including the controls performed through *ex ante* and *ex post* controls, did not identify any cases of fraud or potential fraud in 2019.

2.1.1.1.3. Other control objectives: safeguarding of assets

eProcurement project

The JRC is the business domain owner for the eProcurement Programme which is part of the Commission's actions to put in place a single data interchange area for submitting, storing and processing data in grant and procurement procedures. This is a Commission-wide initiative involving many Directorates-General developing four business processes: preparation, submission and evaluation, contract management and inventory, and logistics management. The progress during 2019 is detailed in Annex 10.4.

JRC assets

The JRC is spread over 6 sites in 5 different countries with a total number of fixed assets of about 43,000 with a net book value of about EUR 215 million. The fixed assets are ranging from simple office furniture to complex scientific and laboratory equipment, including nuclear facilities and buildings.

The JRC is spread over 6 sites in 5 different countries with fixed assets ranging from simple office furniture to complex scientific and laboratory equipment, including nuclear facilities and buildings.

The following measures are put in place to counterbalance the main risks potentially affecting the JRC sites, such as accidents, unauthorised access, intentional acts against safety and security including against the protection of sensitive documents. Regular safety inspections are carried out on JRC sites of laboratory facilities and hazardous materials by the JRC itself, external consultants and by national authorities. Organisational measures are implemented to ensure that access to JRC sites, critical assets and sensitive information are controlled. Certification of laboratories and institutes to internationally recognised quality management standards helps to offset risks and ensure compliance with norms and regulations.

The JRC strives to perform physical localisation checks of the inventoried items at least on a 3-year basis. JRC assets are presented in Annex 10.4.

Based on an assessment of the controls in place on the safeguarding of the JRC's assets, management considers that the control results are complete and reliable and that the control objective is achieved.

2.1.1.2. Efficiency

Based on an assessment of the most relevant key indicators and control results, the JRC has assessed the efficiency of the control system and reached a positive conclusion. Further information on initiatives such as eProcurement as well as others improving controls efficiency in financial management could be found in subchapters 2.1.1.1.3., 2.2.6 and Annex 10.2.

a. Procurement in direct management mode

A quantitative estimation of the volume of errors prevented and detected is not available, therefore it is not possible to quantify the related benefits, other than the EUR 255,155 recovered as a result of these controls (Annex 3, Table 8). The main benefit is that the controls performed ensure that errors are detected and corrected and that potential litigations or contestations from tenderers are kept to a minimum.

As a consequence, it is not possible to determine the cost-effectiveness of controls by comparing costs with benefits, and it is necessary to consider the efficiency indicators retained. To do so, the JRC has defined efficiency measures for the controls associated with the three main stages, the first 2 stages performed *ex ante* and the third stage, *ex post*:

- For procurements, an estimated EUR 4,301,250 were invested in controlling 282 procurement procedures for contracts with a total value of EUR 179,457,385. Thus 2.40% of the total contract value was dedicated to control. This covers all types of procurement, ranging from low-value contracts, for example purchase of low-value laboratory equipment, to high value extremely complicated contracts such as in the area of satellite images. The cost of control on procurement has decreased by 23% compared to last year which is complemented by a decrease of 25% in the number of procurement procedures closed during the year. The procurement procedures are to a large extent a regulatory requirement which cannot be curtailed. In addition, the JRC considers that the necessity of these controls is undeniable, because as shown by the risks outlined in Annex 5 (RCS No 1), a significant proportion of the appropriations would be at risk in case they would not be in place.
- For financial circuits an estimated EUR 6,611,250 were invested in controlling 26,610 financial transactions worth EUR 241,684,889. Thus 2.74% of the total payment amount was dedicated to control. Despite the increase the average cost of staff, the overall cost invested in controlling financial transactions has decreased by 8.2% which is complemented by the fact that the number of

financial transactions decreased by 5.1%. Each financial transaction costs an estimated EUR 248, which is 3.6% lower when compared to 2018.

The timeliness of payments for 2019 (93.5%) score a slightly above the target (93%) and is steady at the same average of the last 2 years. The average is heavily affected by the late payments occurring in January due to the carry-over activities and the introduction of new expert payments systems.

b. Revenue operations through contractual activities

The costs of controls incurred for the three main phases of the JRC's revenue operations through contractual activities have been estimated. The criteria for the calculation and the indicators used are shown in Annex 5 RCS No 2. As mentioned in the previous section, it is not possible to quantify all of the costs and benefits of controls. Estimating the intangible benefits is particularly problematic. The JRC has, nonetheless adopted the following efficiency indicators for the controls associated with the three stages of the revenue process which are performed *ex ante*:

For the contract proposal phase, an estimated EUR 21,640 was invested in assessing the risk and reviewing 116 contractual project proposals with a total value of EUR 83,390,000. Thus 0.03% of the total contractual project proposal value was dedicated to carrying out a risk assessment and management review, with a cost of EUR 186 per proposal. For support to Commission contracts an additional 0.02% of the total contractual project proposal value is incurred for high-level management review. The third party work (TPW) type of contracts incurred an additional 0.15% of the total contract value for requesting up-front payments. The latter additional cost has led effectively to no default on TPW contracts.

For the contract preparation phase, an estimated EUR 10,730 was invested in reviewing the contract wording and ensuring these are in line with standard clauses, which represents 0.01% of the total value of the signed contractual contracts with a cost of EUR 93 per contract. For the financial circuits carried out on forecasting of revenue, an estimated EUR 40,790 was invested in controlling 294 forecasts of revenue worth EUR 78,582,725. Thus 0.05% of the total forecast of revenue amount was dedicated to control with an estimated cost of EUR 138 per transaction.

For the contract implementation phase, an estimated EUR 63,686 was invested in monitoring budget consumption of the contractual contracts and reviewing the recovery orders (ROs) issued, which represents 0.11% of the RO values.

When required, an independent auditor carries out *ex ante* audits on framework programme (FP) contracts with a reimbursable direct cost higher than EUR 325,000. Each audit has a fixed cost of EUR 1,500 and the total costs of the audits in 2019 amounted to EUR 9,300 representing 0.5% of the value of contractual projects audited.

In 2019 an estimated EUR 8,140 was used to deliver an *ex post* control process to review 16 contracts representing 0.01% of the cashed income from contractual activities.

The contractual cashing indicator (as a percentage of the institutional budget) has decreased from 21.68% of last year to 19.68%, which remains significantly higher than the target of 15% and clearly evidencing the efficiency of the controls performed. The JRC has reached a positive conclusion on efficiency of contractual cashing indicator.

The JRC concludes positively on the cost-effectiveness of its revenue operations and on the efficiency of the contractual cashing

The benefits of control in non-financial terms cover: accepting only project proposals which have an acceptable level of risk, which are in line with the JRC work programme

and which meet customer expectations, sound financial management, deterrents efficiency gains, limiting the risk of litigation, respect of contractual provisions, system improvements and, as mentioned above, compliance with regulatory and research programme provisions.

2.1.1.3. Economy

a. Procurement in direct management mode

The JRC has produced an estimation of the costs of control of the three main stages related to 'procurement in direct management mode'. The criteria for the calculation and the indicators used are shown in Annex 5 RCS No 1.

The overall cost of control related to 'procurement in direct management mode' in 2019 was EUR 10,912,500, which represent 4.52% of the total payments executed by the JRC during the year. The overall cost of control decreased by 14.6 % compared to 2018 whereas in 2018 cost decreased by 3% relative to 2017.

For supervisory *ex post* measures, an estimated EUR 89,288 were invested, which represents 0.04% of the total payments executed by the JRC during the year

b. Revenue operations through contractual activities

The overall cost of control related to 'revenue operations from contractual activities' in 2019 was EUR 173,000, which represents 0.22% of total contractual project cashed value for the year. The overall cost of control indicator has decreased slightly from last year's indicator value of 0.26%.

JRC considers that the necessity of the controls performed on revenue operations process is undeniable, as they are a regulatory requirement. Furthermore, the JRC considers that these controls are necessary to mitigate the risks outlined in annex 5 (RCS No 2).

2.1.1.4. Conclusions on the cost-effectiveness of controls

Based on the most relevant key indicators and control results, the JRC has assessed the effectiveness, efficiency and economy of the control system and reached a positive conclusion on the cost-effectiveness of controls.

The error rates and the cost of controls remain below the targets, and the timeliness of payments is close to the target. The timeliness is heavily affected by carry-over activities not linked to controls.

2.1.2 Audit observations and recommendations

This section sets out the observations, opinions and conclusions reported by auditors including the limited conclusion of the Internal Auditor on the state of internal control. Summaries of the management measures taken in response to the audit recommendations are also included, together with an assessment of the likely material impact of the findings on the achievement of the internal control objectives, and therefore on management's assurance.

2.1.1.1. Audit work carried out by the EC Internal Audit Service during the reporting year

In 2019, the Internal Audit Service (IAS) finalised one audit on 'JRC's site management and infrastructure support services'. The audit formulated two very important recommendations, one on governance and another on human resources management of

the process as well as three important ones. The JRC accepted all recommendations and the corresponding action plan is waiting IAS approval.

In addition, the IAS conducted two audits on JRC processes: one on 'JRC's support to EU policy and knowledge management', and one on 'IT governance and project management' to be finalised in 2020. The JRC is also associated service to audits on the Commission's policy on data, information and knowledge management and one on data protection. These are to be finalised in 2020.

Follow-up audits resulted in closing three³⁴ very important recommendations, downgrading one very important³⁵ and closing two³⁶ important recommendations. The IAS decision on the successful implementation of nine recommendations (three of which are 'very important') submitted for review is pending. Currently none of the standing very important recommendations is long overdue³⁷.

Five recommendations are under implementation, three of which very important.

Refer to Annex 10.1 for further details.

2.1.1.2. IAS limited conclusion and recommendations under implementation

The Internal Auditor, in its limited conclusion, stated that the JRC internal control systems in place - for the audited processes - are effective, except for the observations giving rise to 'very important' recommendations.

Over the last 3 years the IAS audited the following JRC processes: scientific project management, management of intellectual property rights, decommissioning and waste management programme implementation, and recruitment of temporary scientific staff. The JRC accepted all recommendations stemming from these audits. Action plans were drafted and the IAS has accepted all of them.

The implementation of the above-mentioned action plans is on track except for the following:

- One very important recommendation on human resources management, under the audit on decommissioning and waste management programme implementation, has expected delay of 5 months. Due to the departure of the JRC Director-General, and to take into account a report of a high level group of experts, the high level steering committee (decision-making body for the decommissioning process) has not yet finalised the discussion on the medium-term staffing plan. In the meantime, temporary mitigating measures are in place with the establishment and partial implementation of a short-term staffing plan 2019-2020.
- One very important recommendation on the recruitment strategy under the audit for 'recruitment of temporary scientific staff', has an expected delay of 2 months. The delay is due to the underlying database enrichment with an additional feature, which will optimise the competency mapping recommended by the IAS. The completion of the mapping tool will also enable the establishment of consolidated recruitment plans, which are a complementary element of the recommendation.
- The other recommendation under implementation concerns corporate intellectual property rights management. The implementation of this recommendation is expected to have a slight delay (1-2 months). Pending actions are the roll-out of

³⁴ 2 on IT Security in the JRC ICT Systems, 1 on Intellectual Property Rights

³⁵ Recommendation on IT Security in the JRC ICT Systems

³⁶ 1 on Management of *intra muros*, 1 on Intellectual Property Rights

³⁷ More than 6 months

the EURECA tool across the Commission, which will allow to identify intellectual property and compliance with the corporate risk management guidelines.

Finally, all four recommendations under the audit on scientific project management were completed and submitted to the IAS for review on time. The one very important recommendation related to the monitoring of the work programme execution was completed by defining appropriate reporting and functionalities introduced in the JRC systems.

2.1.1.3. ECA audits

The JRC has no critical or very important findings from the audits of the European Court of Auditors and no overdue actions. More information on the follow-up of recommendations is presented in Annex 10.

In general, during ECA audits, the JRC is an associated DG together with other Commission services, as it disposes of a wide range of expertise in many of the scientific areas underpinning the policy measures being audited, monitors the implementation of such measures and provides technical support to the stakeholders concerned. The full list of reports published in 2019 and ongoing audits/reviews to which JRC was associated is included in Annex 10.

As part of the Statement of Assurance for 2018³⁸, the ECA reviewed five JRC transactions for which, no quantifiable error was reported. Therefore, the ECA's annual report³⁹ 2018 contained no reference to the JRC.

In 2019, the ECA reviewed four JRC transactions. The desk review audit of all four was closed with no findings.

2.1.1.4. Conclusion on the assessment of IAS and ECA audit results

During 2019, the JRC enhanced its qualitative performance through the endorsement of appropriate measures to mitigate risks. Five recommendations (out of which 3 very important ones) reviewed by the IAS during the year of reference were closed.

Audit recommendations issued by the IAS and the ECA do not have a material impact on the assurance. For deficiencies identified by the IAS, appropriate mitigating measures have been put in place.

While the involvement of the JRC in ECA performance audits increased considerably in 2019, none of the findings nor their combined effect have an impact on assurance.

An effective follow-up to all audit recommendations is in place by the JRC management system. The audit follow-up activities are regularly monitored and reported to the JRC management.

For 2019, the IAS reported in its limited conclusion that '...the internal control systems in place for the audited processes are effective, except for the observations giving rise to the 'very important' recommendations...' and pointed to two very important recommendations postponed, one under implementation and two issued in January 2020.

Out of the 5 very important recommendations noted by the IAS in its limited conclusion, for one (under the Decommissioning and Waste Management Programme Implementation) the JRC has established a temporary mitigating measure and for another

³⁸ Finalised during the first half of 2019

³⁹ 2019/C 340/01

one (Recruitment of temporary scientific staff) the implementation is ongoing (see analysis under section 2.1.2.2 above).

Given the actions outlined above, mitigating controls in place, and absence of cross-cutting risks, the JRC considers that the identified risks do not have a material impact on the declaration of assurance.

2.1.3 Assessment of the effectiveness of the internal control system

The Commission has adopted an internal control framework (ICF) based on international good practice, to ensure the achievement of its policy and management objectives. Compliance with the internal control framework is a compulsory requirement.

The JRC uses the organisational structure and the internal control systems suited to achieving its policy and internal control objectives in accordance with the internal control principles and has due regard to the risks associated with the environment in which it operates.

During 2019, the JRC continued to work towards fully integrating the internal control framework with the JRC integrated management system (IMS), which is based on the international quality standard ISO 9001. Such integration allows the JRC to combine requirements from different sources including legal requirements, in one management approach.

The JRC performed an annual assessment of its internal control systems using a variety of sources. This included an analysis of the internal control weaknesses recorded during the year; the risk assessment; findings and recommendations from external and internal audits; an internal control survey to staff; the register of financial exceptions and non-compliance events and of the annual management reports submitted by all JRC authorising officers by subdelegation. In addition, the internal control monitoring criteria were analysed and revised and the implementation of the JRC anti-fraud strategy monitored. In addition, the internal control monitoring criteria were analysed and revised and the implementation of the JRC anti-fraud strategy monitored.

The JRC has assessed its internal control system during the reporting year and has concluded that it is effective and the components and principles are present and functioning well overall. However, improvements are needed as minor deficiencies were identified related to:

The JRC concludes that the internal control components and principles are present and functioning well overall, but some improvements are needed

- governance, organisation and coordination of the site management and infrastructure support service, including concerned staff resource management,
- ICT⁴⁰ security systems vulnerability assessments and IT security scope documents,
- the definition and testing of business continuity plan and the IT disaster recovery plan.

To address the governance, organisation and coordination of the site management and infrastructure support service, an action plan is being developed together with the IAS. The ICT architecture has set the appropriate design for mainstreaming and tackling ICT

⁴⁰ Information and Communication Technologies

governance at the JRC, defining a set of key performance indicators which are monitored periodically. To address issues related to business continuity plan, the remedial actions are being implemented and the document 'Roles and organisation of the first response' have been issued in 2019. The IT disaster recovery plans are part of the ICT action plan.

2.1.4 Conclusions on the assurance

The assessment of the elements and the conclusions reported in Sections 2.1.1, 2.1.2 and 2.1.3 result from a systematic analysis of the evidence available. The following elements provide sufficient guarantees as to the completeness and reliability of the information reported and results in a comprehensive coverage of the budget delegated to the acting Director-General of the JRC:

- the JRC's internal controls systems provide sufficient assurance to adequately manage the risks relating to the legality and regularity of the underlying transactions,
- the JRC has implemented appropriate *ex ante* and *ex post* controls, to the extent that they remain cost-effective,
- the JRC has put in place suitable control measures to limit risks of error and prevent, detect and correct fraud and irregularities,
- recommendations issued by the JRC's auditing bodies do not raise any assurance implications and are being implemented as part of the ongoing continuous efforts in terms of further improvements,
- the JRC's internal control systems provide sufficient assurance with regards to the achievement of the other internal control objectives,
- resources were used for the intended purposes, sound financial management was applied, and the non-omission of significant information was ensured.

Overall conclusion

In conclusion, management has reasonable assurance that, overall, suitable controls are in place and working as intended; risks are being appropriately monitored and mitigated; and necessary improvements and reinforcements are being implemented. The Acting Director-General, in her capacity as Authorising Officer by Delegation has signed the Declaration of Assurance.

DECLARATION OF ASSURANCE

I, the undersigned,

Acting Director-General of the Joint Research Centre

In my capacity as authorising officer by delegation

Declare that the information contained in this report gives a true and fair view⁴¹.

State that I have reasonable assurance that the resources assigned to the activities described in this report have been used for their intended purpose and in accordance with the principles of sound financial management, and that the control procedures put in place give the necessary guarantees concerning the legality and regularity of the underlying transactions.

This reasonable assurance is based on my own judgement and on the information at my disposal, such as the results of the self-assessment, ex-post controls, the work of the Internal Audit Service, for years prior to the year of this declaration.

Confirm that I am not aware of anything not reported here which could harm the interests of the institution.

Brussels, 31/03/2020

Signed,

Charlina VITCHEVA

⁴¹ True and fair in this context means a reliable, complete and correct view on the state of affairs in the DG.

2.2 Other organisational management dimensions

2.2.1 Human resource management

In accordance with the JRC Strategy 2030, the JRC has adopted modern, flexible, people-centred and effective human resource (HR) management practices. The JRC implements the Commission's talent management strategy⁴² by actively contributing to the Commission-wide actions, including staff engagement and promotion of staff mobility.

The promotion of **qualified female staff to management positions** remained a priority for the JRC in 2019. The support offered to female staff members led to an increase of applications to middle management positions when compared to 2018. Regarding the JRC target to appoint 7 first time female Heads of Unit by 1 January 2020⁴³, 6 were appointed by the end of 2019 and one was nominated to start 16 January 2020.

To ensure the positive trend of the staff engagement index that increased from 62% in 2016 to 68%, an action plan was adopted to further improve inclusion, recognition and professional development of staff. Furthermore, as a follow-up of the JRC internal 'Strategy engagement' survey from 2018, several initiatives were launched to raise staff awareness and commitment with the JRC Strategy 2030, for example a communication campaign on strategy related success stories. At unit level, middle managers were, for example, asked to better correlate the unit objectives with the JRC Strategy 2030.

Additional awareness-raising activities, workshops and training courses in all six JRC sites were organised for promoting the Commission's **health and well-being strategy** 2017-2020. The JRC staff well-being demonstrated with the 2018 EC staff survey (66% compared to 51% EC average) is very positive.

Reports on outputs defined in the Management Plan 2019 and on objectives and indicators set up in the Strategic Plan 2016-2020 are available in Annex 2.

2.2.2 Better regulation (only for DGs managing regulatory acquis)

N/A

2.2.3 Information management aspects

The European Commission's strategy on data, knowledge and information management⁴⁴ of 2016 defines a new way of working. All along, the JRC has been one of the leading departments to implement it. In 2019, the JRC co-drafted the Information Management Steering Board's work programme 2020-2021, and took on the leadership for the enhanced management of country knowledge. It also took on the coordination of two major actions, the 'Data Catalogue' and the setting up of a single entry point for advisory services on data topics, the 'Data Advisory', of the new Data Strategy@EC action plan.

The JRC promoted collaboration across Commission departments and helped formulate

⁴² INFO(2016) 62 'Launching the Talent Management Strategy', information note to the College

⁴³ The target set in SEC(2017) 359 (8 females) was lowered to 7 females with agreement with the SG after its adoption.

⁴⁴ C(2016) 6626

research questions to meet policy demands. The Knowledge4Policy web platform (K4P), a virtual meeting place for scientific stakeholders and policymakers, became fully operational and hosts the Knowledge and Competence Centres and other knowledge services, such as the Artificial Intelligence Watch. In 2019, the JRC boosted its participation in the European Semester country teams' collaborative process, also through drafting of country reports, and developed a pilot country knowledge portal for the Commission's budget department. Another example is the EU Policymaking Hub that was co-designed by the JRC together with other services, to be launched in 2020. This is a professional development programme for policymaking in the European Commission. It offers a platform to learn, collaborate and share knowledge in EU policymaking.

Together with the Secretariat-General, and DGs Human Resources and Security and Informatics, the JRC led the 'One-Stop-Shop for Collaboration', a new advisory service for staff at the European Commission on all aspects of collaboration and knowledge sharing. In 2019, this service has for instance helped reduce inefficiencies and raise productivity for high value programmes such as the Customs Union, and high cost activities such as conference management. It has won three excellence awards and is preparing to scale up services in 2020.

To further promote knowledge management and sharing at the Commission, the JRC continued its knowledge-for-policy training programme and coordinated a 2019 edition of the JRC-initiated EC Knowledge Week, featuring more than 100 events organised by 36 Commission services, with more than 3,000 people attending and another 1,000 online.

An example of a novel way to improve outreach and networking with policy DGs is the joint work on how to tackle climate change, with the European Political Strategy Centre⁴⁵.

To ensure compliance with the Internal Data Protection Regulation and the Commission's Data Protection Action Plan (C(2018)7432), the JRC has reviewed its processing operations on personal data. Following the review, 38 new records have been drafted and the existing records and privacy statements to inform data subjects of their rights, have been reviewed and revised to comply with the new rules. The public register contains now roughly 50% of all JRC's notifications (150 in total) covering a large variety of JRC's activities. Handling of personal data protection at process level has been further improved by engaging and targeting managers specifically as primarily involved in controlling functions, through an awareness-raising campaign. Also, and a new guidance document for the JRC staff has been drafted and distributed. Additional resources were allocated to deal with outstanding issues.

Concerning document management, the JRC has reviewed its filing plan to increase the accessibility of its files: as a result, the percentage of shared files increased to more than 30% from 25% in 2018. Making the JRC Project Browser (JPB), IT system for planning and monitoring the work programme, and the collaborative online platforms fully compatible with the Commission document management tools was put on hold due to other priorities. However, compatibility of the JRC-specific parts of the expert contract management system (AGM) was achieved thus reinforcing the 'paperless JRC' policy. The paperless policy is further promoted through a communication campaign on document management including workshops and information sessions and training on how to use the e-signatory on all JRC sites. In addition, the JRC is leading the European Commission's eProcurement project aiming for full electronic business transactions; the progress of the project is described in detail under Chapters 2.1.1.1.3 and 2.2.6, and in Annex 10.

⁴⁵ With the new von der Leyen Commission, the think-tank has evolved into IDEA - Inspire, Debate, Engage and Accelerate Action

The JRC also manages the intellectual property (IP) portfolio of the European Commission, including the European Emblem. In 2019, new patent or trademark filings, payments and renewals as well as actions to defend these rights numbered more than 800 actions all together. 35 other Commission DGs consulted the Central IP Service, soliciting legal advice for 593 cases of which 552 were solved in 2019; nearly 80% concerned copyright issues (see Figure 2.2.3-1 for a breakdown of issues). A total of 567 staff participated in training on third party owned IP, helping them avoid infringing IP rights, and new guidelines, studies and articles on specific IP issues are now available at the IP website. To enable a more consistent IP (risk) management at the Commission, an IP management system is under development. The corporate launch of the system was postponed to the first quarter of 2020, but a pilot started with 5 DGs in May 2019.

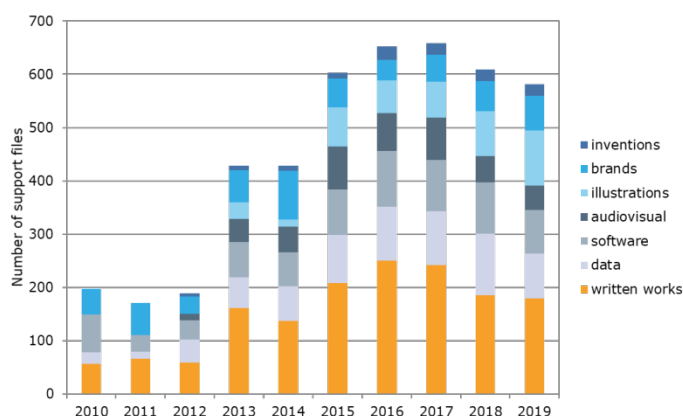


Figure 2.2.3-1. JRC's IP support activities by type of asset. Note that the number of requests and the underlying IP right do not numerically match since one request may pertain to more than one IP right.

2.2.4 External communication activities

The JRC's communication activities offer insights into how science shapes EU policy that serves citizens and show that good policy decisions are based on sound scientific evidence. They highlight the links between EU policies and the JRC's contribution to them on the one hand, and the Commission's political priorities and narrative on the other.

In 2019, close coordination with policy DG communicators, Cabinets and the Spokespersons' Service produced silo-bridging news based on JRC science, and increased JRC participation in corporate communication campaigns including 'EU Protects' and the pre-election campaign.

The outreach and training activities for journalists provided them with the knowledge and tools necessary to incorporate JRC sources in their reporting. At the same time, 500 JRC scientists benefited from training in communication skills like public speaking, writing for non-scientific audiences and visualising data, while the JRC clear writers network was nominated for the European ombudsman's award and the Commission's clear writing award. Corporate know-how of data visualisation was also boosted by the EUDataViz conference organised with the publication office, which created a new community of users, professionals and experts.

Public outreach activities continued to use innovative concepts and organising public events with appealing new formats such as TEDx, featuring the JRC at various public events and further enhancing social media activities. Nearly 250 JRC events attracted more than 21,000 participants and participation in fairs and large events extended JRC outreach to over 250,000 people. A special programme for schools was launched and the new JRC Digital Media Hub makes available in one virtual place more than 200 videos, tutorials and 360° virtual lab tours produced by the JRC.

As part of a collaboration with science museums, JRC deployed for 12 months, until October 2019, the ARTEFACTS exhibition at the Berlin Museum für Naturkunde. The exhibition illustrated how science and politics work together to find solutions for urgent environmental issues of our time, by focusing on the themes of food, energy, water, air and climate. In this way the JRC communicated the Green Deal priority of the President-elect of the next Commission. An estimated 600,000 people visited the museum during the exhibition, three out of four visitors saw it and about 300,000 people stayed for longer than 20 minutes. Building on this success, a new collaboration will start in 2020 with the science museums in Milan and Paris, focusing on artificial intelligence.

The coverage of the JRC in the media has reached an all-time high of 4,393 articles, while it has further increased its social media outreach by roughly 40% compared to 2018.

Overall statistical data is displayed in Figure 2.2.4-1.



Figure 2.2.4-1. JRC's social media and web, events and media outreach in numbers.
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2.2.5 Infrastructures

2.2.5.1 Infrastructure development

Unlike other DGs, the JRC owns and manages buildings and related infrastructure on all its sites, except Brussels. Therefore, the JRC Strategy 2030 foresees the development of a single, consolidated, multi-year plan for the development of fit-for-purpose infrastructure across all its sites and Directorates. At the end of 2018, the JRC endorsed the 'JRC Site Development Vision 2030' and related plans for each site. For the office buildings, the Directive on Energy Efficiency and Energy Performance of Buildings constitute the reference standard when setting development objectives.

The main infrastructure works delivered as scheduled in 2019 on the Ispra site were a fully refurbished building, turned into the first nearly zero-energy building on the site, and another building aimed at hosting the new vehicle testing facilities for market surveillance. In Petten, 2019 saw the completion of the first phase of the Creative Hub, a collaborative space to stimulate creative thinking. In Karlsruhe, the brickwork of Wing M, state-of-the-art nuclear lab and the biggest single investment into research infrastructure of the JRC in at least 20 years, was finalised.

The target for the surface area of newly delivered buildings and buildings demolished and refurbished in line with Directive 2012/27/EU is set at 3% annually. The 2019 JRC result (5.7%) is above the target, as the result of the delivery of several buildings under construction or refurbishment in the past years; in addition, new energy efficient buildings in Karlsruhe and Ispra are currently under construction and will generate a further boost when delivered from 2020 onwards.

2.2.5.2 Decommissioning and Waste Management Programme

The JRC has to manage its nuclear liabilities and decommission its nuclear installations once they have been definitively shut down⁴⁶.

In 2019, progress was made on waste management and characterisation facilities, decommissioning and clearance of obsolete facilities and equipment (see Annex 13 for details). A major achievement was the transfer of responsibility of one of the two shutdown research reactors at the Ispra site to the Italian government, as compensation for the costs resulting from the former use of the reactor for the Italian nuclear research programme. An evaluation of the Decommissioning and Waste Management (D&WM) programme for the period 2013-2018 is under preparation. In 2019, JRC also started activities to prepare for the new objective on the dissemination of relevant decommissioning knowledge at EU level under the new funding programme 2021-2027⁴⁷.

The complete reports on the main outputs for 2019 for the four relevant JRC sites can be found in Annexes 2 and 13.

2.2.5.3 Supplementary research programme for the High Flux Reactor in Petten

The High Flux Reactor (HFR), located at the JRC site in Petten (NL), is owned by the Commission, which puts it at the disposal of interested Member States. As a result, its

⁴⁶ More information on the Decommissioning and Waste Management Programme (D&WMP) could be found in Annex 2

⁴⁷ European Commission draft proposal for a Council Regulation establishing a dedicated financial programme for decommissioning of nuclear facilities and management of radioactive waste, and repealing Council Regulation (Euratom) No 1368/2013, COM(2018)467 final

operation has been supported by a series of supplementary research programmes⁴⁸.

The supplementary research programmes have been running since 2012 under Council decisions. The last supplementary research programme covering the period 2016-2019⁴⁹ was financed entirely out of contributions from France and the Netherlands, through the Commissariat pour l'Energie atomique et les énergies alternatives (CEA) and Nuclear Research & Consultancy Group (NRG), respectively. A Commission proposal for a Council Decision for a new four-year programme for the HFR operation (2020-2023) will be adopted by the College in the first half of 2020.

2.2.6 Examples of initiatives to improve the economy and efficiency of financial and non-financial activities of the DG

The JRC contributes to creating efficiency gains at the corporate level thanks to its strong expertise in procurement, in addition to the simplification and improvement actions generating JRC internal efficiencies. As the business domain owner for the eProcurement project the JRC has been at the forefront of delivery across many different domains. The JRC's eProcurement preparation solution continues to provide real and identifiable benefits as the JRC delivers paperless procurement, the main highlights being: 1) a structured file in ARES with a sub-file to store tenders received via eSubmission; 2) population of a draft contract notice; 3) harmonised procurement templates; 4) corporate documentation; 5) creation of the call for tender space in eTendering; 6) eSignatory in ARES giving approval of the opening committee.

A new ICT strategy and ICT architecture framework together with a JRC-wide ICT governance structure will enable the JRC to gradually consolidate its ICT expertise and resources to better serve the needs of its users across the organisation. It is expected that this will lead to important efficiency and synergy gains over the next five years.

The **JRC's integrated management system (IMS), based on international quality management standards** provides a framework for continuous improvement. Main achievements in 2019 were:

- A new internal audit strategy, in line with ISO series standards, has been defined to assess both compliance and processes' performance, identifying opportunities for improvement and spreading good practices within the organisation. The implementation of this strategy should lead to a reduction in the overall effort involved: a smaller number of audits and less audit days for auditees and auditors. Internal audit reports are managed by the IMS IT tool (IMSIS) to enable findings' follow-up,
- Implementation of a common, consistent and harmonised scientific project management (SPM) methodology across the JRC. The methodology includes a set of enhanced features for IT tools supporting project management, as well as introducing guidance.

In addition, an editorial review board has been established to ensure in a professional and harmonised way the integrity and quality of manuscripts written by JRC staff, which are published or made publically available.

⁴⁸ More information on the supplementary research programme could be found in Annex 2

⁴⁹ Council Decision (Euratom) 2017/956 of 29 May 2017 on the adoption of the 2016-2019 high flux reactor supplementary research programme to be implemented by the Joint Research Centre for the European Atomic Energy Community