



2017

Annual Activity Report

Joint Research Centre

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THE DG IN BRIEF

The Joint Research Centre (JRC) is the European Commission's science and knowledge service. Its scientific work supports EU policies with independent evidence throughout the whole policy cycle in a variety of areas from agriculture and food security, to environment and climate change, as well as nuclear safety and security and innovation and growth.

The JRC creates, manages and makes sense of knowledge and anticipates emerging issues that need to be addressed at EU level. It develops innovative tools and makes them available to policy-makers. It explores new and emerging areas of science and hosts specialist laboratories and unique research facilities. Its scientific results are highly ranked by international peer systems.

The JRC provides independent scientific evidence for EU policies.

The JRC recently established knowledge centres that bring together experts and knowledge from inside and outside the European Commission to inform policy-makers. They are complemented by competence centres focusing on analytical tools which can be applied to any policy area offering skills in microeconomic evaluation, composite indicators, text mining and innovation monitoring.

The JRC draws on 60 years of scientific experience and continually builds its expertise, sharing know-how with EU countries, the scientific community and international partners. It works together with over a thousand organisations worldwide whose scientists have access to JRC facilities through various collaboration agreements.

While most of JRC's scientific work serves the policy Directorates-General of the Commission, JRC's work has a direct impact on the lives of citizens by contributing with research outcomes to a healthy and safe environment, secure energy supplies, sustainable mobility and consumer health and safety.

The JRC works together with over 1000 organisations worldwide.

The JRC is funded by the EU's framework programme for research and innovation, Horizon 2020, and by the EURATOM Research and Training Programme for its work in the nuclear field. The JRC contributes to the overall objectives¹ of the H2020 programmes while fully aligned with the political guidelines of President Juncker's Commission. JRC collaborates closely in key policy areas with the other European Commission Directorates-General (DGs), delivering on priority topics and its existing long-term obligations (i.e. as specified in existing EU legislation and contracts).

The JRC is organised in two directorates with corporate responsibilities for strategy and work programme coordination and resources, and eight scientific directorates of which two are cross-JRC directorates for knowledge management and competences. The JRC directorates are spread across six sites in five different countries within the EU. Following the adoption of JRC Strategy 2030 a major reorganisation was carried out in 2016 and completed in 2017.

Unlike the other Directorates-General of the Commission, the JRC manages scientific infrastructures and nuclear facilities. Given the geographic spread of its sites and the technical nature of its work, the JRC policy is to place local decision-making responsibility with the operational services. Therefore JRC scientific unit heads are nominated as sub-delegated authorising officers for the budget lines specifically related to their research projects.

¹ JRC objective for non-nuclear work under the Horizon 2020 is 'to provide customer-driven scientific and technical support to Union policies, while flexibly responding to new policy demands'. JRC objective under the Euratom programme is 'the pursuit of research, knowledge management and training activities with an emphasis on nuclear safety, security and safeguards'.

EXECUTIVE SUMMARY

The Annual Activity Report is a management report of the Director General of the JRC to the College of Commissioners. Annual Activity Reports are the main instrument of management accountability within the Commission and constitutes 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 general and specific objectives of the DG (executive summary of section 1)

In 2017, the **JRC has supported policy-making** in areas of high political importance and sensitivity, increasingly focusing on pressing issues such as security and migration, and supporting regional economic development. It has contributed to several Commission initiatives and supports measuring and monitoring the implementation of policies. Examples are the social scoreboard which helps monitoring social progress in Europe feeding into the European Semester, data related to the state of the energy union and indicators for the raw materials scoreboard.

The **JRC has contributed to better regulation** by supporting the Commission with methodologies for quantification and data planning. It has strengthened its modelling support to the European Semester, the deepening of the Economic and Monetary Union, including to the social dimension via social impact assessments of financial measures and stability programmes and the development of indicators to measure social progress.

The **JRC has also responded to emerging issues** such as dual quality of food products and the fipronil case. Its work on African issues and its extensive scientific knowledge about Africa is a prime example of added value with respect to EU's political agenda.

The JRC has met its targets within the Horizon 2020 programme and those defined in its strategic plan. Its nearly 1500 studies, technical systems, data sets and data bases, standards and its operational services implementing the EU legislation contributed directly to the Commission's policy departments' goals and that way to the achievement of the Commission's general objectives. **The H2020 interim evaluations^{3,4,5} have judged JRC's performance, scientific quality and impact favourably.**

JRC's role as Commission's science service is being increasingly recognised as demonstrated by wide collaboration with policy departments within the recently established Knowledge and Competence Centres and the European Parliament request to continue JRC's initiative of making science accessible to the parliamentarians.

2017 has been a year of change for the JRC. After the adoption of its Strategy 2030 in 2016, a major reorganisation was carried out to foster the JRC's new focus as a manager of knowledge for EU policies, capable to assist the Commission in delivering evidence-informed policies. The JRC has been able to complete 95 % of the actions in its strategy implementation plan and is on track towards its strategic goals as also acknowledged by the interim evaluation of JRC in H2020.

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

³ In-depth interim evaluation of Horizon 2020, SWD(2017) 220 final

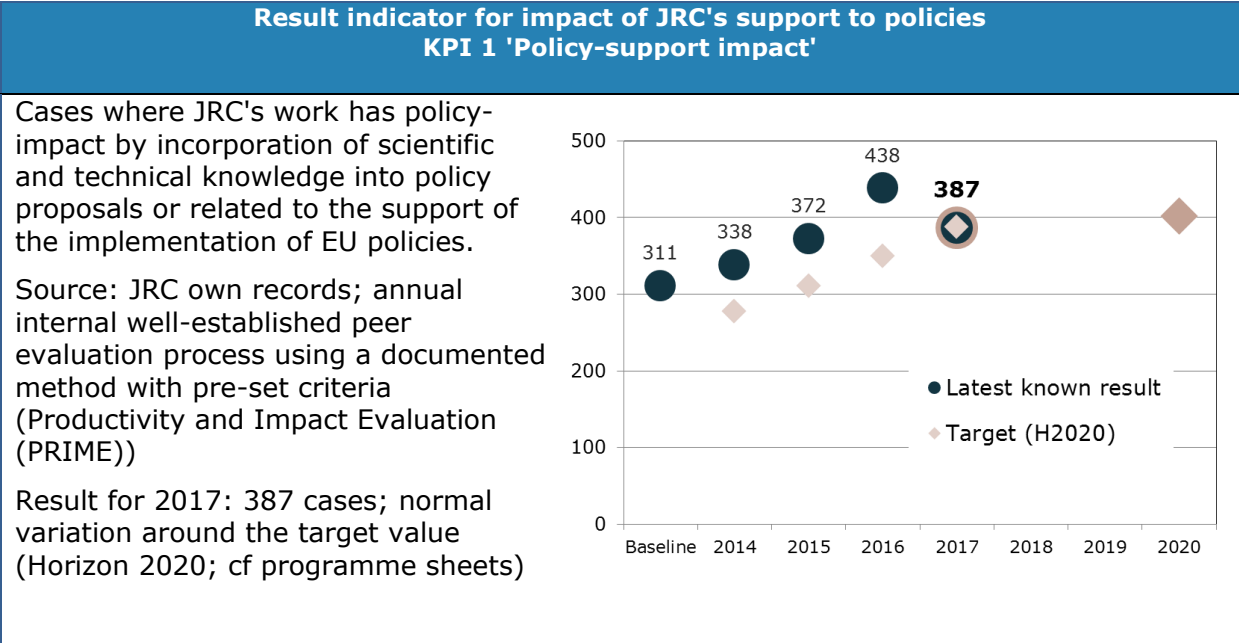
⁴ JRC Implementation Review 2017: In the context of the interim evaluation of the Horizon 2020 Programme <http://data.europa.eu/doi/10.2760/459053>

⁵ Interim Evaluation of the Direct Actions under the Euratom Research and Training Programme (2014 - 2018). <http://data.europa.eu/doi/10.2760/402387>

Finally, in 2017 the JRC decommissioning programme has made good progress in e.g. commissioning of a new storage facility at the Ispra site. JRC has also completed a full review of its decommissioning and nuclear waste management strategy and budget and can proceed with drafting the new Communication to the Council and Parliament on the status of the programme to be adopted in 2018. Important progress in 2017 was also the signing of the settlement agreement with the JRC by the Italian government, which deals with the mutual responsibilities for the decommissioning of the nuclear liabilities on the JRC's Ispra site, and the high-level discussions within Commission services on giving a more sound and operational basis to the decommissioning and waste management programme in the next MFF.

b) Key Performance Indicators (KPIs)

The JRC maintains a comprehensive indicator framework to monitor the performance and the 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 monitoring of progress towards objectives defined in JRC's Strategic and Management Plans; see Annex 14 for an overview. The Strategic Plan 2016-2020 sets out five of them as JRC's key performance indicators (KPIs).

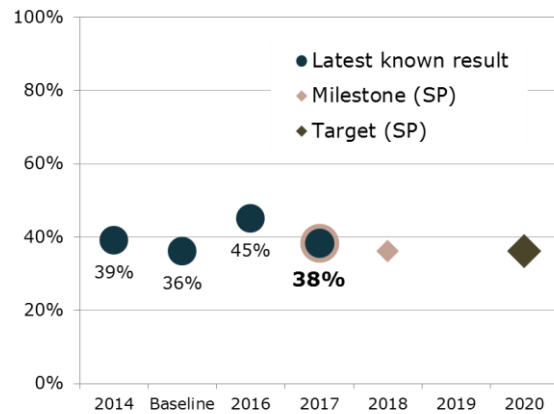


Result indicator for scientific excellence
KPI 2 'Proportion of peer-reviewed publications in the top 10 % most-cited journals'

Reflects the degree to which JRC publishes the results of its research in highly-cited peer-reviewed scientific journals, in particular journals ranked amongst the top 10 % most-cited journal by science journal ranking (SJR⁶) and often jointly with external scientists.

Source: Abstract and citation database of peer-reviewed literature Scopus (Elsevier publishing company)

Result for 2017: 38 %; normal variation around the target value

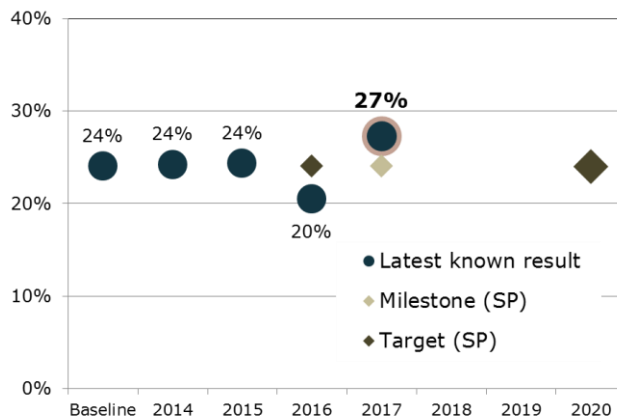


Result indicator for scientific collaboration and networking
KPI 3 'International collaborations'

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

Source: JRC own records; internal review process

Result in 2017: 27 %; exceeded the target for 2017 (milestone); normal variation within the target range



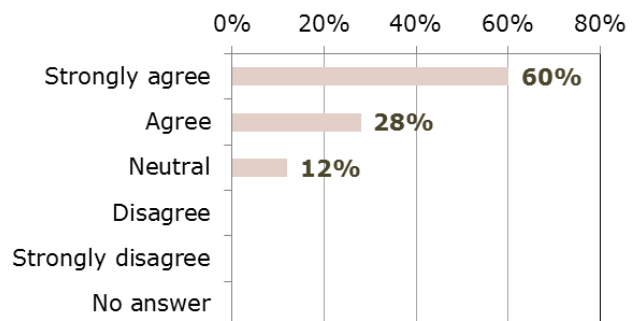
Result indicator for partner satisfaction
KPI 4 'Weighted average of overall customer satisfaction'

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.

Source: JRC survey 2017

Result in 2017: 88 % very satisfied or satisfied. As this is a pilot survey, no values for the indicator nor targets are available yet.

Overall, you are satisfied with how the JRC managed the project.



⁶ Scimago Journal & Country Rank

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

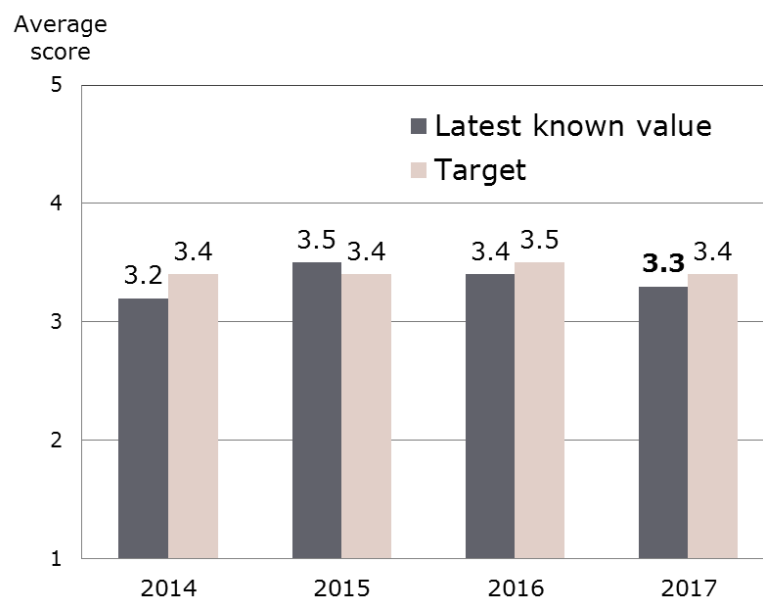
The fifth SPP key performance indicator is linked to the achievement of the internal control objective.

The indicator's numerical value represents the average of scores, range between 1 ('Fully disagree') and 5 ('Fully agree'), obtained from the annual survey that was carried out in the reporting year to assess the staff perception of the degree of implementation of the Internal Control Standards (ICS) in the JRC and to appraise if the internal control systems are effective.

Source: JRC Internal Control Standards survey

Result in 2017: The 2017 value of 3.3 is slightly lower than the target set and the 2016 value of 3.4. Nevertheless, this evidences a rather stable situation with respect to staff perception of the degree of implementation of the ICSs in the JRC considering that awareness-raising activities and trainings were put on hold in view of the revised Internal Control Framework (ICF).

Based on the survey results as well as on the analysis and the overall conclusion reported in Part 2 of this report, there is reasonable assurance that, overall, the JRC has suitable internal controls in place and working as intended; risks are being appropriately monitored and mitigated; and necessary improvements and reinforcements are being implemented.



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 and its staff 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.

The Commission has adopted a set of internal control standards, based on international good practice, aimed to ensure the achievement of policy and operational objectives. The financial regulation requires that the organisational structure and the internal control systems used for the implementation of the budget are set up in accordance with these standards. The JRC has assessed the internal control systems during the reporting year and has concluded that the internal control standards are implemented and function as intended. 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 aimed to supervise entities to which it has entrusted budget implementation tasks, as well as the observations and recommendations issued by internal auditors and the European Court of Auditors (ECA). These elements have been assessed to determine their impact on the management's assurance as regards the achievement of 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 Director General, in his capacity as Authorising Officer by Delegation has signed the Declaration of Assurance.

d) Provision of information to the Commissioner

In the context of the regular meetings during the year between the DG and the Commissioner on management matters, also the main elements of this report and assurance declaration have been brought to the attention of Commissioner for Education and Culture, Youth and Sports, Tibor Navracsics, who is also responsible for the JRC.

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

As defined in its mission and in line with its legal basis⁷, the JRC contributes to Commission's political priorities and Europe 2020 goals by supporting EU policies with independent evidence at all stages of the policy cycle. Its studies, technical systems, data sets and data bases, standards and its operational services implementing the EU legal obligations contribute directly to the Commission's policy departments' goals and that way to the achievement of the Commission's general objectives. JRC's research contributes also directly to achieving the Commission's general objectives through the tools, knowledge and services it makes available to Member States and globally, and to the research community at large.

Following a well-established process, the JRC's broad work programme for 2017-2018 was developed in consultation with partner DGs and adopted by a Commission decision ensuring political relevance and alignment with Commission's general objectives and the Commission work programme, and continued support related to legal and/or contractual obligations. Importantly, while subject to political agreement, the JRC's work programme is a rolling plan and gives the JRC the ability to adapt rapidly to take up emerging issues. See intervention logic in Figure 1.

In 2017, the JRC has contributed to many Commission initiatives and supported measuring and monitoring the implementation of policies. Examples are the social scoreboard which helps monitoring social progress in Europe, data related to the state of the energy union and indicators for the raw materials scoreboard.

The JRC has contributed to better regulation by supporting the Commission with methodologies for quantification and data planning. It has strengthened its modelling support to the European Semester, the deepening of the Economic and Monetary Union, including to the social dimension of EMU via social impact assessments of financial measures and stability programmes and the development of indicators to measure social progress.

The JRC has also responded to emerging issues such as dual quality of food products: it will work further with stakeholders to ensure relevant testing so that Member States can discuss this issue on a sound and shared scientific basis that is the same for all. In the wake of the fipronil crisis, it organised a proficiency test which confirmed that the majority of European control laboratories can accurately detect levels of fipronil in products bound for human consumption.

The JRC has responded to emerging issues such as dual quality of food products and the fipronil case.

Other examples of JRC's activities, achievements and impact are described under sections 1.1 – 1.4 and in detail in Annex 15. Apart from giving a snapshot of JRC's many activities and their impact, they demonstrate the **added value of JRC's work** through *i.a.*:

- providing the Commission with the independent evidence it needs for formulating, monitoring and evaluating policies;
- placing the Commission on equal footing with stakeholders and Members States

⁷ 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.

as regards technical knowledge;

- leading EU-wide processes defined in the legislation, saving administrative costs at Member State level like the Integrated Pollution Prevention and Control (IPPC) Bureau for industrial emissions;
- EU-wide and global harmonisation and standardisation, contributing to health and safety of the citizen, security, protection of the environment and EU's competitiveness;
- sharing knowledge, enabling the Member States and Candidate Countries to tap into best practises and rich data sources; and
- operational services that enable EU take action in e.g. crisis situations.

The JRC aims to become a global leader in the creation, management and transfer of knowledge for public policy, helping to address the concerns raised by the current 'post-fact' debate and leading the campaign for evidence-informed policy. It has established four Knowledge Centres that bring together experts and knowledge to inform policy-makers about the status and findings of the latest scientific evidence. Collectively, they involve 24 DGs and Services. Two more are in preparation and will be launched in 2018. Four Competence Centres have been created, centred on analytical tools and providing services across the Commission, working directly with 20 Commission policy DGs and Services so far to apply these tools to the policy problems at hand.

Furthermore, JRC's 'Science Meets Parliaments' events have been a success, making the best science accessible to parliamentarians and the European Parliament has requested JRC to start a three-year campaign across EU to advance evidence-based policy-making. These developments demonstrate that JRC's role as a science advisor and provider of sound and independent evidence has found recognition across institutions.

Example of EU added value (1). The EU wants to ensure that agriculture remains sustainable and competitive. With an annual budget of roughly EUR 59 billion, the EU funds measures to support farmers, agricultural markets and rural development programmes. Developments in global agricultural markets and new EU commitments on climate change and sustainable development mean the common agricultural policy needs to evolve yet again, to meet these continuing challenges. JRC has been playing a key role in **supporting the CAP simplification and modernisation** process in 2017. It provided economic analysis in preparation of the Communication on 'The Future of Food and Farming' a.o. through the study 'Scenar2030 – Pathways for the European Agriculture and food sector beyond 2020'. It has been working on environmental indicators, farm level tools and providing scientific analysis of environmental and climate impacts on farming to prepare for a CAP higher in ambition and more results-focused as regards resource efficiency, environmental care and climate action. It is also deeply involved in the design and roll-out of a revised technical framework for a new control mechanism of CAP direct payments that is based on monitoring through Copernicus data.

Example of EU added value (2). The Sustainable Development Goals (SDGs) are a collection of 17 global goals set by the United Nations. The EU is committed to implement the 2030 Agenda in cooperation with its partners and has adopted a sustainable development package. The JRC has developed a web-based interface which maps EU Sustainable Development Goals (SDGs) related policies and provides access to indicators, methods and data related to the SDGs. It facilitates the **identification of interlinkages, trade-offs and synergies between SDGs and their targets**. The JRC will complement this work by carrying out a 'Distance to SDGs Analysis in the EU' which aims to measure how far the EU as a whole is from the 'achievement' of the SDGs in 2030.

Example of EU added value (3). Policy-makers and risk managers are faced with increasingly severe natural and manmade disasters. **Better understanding of disaster risk** will help to build resilience and risk-informed approaches to policy-making, and contribute to smart, sustainable and inclusive growth. JRC's report 'Science for disaster risk management 2017: knowing better and losing less' addresses the three distinct phases of understanding, communicating, and managing disaster risk. It supports the integration of science into informed decision-making through synthesising and translating evidence for disaster risk management and strengthening the science-policy and science-operation interface. **JRC's Disaster Risk Management Knowledge Centre (DRMKC)** provides a networked approach to the science-policy interface in DRM, across the Commission, EU Member States and the DRM community within and beyond the EU. At a global level, the EU supports the Sendai Framework for Disaster Risk Reduction to promote a more systematic and reinforced science-policy interface to strengthen the contribution of DRM to smart, sustainable and inclusive growth globally.

Example of EU added value (4). In 2016, the EU and its Member States' development aid to Africa was EUR 21 billion. In 2015, EU and EU companies' direct investment in Africa amounted to EUR 32 billion, making up one third of the overall foreign investment, and between 2014 and 2020 EUR 1.4 billion are committed to educational programmes.

The JRC has cooperated with academic and administrative bodies in Africa for more than 30 years. Its satellite imagery, instruments and research have been serving the African people across the continent, by forecasting crop yields, carrying out environmental and energy-related research, providing data when disasters strike, and highlighting demography and migration issues. This wealth of knowledge was put together in a flagship report and interactive online tools for '**Science for the AU-EU Partnership**', presented at the 5th AU-EU Summit. The report explores the opportunities and challenges arising from the fact that Africa has over twice the population of the European Union (EU), is the world's most youthful continent, has an economy that is growing faster than that of the EU, is almost seven times larger geographically, yet is vulnerable to diverse internal and external stresses. It will support and inform an evidence-based dialogue and further engagement with Africa's policy-making and scientific communities, and thus further strengthen, with a solid knowledge base, the renewed AU-EU Partnership.

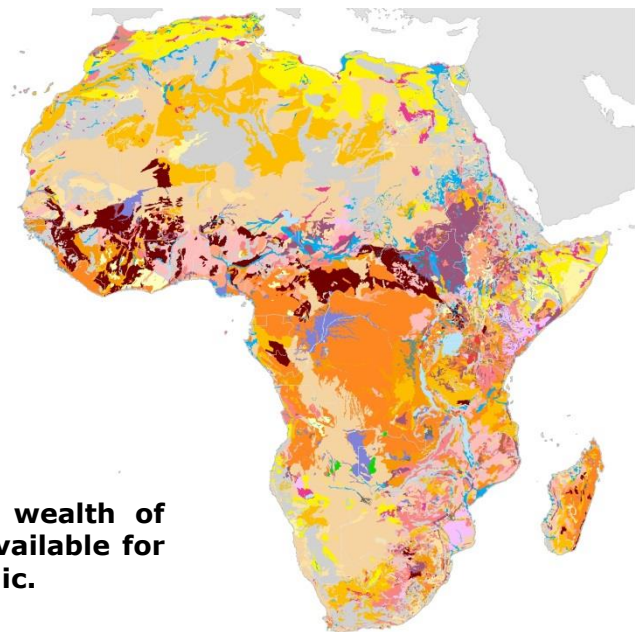


Figure 1. The JRC has a wealth of knowledge about Africa, available for policy-makers and the public.

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Progress towards the achievement of general and specific objectives. The largest part of the JRC's work contributes to four Commission general objectives, namely general objectives 1, 3, 4 and 9 as described in the JRC's strategic plan (SP) 2016-2020 (see Table 1 for correspondence of objectives). However, the JRC also contributes to the goals of the other priorities of the Juncker Commission, and provides further cross-cutting support to all general objectives (GOs) by developing a stronger knowledge management capacity. Its performance is therefore reported either for the four main general objectives or for all activities, according to set criteria.

The JRC achieved its targets for policy related outputs and their impact and scientific productivity set out in the H2020 programmes, as defined under the specific objectives for JRC direct actions (see H2020 programme statements) and positively contributed to implementation of the Horizon 2020 programme.

In 2017, the JRC has produced nearly 1500 studies, technical systems, data sets, data bases or standards in support of EU policies.

In 2017, the JRC has produced nearly 1500 studies⁸, technical systems, data sets, data bases or standards as a result of its research activities and reflecting its operational services supporting the different stages of policies.

Example of EU added value (5). The EU's energy union means making energy more secure, affordable and sustainable. The JRC contributed by carrying out security, safety, risk and techno-economic assessments of the EU's energy supply, assessing the development of energy infrastructure and energy markets in the EU, and supporting the implementation of renewable energy and energy efficiency legislation. For instance, JRC produced the first **Best Available Technique (BAT) reference document on cyber-security** with regard to digitalisation in the energy sector, now endorsed by the European Commission Smart-Grid Task Force. The JRC-developed key performance indicators measure progress in research and innovation in the EU as a whole and for each Member State through specific methodologies and using the **Strategic Energy Technologies Information System (SETIS)** which it manages. The JRC has also examined the impact of different drivers of primary energy consumption at the EU level over the last decade to better understand factors behind improvements in energy efficiency and identified public policy as the key driver. The JRC's many scientific evidence have supported conclusions of the European Commission's **State of the Energy Union Reports**.

JRC's internal evaluation process has identified nearly 400 cases of JRC's immediate policy-impact by incorporation of scientific and technical knowledge into policy proposals or policy-impact that is related to the support of the implementation of EU policies⁹. The number of such cases has grown over the years, already exceeding JRC's target for 2020, witnessing of JRC's closer working together with the other services as a strategic partner, helping them achieve their goals. Analysis also shows a continued commitment to harmonisation and standardisation, crisis support and support to the Member States. Furthermore, nine out of the 11 selected Commission-wide indicators show a positive trend towards achieving set targets, highlighting areas where JRC's contribution helps achieving the political goals.

89 % of the policy related outputs planned for 2017¹⁰ were completed evidencing the JRC's excellent performance in line with the set targets

and reflecting the research character of JRC's work and changes in the Commission-wide priority setting.

⁸ 1200 of which are related to general objectives 1, 3, 4 and 9.

⁹ One instance of policy-impact is supported by one or more JRC outputs.

¹⁰ As defined in JRC's Management Plan 2017.

The H2020 interim evaluations^{11,12,13} have judged JRC's performance, scientific quality and impact favourably, commending JRC on its rapid progress in implementing its new strategy. The evaluations noted that the JRC has supported policy-making in areas of high political importance and sensitivity, increasingly focusing on pressing issues such as security and migration, and supporting regional economic development.

In 2017, the JRC started collecting information on meeting the expectations of the partner DGs and stakeholders for the first time through a standardised survey¹⁴. This pilot survey was sent to a group of recipients of JRC services and 25 replies were received (39 % response rate). 88 % of the respondents were very satisfied or satisfied with how the JRC managed the project overall while the remaining 12 % provided a neutral opinion.

JRC's **scientific productivity and impact** show improved performance and scientific excellence during the H2020 programme. According to a 2017 study¹⁵, between 2007 and 2015 the JRC produced ca. 7000 scientific publications and achieved double the world average in the number of publications in the top 10 % journals. In the recent years, the JRC's share of top 1 % highly cited publications (field-normalised) is more than three times the world average. In 2017, the work of JRC scientists was published in 636 peer-reviewed research papers. See specific objective 11 in section 1.5 for more details on indicators.

However, the JRC needs to invest in maintaining and developing its scientific excellence. Therefore, JRC's long-term strategy adopted in 2016, has outlined new instruments for scientific development. In 2017, three new initiatives were implemented, namely the Centre for Advanced Studies (CAS), the Opening of Research Infrastructure (RI), and the Collaborative Doctoral Partnership (CDP). 2.2 % of JRC's resources were used in exploratory activities of which 25 % in emerging areas, exceeding the targets of 2.0 % and 15 % for 2017. In support of scientific excellence, to make the best use of its extensive expert networks and to identify new collaborators for future work, the JRC has also reviewed its strategic partnership framework. In 2017 it focused on new or renewed partnerships with top organisations in China, Japan and the United States and enhancing JRC's relations with international organisations and academia. See specific objective 10 in section 1.5 for more results in this area.

The JRC has been complimented by the interim evaluation panel on maintaining a good record in producing scientific results that are highly ranked as well as being relevant to policy.

Since the activities of the JRC are funded through the H2020 spending programme, all policy-related outputs are expenditure outputs.

¹¹ In-depth interim evaluation of Horizon 2020, SWD(2017) 220 final.

¹² JRC Implementation Review 2017: In the context of the interim evaluation of the Horizon 2020 Programme <http://data.europa.eu/doi/10.2760/459053>

¹³ Interim Evaluation of the Direct Actions under the Euratom Research and Training Programme (2014 - 2018). <http://data.europa.eu/doi/10.2760/402387>

¹⁴ Apart from the pilot standardised survey, JRC collects feedback on its services at different levels and in different ways, in line with the requirements of its quality management system.

¹⁵ Jonkers K, Del Rio JC, Meyer N. 2017. The research performance of the European Commission's Science and Knowledge Service, Joint Research Centre (2007-2015) - A bibliometric analysis, internal JRC report. Brussels

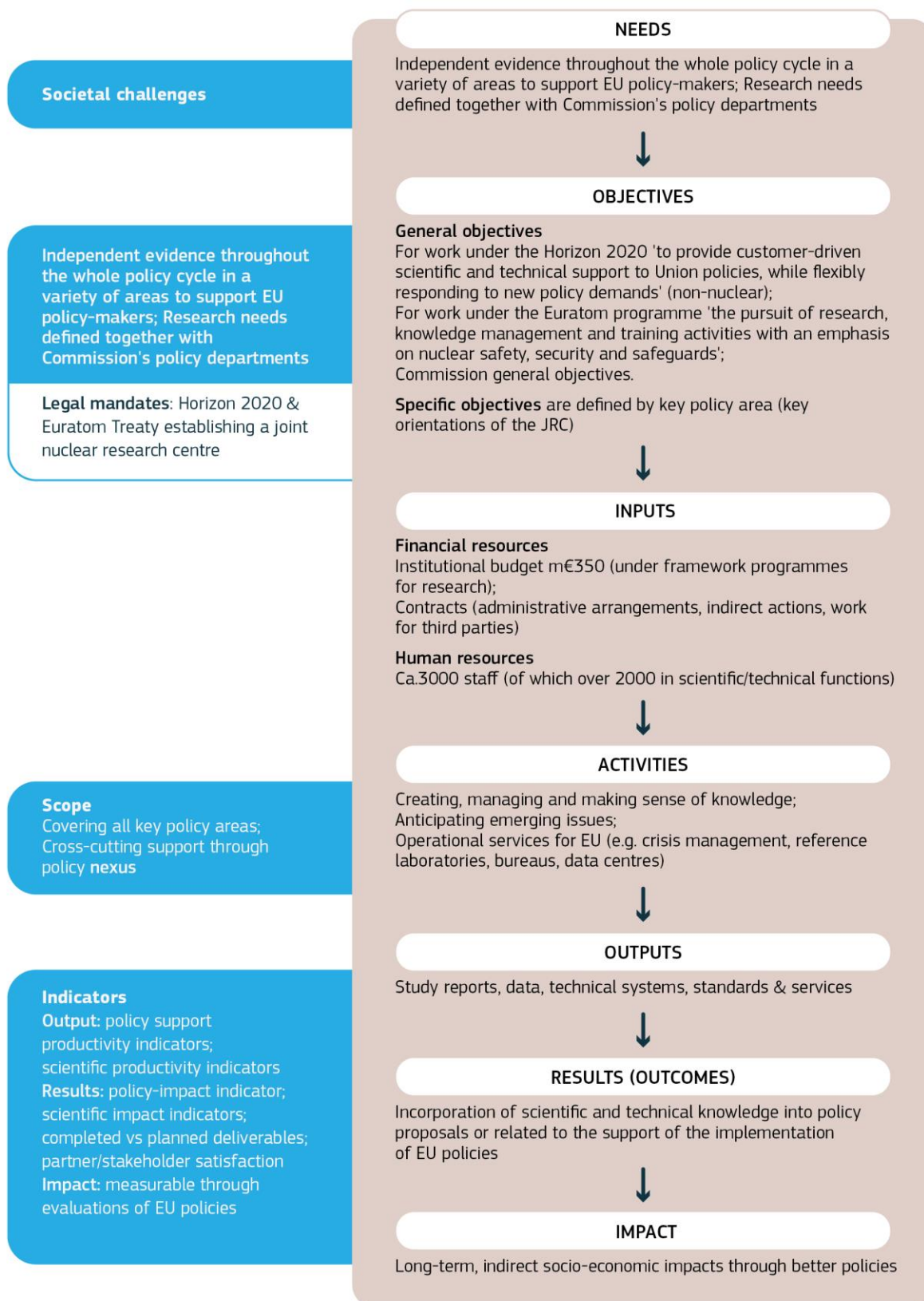


Figure 2. JRC's intervention logic, illustrating the operating principles of the JRC.

Challenges. Following the adoption of JRC Strategy 2030 a major reorganisation was carried out in 2016 and completed in 2017 to foster the JRC's transformation from a traditional research-making organisation into a manager of knowledge for EU policies, capable to assist the Commission in delivering evidence-informed policies in innovative ways. Year 2017 has been a year of change, JRC adapting to its new role, acquiring new competencies and committing to new ways of working across the whole Commission (cf. Commission corporate data, information and knowledge management strategy (SWD(2016)333 final and C(2016)6626 final)). The JRC has been able to complete 95 % of the actions in its strategy implementation plan and is on track towards its strategic goals as also acknowledged by the interim evaluation of JRC in H2020.

While an emphasis on cross-cutting research and delivering integrated syntheses will enhance the knowledge base required to propose policy options, the JRC also needs to retain its excellent scientific credentials to ensure that scientific advice is based on the best available scientific evidence. This point was addressed by a recommendation of the interim evaluation.

External factors. The impact of JRC's work may be affected by changes in EU and Commission priorities at all levels. The JRC is flexible to take on new requests during the year to adapt its planning in agreement with the needs of the partner DGs. Thus a part of the planned work needs to be either postponed or cancelled and this can reach significant amounts depending on e.g. emerging high-level needs and crisis situations. Also changes in the social context may result in a situation where the research that JRC carried out cannot be taken up by policy-makers. In general, JRC's output is strongly impacted by changes in staffing (cuts). These effects can be mitigated to some extent by closely working together with partner DGs and by JRC's anticipatory activities.

Risks. No risks have materialised in 2017.

JRC contribution to Commission synergies and efficiencies. In line with the Communication on 'Synergies and Efficiencies in the Commission – New Ways of Working' (SEC(2016)170 final) the JRC has been appointed in 2017 as the European Commission's Business Domain Owner of the **eProcurement project** which is part of the SEDIA (Single Electronic Data Interchange Area) programme, recognising the JRC's experience in public procurement and contract management. Since taking up this role the JRC has worked very closely with all concerned partners providing immediate and tangible added value to the project. See section 2.2.6 and Annex 10.5 for more information on the eProcurement project.

Table 1. Relation of JRC's specific objectives to Commission general objectives.

Objective level	Objective number	Description
Commission general objective	1	A New Boost for Jobs, Growth and Investment
JRC specific objectives (contributing to H2020 Specific Objective 17)	1.1-1.9	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
	1.1	Agriculture and rural development
	1.2	Education, culture, youth and sport
	1.3	Environment
	1.4	Maritime affairs and fisheries
	1.5	Health and food safety
	1.6	Regional policy
	1.7	Research, Science and innovation
	1.8	Transport
1.9	Employment, social affairs, skills and labour mobility	
Commission general objective	3	A Resilient European Energy Union with a Forward-Looking Climate Change Policy
JRC specific objectives (contributing to H2020 Specific Objective 17 and to EURATOM Research & Training Programme Specific Objectives 9, 10, 11, 12 and 13)	3.1 - 3.3	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
	3.1	Climate Action
	3.2	Energy
	3.3	Safe, secure and sustainable use of the nuclear energy
Commission general objective	4	A Deeper and Fairer Internal Market with a Strengthened Industrial Base
JRC specific objectives (contributing to H2020 Specific Objective 17)	4.1 - 4.2	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
	4.1	Internal market, industry, entrepreneurship and SMEs
	4.2	Customs policy and the fight against fraud
Commission general objective	9	A Stronger Global Actor
JRC specific objectives (contributing to H2020 Specific Objective 17 and to EURATOM Research & Training Programme Specific Objectives 9, 10, 11, 12 and 13)	9.1 - 9.2	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
	9.1	Global safety and security
	9.2	International cooperation and development
Commission general objectives	1, 3, 4 and 9	A New Boost for Jobs, Growth and Investment A Resilient European Energy Union with a Forward-Looking Climate Change Policy A Deeper and Fairer Internal Market with a Strengthened Industrial Base A Stronger Global Actor
JRC specific objective (contributing to H2020 Specific Objective 17 and to EURATOM Research & Training Programme Specific Objectives 9, 10, 11, 12 and 13)	10	In order to ensure the most relevant and timely scientific support to the European policy-making, 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.
JRC specific objective (contributing to H2020 Specific Objective 17 and to EURATOM Research & Training Programme Specific Objectives 9, 10, 11, 12 and 13)	11	To ensure the highest quality of its policy support, the JRC will effectively and efficiently maintain scientific excellence in its core competences

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 the European level continue to be needed to put Europe on the path to renewed economic prosperity. As the first of the ten Juncker priorities, the Commission work in this area covers a variety of policies, a number of which the JRC contributed to in 2017.

Bringing concrete evidence of the potential of cultural and creative sectors, supporting the simplification of the Common Agricultural Policy, tackling important knowledge needs on environmental questions and the circular economy, contributing to maritime and fisheries priorities, promoting good health and food safety are all examples of Commission activities that the JRC backed this year with its expertise.

The JRC manages the intellectual property portfolio of the European Commission¹⁶ and in 2017 it handled 585 requests from different Commission departments.

Examples in this area are described in Annex 15 and include:

- Cultural and Creative Cities Monitor identifies strengths and opportunities across Europe;
- Europe's fight against cancer: waging battle with leading research;
- A new scientific yardstick for the early diagnosis of Alzheimer's disease;
- Procurement of food for health: halting the rise of childhood obesity;
- Towards water sustainability: Urban Water Atlas for Europe;
- Supporting fishing and maritime policy in the Mediterranean Sea;
- Tracking invasive alien species by smartphone;
- Identifying and eliminating marine and riverine litter from the ecosystem;
- The real value of nature's water purification ecosystem;
- Science for an evolved Common Agricultural Policy;
- Improving the transparency and reliability of international and domestic economic analyses;

¹⁶ In line with SEC 2012/103

- The Air Quality Atlas for Europe; and
- Finding alternatives to animal testing in preventing skin allergy.

A complete reporting on outputs identified in the 2017 Management Plan and on objectives and indicators set up in the Strategic Plan are available in tables in Annex 12.

Science for an evolved Common Agricultural Policy

The JRC's scientific insight helps policymakers understand the scope and impacts of potential efforts to ensure that the CAP is fit for today's world: a policy that is focused on meeting the challenges of a fair standard of living for farmers, preserving the environment and tackling climate change - as outlined in the Commission's November 2017 communication on the 'Future of Food and Farming'.

JRC-Scientists applied three exploratory scenarios to characterise future visions for the CAP up to 2030. The 'no-CAP' scenario - removing all budgetary support to farmers - could lead to a strong decline in farming income by 2030, job losses and a return for the EU as being a net importer of agricultural products. The study emphasises that whatever policy choices are made, smaller farms are likely to be more heavily impacted by changes to regulations and subsidies.

The study also considers (i) an 'Income and Environment' scenario: maintaining the CAP budget at its current level with stricter environmental rules, which could result in an overall higher income (with some job losses) while avoiding an increase in GHG emissions; and a (ii) 'Liberalisation & Productivity' scenario: a strong reduction in subsidies and a shift to productivity-increasing measures and further trade liberalisation, which could lead to a drop in farming income, job losses and agricultural production.

The analysis of the various options made use of the JRC's iMAP platform models MAGNET, CAPRI and IFM-CAP in an integrated manner, covering spatial scales from the global right down to individual farm level.



Figure 3. The JRC's new air quality monitoring station in Ispra (IT) supports the implementation of the European Monitoring and Evaluation Programme (EMEP), which underpins the Convention on Long-Range Transboundary Air Pollution under the United Nations Economic Commission for Europe.

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

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, secure and sustainable use of the nuclear energy

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

In 2017, the JRC's contributions to climate change policy focused on mitigation efforts, notably on economic and climate modelling/assessments, monitoring and analysing emissions from different sources (transport, agriculture, etc.), looking into alternative fuels, and assessing climate change impacts (economic and non-economic), vulnerability, resilience, and adaptation options. On energy specifically, the JRC contributed to carrying out security, safety, risk and techno-economic assessments of the EU's energy supply, assessing the development of energy infrastructure and energy markets in the EU, and supporting the implementation of renewable energy and energy efficiency legislation.

Examples in this area are described in Annex 15 and include:

- Realising the climate change mitigation potential of forests;
- Evidence that a clean and green planet is both possible and affordable;
- The dangerous arrival of climate anomalies in Europe and across the world;
- Tracking progress towards completing the Energy Union;
- Growth potential of renewables: ocean, wind, and solar energy in Europe;
- Supporting standardisation on natural gas quality;
- Providing the basis for a competitive and sustainable European car industry;
- Assessing Baltic power system and market changes scenarios;
- Smart Grid Projects Outlook 2017;
- Electricity supply security and resilience;
- OpenECHO portal sheds light on unconventional hydrocarbon activities in Europe; and
- JRC improves assay techniques for radioactive waste characterisation.

A complete reporting on outputs identified in the 2017 Management Plan and on objectives and indicators set up in the Strategic Plan are available in tables in Annex 12.

Electricity supply security and resilience

Electricity security, which has to do with the power system's capability to deliver energy to the users, represents a crucial concern for decision making at all levels and occupies a prominent place in most of the EU's energy policy action areas.

In particular, the proposal for a regulation on risk-preparedness in the electricity sector has been published within the broader Clean Energy package. The goal of the proposed regulation is to provide an EU-wide system in case of a major electricity supply crisis, which often is not restricted to one Member State.

Against this background, in 2017 the JRC produced several studies assessing diverse facets of electricity security. A study on power grid recovery after impact from natural hazard reported on the performance of the power grid during 16 earthquakes, 15 space weather events and 20 floods. The study provided a number of recommendations related to policy, hazard mitigation and emergency management to reduce the risks of natural hazards to electric infrastructure and to improve crisis management in the aftermath of a natural disaster.

Another study characterised electricity security via features at the cross-roads of policy and science. It reviewed the electricity security modelling and assessment approaches across sectors, proposed elements for a novel electricity security decision-analytic framework for the EU, and contextualised the proposed framework in EU's Energy Union grid design initiatives.

Ad-hoc analyses were also produced to support the definition of the power system risk preparedness regulation proposal. By putting forward EU-wide rules to follow in case of crises, the Commission proposal is intended to bolster regional cooperation and assistance among Member States.



Figure 4. The JRC studies have contributed to EU vehicle emission legislation.

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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 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 4.1)	Internal market, industry, entrepreneurship and SME
(Specific objective 4.2)	Intellectual property rights
(Specific objective 4.3)	Customs 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 2017, JRC's activities contributing to strengthening the internal market included standardisation, reference measurements and (nano-)materials; support for industrial sectors to enhance their environmental efficiency, energy performance, climate resilience, GHG emissions reductions; material efficiency and circular economy; advanced manufacturing and key enabling technologies; SMEs and innovative companies, and industrial competitiveness.

Examples in this area are described in Annex 15 and include:

- Stairway to Excellence: supporting regional innovation for all Member States;
- Research and Innovation Observatory monitors development across the EU;
- MARS Explorer: the EU-wide crop and weather monitoring e-service;
- New EU environmental standards for large farms, combustion and chemical plants;
- The latest research on clean and intelligent transport;
- Advancing Europe towards the circular economy;
- Food colour regulations in the EU and the US: the benefits of closer cooperation; and
- Assessing control proficiency in fipronil detection.

A complete reporting on outputs identified in the 2017 Management Plan and on objectives and indicators set up in the Strategic Plan are available in tables in Annex 12.

Stairway to Excellence: supporting regional innovation for all Member States

The Stairway to Excellence Project expanded in 2017 to cover new areas like energy, bio-economy, health, aviation and agri-food and support all regions and stakeholders in all EU Member States. It enables them to access Horizon 2020, the EU's research and innovation programme, and make the most of the European Structural and Investment Funds. The project is managed by the JRC and the Directorate-General for Regional and Urban Policy, on behalf of the European Parliament.

Broadening the programme provides regions, industry and organisations with tailor-made support in research and innovation. **Academia, business and authorities collaborate to better use resources to foster innovation, economic growth, and social cohesion.** It enables dialogue and generates opportunities between key stakeholders with common priorities.

Research carried out by the JRC fosters this collaboration: it includes country-based quantitative reports and qualitative analyses. The Stairway to Excellence Country Reports address the issue of bottlenecks affecting the optimal use and combination of key research and innovation funds. Under the **Smart Specialisation Platform** the JRC has also developed the 'R&I Regional Viewer' to review planned research-related investments.

From its launch in October 2014, the Stairway to Excellence Project covered the 13 Member States that joined the EU during or after 2004, engaging over 1000 stakeholders in various events. It has now expanded both its geography and its focus, covering new areas like energy,



Figure 5. JRC scientists cracked 4000 contaminated eggs for studies on fipronil in eggs.

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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 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 9.1)	Global safety and security
(Specific objective 9.2)	International cooperation and development
(Specific objective 9.3)	Associated and neighbourhood countries

Today's 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.

To enhance the EU's and its partners' resilience in this changing global environment, the JRC has undertaken a number of new initiatives to assist Commission services, with the monitoring and implementation of the 2030 agenda for sustainable development and its Sustainable Development Goals and Targets (SDGs). The JRC is addressing in particular the areas of food security and nutrition, environment and biodiversity, resource efficiency and sustainable production and consumption, climate, energy, and urban development.

Examples in this area are described in Annex 15 and include:

- Science for sustainable, affordable energy in sub-Saharan Africa;
- Supporting resilience, prevention and mitigation of disasters;
- A new early warning system to mitigate droughts and food crises;
- A new indicator of connectivity between natural protected areas;
- Science for the African Union-European Union Partnership;
- Protecting our critical infrastructure against extreme space weather events;
- Technical Reachback Capabilities;
- Nuclear forensics: the clash of cultures; and
- JRC support to the implementation of the EU Dual-use export control Regulation.

A complete reporting on outputs identified in the 2017 Management Plan and on objectives and indicators set up in the Strategic Plan are available in tables in Annex 12.

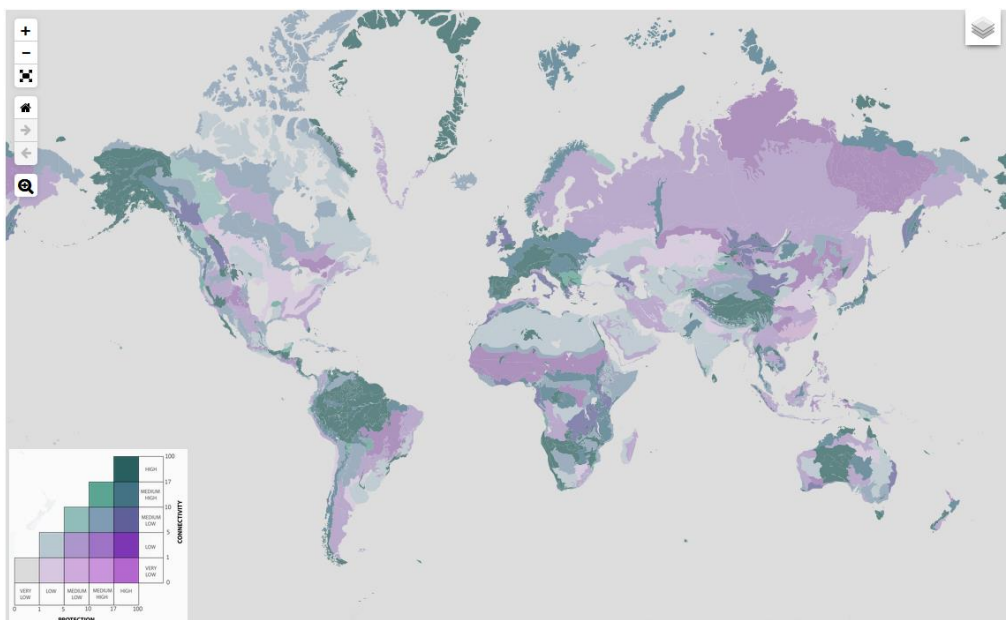


Figure 6. The JRC has developed a Digital Observatory for Protected Areas. This map shows protected areas coverage and connectivity for the terrestrial ecoregions of the world.

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Supporting resilience, prevention and mitigation of disasters

In May, the JRC's Disaster Risk Management Knowledge Centre launched its flagship report on science for disaster risk management, a cooperative work of 273 scientists from 26 countries and 172 organisations, with inputs from 11 Commission services. The report presents the state-of-the-art in the field and contributes to the Science and Technology Roadmap of the Sendai Framework for Disaster Risk Reduction.

Early in 2017, the JRC presented the 'Atlas of the Human Planet 2017' at the UN Global Platform for Disaster Risk Reduction. The atlas is a comprehensive study of human exposure to natural hazards. It covers six major natural hazards: earthquakes, volcanoes, tsunamis, tropical cyclone winds, tropical cyclone storm surge and floods.

The study highlights that global exposure to these hazards has doubled between 1975 and 2015, mostly due to urbanisation. Flooding is the most common of the hazards studied in Europe, with Germany having the highest number of people exposed to floods. Additionally, over 170 million Europeans are potentially exposed to earthquakes – with over 80 % of people in Italy, Romania, and Greece at risk.

The JRC also analysed areas in which science and knowledge can be further integrated into evidence based disaster risk management policy. They have identified areas for potential improvement, such as public-private partnerships for risk sharing, which - when addressed - can save more lives and minimise damage from disasters.

The JRC has also developed a number of disaster management and mitigation instruments, including a flood forecasting methodology integrated in the Copernicus European Flood Awareness System, a handbook that supports the EU and third countries to reduce impacts of industrial accidents, a stress test framework for non-nuclear critical infrastructure, such as telecommunication, and a Global Wildfire Information System to monitor wildfires.

1.5 Commission General Objectives 1, 3, 4 and 9¹⁷

Specific objective 10:

In order to ensure the most relevant and timely scientific support to the European policy-making, 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.

Overall coordination of work programme design and strategic planning, partner and stakeholder relations, development of new scientific capabilities in emerging areas or new to JRC and knowledge management help JRC keep focussed and deliver effectively and efficiently.

In 2017, the JRC strengthened dialogue with inter-institutional partners, EU Member States, H2020 Associated Countries and international partners by organising new JRC's '**Science meets regions**' and '**Science meets parliaments**' events, presenting its work to Council working parties, through 80 thematic events at its Ispra site and by closing new agreements with European research organisations and with non-EU partners, such as the Chinese Academy of Sciences, the Japanese Institute for Advanced Industrial Science and Technology (AIST), the Ministry of Energy of Israel and the National Academy of Science of Moldova. It also co-organised the 6th annual forum of the EU Strategy for the Danube region.

New initiatives on scientific development were implemented including the Centre for Advanced Studies (CAS), the Opening of Research Infrastructure (RI), and the Collaborative Doctoral Partnership (CDP). All three initiatives have generated widespread interest in the JRC among the scientific community and created a strong interest for collaboration, helping JRC gradually build up competences in emerging policy relevant areas through excellent research, extend its expert networks with industry and academia and make the best use of its facilities.

Another new instrument for scientific development, the JRC Art and Science initiative to stimulate out-of-the-box and across boundaries thinking in collaboration with artists, complemented JRC's work on fairness. The Resonances II festival and an exhibition in the Science and Technology Museum in Milan reached ten thousand people, engaging the European Commission in dialogue with the citizen on social issues such as migration.

The JRC Exploratory Research programme has evolved into a flexible instrument accommodating different types of activities of exploratory nature from well-defined projects to scoping workshops or inviting experts for short stays and activities to seed new activities. In 2017, **2.2 % of JRC's resources were used in exploratory activities** of which 25 % in emerging areas, exceeding JRC's respective targets of 2.0 % and 15 % for 2017. The first steps towards building an exploratory research community were taken. First analysis of the new types of activities indicate they strongly stimulate exploring novel approaches also in areas new to JRC.

In 2017, the JRC has made significant progress in delivering on the new Knowledge Management role envisaged by the JRC 2030 Strategy. **The JRC aims to become a global leader in the creation, management and transfer of knowledge for public policy, helping to address the concerns raised by the current 'post-fact' debate**

¹⁷ SO10 and SO 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*

and leading the campaign for evidence-informed policy. The JRC's Knowledge Centres in key policy areas (disaster and risk management; migration and demography; territorial policies; and bioeconomy) bring together policymakers and researchers to co-create answers to priority policy questions, making sense of available knowledge while better aligning research with policy needs. In an analogous way, four Competence Centres (on composite indicators and scoreboards; micro-economic evaluation; text mining and analysis; and modelling) have created unique communities focused on specific cross-cutting policy research tools, helping to develop lateral thinking across policy domains.

Through the further development of the Connected online platform and its use for the **European Semester** project, the JRC championed and promoted innovative collaborative working techniques, tackling head-on the practical, day-to-day obstacles to silo-breaking in the Commission. To promote also a cultural change, steps were taken towards developing skills in knowledge brokering at the interface between science and policy. Work on data management was enhanced, investing in innovative ways of deriving information and knowledge from the wealth of JRC research data, made available to researchers, information professionals, entrepreneurs and the general public via the JRC Data Catalogue.

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

67 % of JRC scientific publications are published in peer-reviewed journals and proceedings, the indicator value exceeding its target; 38 % of JRC's peer-reviewed articles are published in the top 10 % most-cited journals thereby exceeding the set target; and 79 % of JRC's peer-reviewed publications result from collaborations with scientists from other organisations and 27 % of JRC's peer-reviewed publications are co-authored with organisations from countries outside the European Research Area, both meeting the set target range.

Moreover, with 636 peer-reviewed publications (listed in SCI-e and SSCI, data from JRC's own records system) the JRC is well in line with its targets achieving the JRC objectives under Horizon 2020 and within typical variation over the years, inherently related to the publication process. Control with external records returns over 700 peer-reviewed articles for 2017 (Scopus¹⁸).

A complete reporting on outputs identified in the 2017 Management Plan and on objectives and indicators set up in the Strategic Plan are available in tables in Annex 12.

¹⁸ Abstract and citation database of peer-reviewed literature (Elsevier publishing company).

2. ORGANISATIONAL MANAGEMENT AND INTERNAL CONTROL

This section answers to the question *how* the achievements described in the previous section were delivered by the DG. This section is divided in two subsections.

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

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

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. Its results are explicitly documented and reported to the Director General. The reports produced are:

- Assurance Statements from Sub-delegated Authorising Officers;
- The reports from Authorising Officers in other DGs managing budget appropriations in cross-delegation;
- The contribution of the Internal Control Coordinator (ICC), 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. This 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 Director General of the JRC.

This section reports the control results and other relevant elements that support management's assurance. It is structured into (a) Control results, (b) Audit observations and recommendations, (c) Effectiveness of the internal control system, and resulting in (d) Conclusions as regards assurance.

2.1.1 Control results

This section reports and assesses the elements identified by management that support the assurance on the achievement of the internal control objectives¹⁹. The DG's assurance building and materiality criteria are outlined in the AAR Annex 4. Annex 5 outlines the main risks together with the control processes aimed to mitigate them and the indicators used to measure the performance of the control systems. Annex 10 provides extensive 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 the Table 2.1.1-1 and Figure 2.1.1-1, detailing the JRC's financing sources for 2017.

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

- contractual activities (formerly called competitive activities), in line with the Council Decision C126 of 26 April 1994 on the role of the JRC that requires that additional revenue be generated through contractual activities (up to 15 % of the institutional budget²⁰). 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-sub-delegations' 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 2017, the JRC had EUR 25 004 070 (representing 4.6 % of its total financing sources in payments) allocated to **decommissioning activities**. The JRC's decommissioning and waste management (D&WM) programme was started in 1999 under the coverage of COM(1999)114 'Communication from the Commission to the European Parliament and the Council – Historical liabilities resulting from nuclear activities carried out at the JRC under the Euratom Treaty – Decommissioning of obsolete nuclear installations and waste management'. As also explained in Annex 13, this programme aims to dismantle former, obsolete EURATOM nuclear installations (historical liabilities) as well as to plan for (and execute in the future) the long-term dismantling of installations which are still in use (future liabilities). Four JRC sites are involved i.e. Ispra, Karlsruhe, Petten and Geel.

During 2017, the JRC received **cross sub-delegated authority** to use the budgetary resources of other Directorates-General and services of the Commission. Such authorisations are linked to specific research projects or actions. The JRC has also provided cross sub-delegations to other DGs of the European Commission. In addition, the JRC has put in place horizontal and vertical co-delegations²¹ (art. 3.2 of the Internal Rules) with other Directorates-General of the European Commission. The services and amounts concerned for sub-delegations (both cross and co-delegations) are summarised in Annex 10.1. Being a Commission service itself, the JRC is required to implement the appropriations subject to the common Commission rules, responsibilities and accountability arrangements and therefore payments related to the sub-delegations

¹⁹ Effectiveness, efficiency and economy of operations; reliability of reporting; safeguarding of assets and information; prevention, detection, correction and follow-up of fraud and irregularities; and 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 32).

²⁰ The institutional budget means 'budget for JRC (direct actions) under the Framework Programme for Research'.

²¹ 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).

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.

Table 2.1.1-1. Financing sources for 2017.

ABB Activities	Description	Payment appropriations (in EUR)
10 01 and 10 02	Horizon 2020 (2014-2020) - The EU Framework Programme for Research and Innovation	255 954 477
10 01 and 10 03	Euratom (2014-2018) - Research and Training Programme of European Atomic Energy Community complementing the Horizon 2020 Framework Programme	111 360 823
10 05	Decommissioning - The Decommissioning Programme pursuant to Article 8 of the Euratom Treaty	25 004 070
EFTA States Contribution		6 327 685
Voted budget (total of above 4 headings)		398 647 055
External assigned revenue	Supplementary credits from Association Agreements to H2020 and Euratom	20 775 047
	Contractual income	87 439 480
Internal assigned revenue		4 106 038
Co- and cross-delegations received²²	Co-delegations	18 865 859
	Cross delegations	11 161 067
Grand total financing sources 2017 in payments^{23 24}		540 994 546

²² More information on co- and cross-delegations can be found in Annex 10.1.

²³ This total does not include appropriations carried over from previous exercises nor the High Flux Reactor (HFR) appropriations.

²⁴ This total includes the salary budgets of the JRC staff (officials, contract staff and seconded national experts).

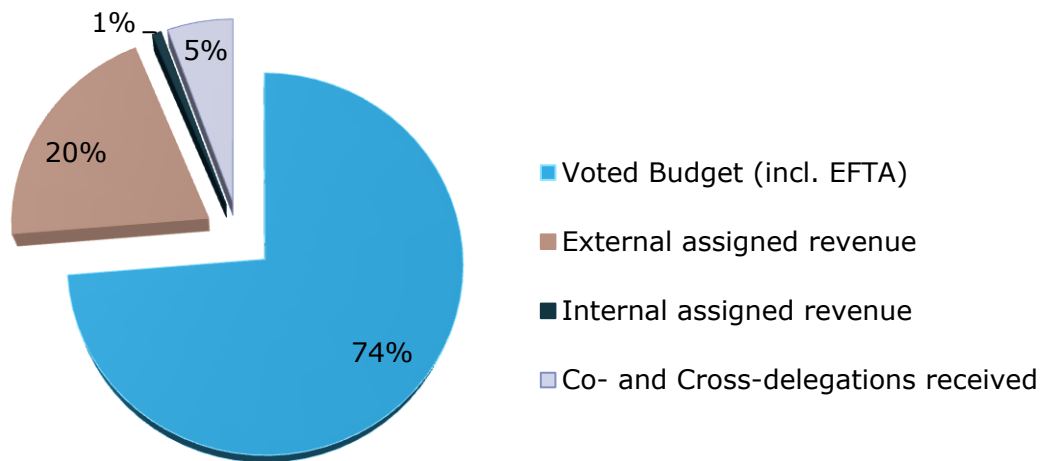


Figure 2.1.1-1. Financing sources in payment appropriations.

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. An internal control template (ICT) covering JRC's procurement is available in Annex 5. The type of procurement procedures carried out by the JRC during 2017 is described in Annex 10.2.

The JRC's operational activities, are carried out under direct management mode, which has been assessed as having a relatively low inherent risk.

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 10.3 provides details on the JRC's mandate, the type of contractual contracts and information on the contracts signed during 2017.

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. An ICT 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', which ensure that, before any operation is authorised, all aspects of the operation (both operational and financial) are verified by at least one member of staff other than the person who initiated the operation. In 2017 the JRC had 3 types of financial circuits models in place which are described in detail in Annex 10.4. The type of financial circuits chosen is determined by the nature of the financial transaction which is undertaken, as well as by geographical considerations. Circuit 1 is the model which is 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. Transactions relating to decommissioning, scientific activities and income-generating activities fall under the financial circuit 1. In any event, all staff having the role of financial agents are based in the Financial Units of the Resources Directorate. In 2017, the JRC financial circuits were revised to simplify the workflows and reflect the new organisational structure put in place in July 2016. The new version of financial circuits entered into force in January 2018.

Based on the results from the Table 2.1.1-2, the JRC concludes that the control results are factual, complete and reliable.

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).

Table 2.1.1-2. 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 ²⁵ below 0.5 %	Average error rate below 0.5 %	Positive conclusion
Cost-effectiveness of controls	Positive conclusion (Costs/total payments executed) = 6.28 %)	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 210 670 923	EUR 87 571 357²⁶	EUR 247 454 907
<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 Coverage of the Internal Control Objectives and their related main indicators

i. Control effectiveness as regards legality and regularity

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 concerned. In order 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.

²⁵ For the estimation of the Average error rate the reader is referred to Table 2.1.1.1-2.

²⁶ This value represents the revenue cashed from contractual activities in 2017, 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.

Procurement in direct management mode

Financial management and control of 'Procurement in direct management mode' (Annex 5 ICT 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;
- accounting controls;
- ex-post supervisory controls; and
- the Assurance Statements from Sub Delegated Authorising Officers.

Exception reporting

Control overrides or deviations from standard policies and procedures are tracked and recorded as reports in the 'register of exceptions'. When signalling an exception²⁷ or a non-compliance event²⁸, managers are required to report on any envisaged corrective measures and/or follow-up actions. The follow up of the exceptions and other non-compliance events is part of the regular reporting of the authorising officers by sub delegation to the authorising officer by delegation. The 'register of exceptions' is regularly reviewed to determine whether the frequency or the nature of the exceptions registered should prompt a revision of the JRC's procedures.

In total 65 exceptions and non-compliance events were recorded in the central register in the JRC in 2017 and 21 of these were classified as exceptions, being the majority non-compliance events, i.e. errors. 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. 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 2017 with 29 155 transactions and most of them were payments: 21 618. The exceptions and non-compliance events amount to 0.22 % of the total number of transactions, meeting the target set in the Management Plan (less than 1 % of transactions subject to exception).

The reporting year showed a decrease of 37 % in the number of non-compliance events registered.

The Public Procurement Advisory Group (PPAG)

The Public Procurement Advisory Group (PPAG) is a consultative body providing support for the correct application of tendering procedures. It is regarded as a key ex-ante control for the JRC which ensures the respect of the procurement principles. The PPAG must be consulted with regard to procurement files for high value contracts

²⁷ An exception constitutes a conscious decision to act against the procedures.

²⁸ A non-compliance event may be detected after the event, when the rules have already been broken and it generally originates from errors or weaknesses in the control system.

(≥ EUR 500 000) and for some negotiated procedure contracts based on Article 134 (1) RAP. In addition, contracts between EUR 60 000 and EUR 500 000 and contracts deriving from some negotiated procedures (for additional services/works, repetition of similar services/works, additional supplies) and for all cases based on Articles 135 (1), 136a RAP and 136 (1) (a) and (b) RAP are also submitted to the PPAG for advise, on the basis of a sampling system using a risk-based method.

In 2017, 83 files were screened by the PPAG, representing a value of approximately EUR 126 Million. In the vast majority of cases, 79 files (95 %), this scrutiny resulted in a favourable opinion being issued, which confirms the positive trend in the past years and the level of quality of the JRC's procurement procedures submitted to the PPAG.

There were however 3 files for which an unfavourable opinion was issued. The unfavourable opinions were associated to selection criteria and minimum requirements not met, potential unequal treatment of candidates, non-conformity in comparison to the Contract Notice announcement and non-rejection of the offer received. The errors are generally rectified by the cancellation and re-launch of the procedure based on the specific recommendations from the PPAG. Indeed 2 out of 3 procurement procedures were cancelled. One is in the process of being re-launched and the other was re-launched following the recommendation of the PPAG. However for 1 case out of the 3, the Authorising Officer considered that none of the PPAG remarks were indicative of a significant legal or reputational risk and decided, for operational reasons, to overrule the PPAG's opinion by awarding the contract by means of a '*passer-outre*'. There were as well 3 files which were suspended for further analysis. In 2 cases the suspended opinions became favourable ones as final outcome, while 1 file is still suspended.

During the reporting year there has been 1 case in which the Authorising Officer decided not to submit a file to the PPAG, even though submission was compulsory. In the concerned case, a contract in the specialised nuclear sector market, representing 0.1 % of the JRC's total value contracted, a negotiated procedure was followed and the PPAG was informed accordingly.

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 controls carried out in 2017 have followed the Annual Accounting Quality Plan. The controls performed are additional to the ex-ante controls performed by Financial Verifying Agents and Sub Delegated Authorising Officers on each transaction, in compliance with the Financial Regulation.

The controls on the General Ledger (GL) account of invoices were performed on a sample²⁹ of payment transactions equivalent to 66.3 % of the monetary value of invoices and internal documents registered by the JRC.

Assets wrongly treated as expenses errors found in the sample having an impact on the accounts amounted to EUR 4.2 million and these were duly corrected. The estimated errors on the remaining invoices and documents not sampled (33.7 %) is estimated at EUR 2.13 million.

Errors where a wrong Economic Outturn category (operational vs administrative expenditure) was chosen, amounted to a net EUR 164 123 and these were considered immaterial and thus not subject to a required correction as per EC accounting closure guidelines but documented for internal and audit purposes. Additional checks on the administrative expense category revealed a total amount of EUR 2.3 million. Corrections

²⁹ Using a risk-based sampling methodology.

were done and the correct administrative GL account was chosen. This type of error has no impact on the accounts.

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 %, thus confirming the reliability of the JRC's accounts. It is important to highlight that all the errors mentioned above are of an accounting reclassification error and which do not lead to irregular payments.

There are no more open recommendations in the context of Directorate-General for Budget (DG BUDG)'s validation of local systems as these have been satisfactorily closed during 2017.

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 ex-post controls strategy is implemented using a representative stratified sampling methodology at site/sector level (1 file for payments lower than EUR 1 000; 2 to 3 files for payments between EUR 1 000 and EUR 15 000; 4 to 5 files for payments between EUR 15 001 and EUR 60 000; 4 to 5 files for payments between EUR 60 001 and EUR 135 000; 3 to 4 files for payments above EUR 135 000 and 2 files for payments corresponding to the 10 highest value time). The sampling is done at JRC site level (Brussels, Geel, Petten, Karlsruhe, Seville and Ispra) with an additional split for Ispra to cater for the two Ispra finance and procurement sectors. The two Ispra sectors are subject to the review of an additional ex-post controller, as a result of the importance in size and the number of files sampled.

In 2017, ex-post controls were carried out on 120 sampled payments³⁰ and 59 associated procurement files related to legal commitments (including specific contracts on framework contracts) entered in the course of the year. The procurement procedures are also subject to the ex-ante verification of the PPAG and during the reporting year procurement procedures of approximately EUR 126 million were screened by the PPAG.

Whilst a variety of formal errors were noted, no systematic errors or weaknesses in the JRC's control system were observed and no procurement issues were identified. The findings relate mainly to the lack of certain formalisation aspects in the finalisation of the procedures which did not lead to a financial loss for the JRC and *saisines a posteriori* situations, of a small financial value, where the budgetary commitment was made after the legal commitment. The only quantifiable error detected was the application of an incorrect exchange rate for the reimbursement of an expert which resulted in an insignificant error of less than EUR 10. The JRC's detected error rate is 0 % confirming the trend of the past years and indicating that there are no issues concerning the JRC's procurement and payments activities. The ex-post findings have been discussed with the units concerned and an agreement on both the findings was reached. Corrective actions will be taken and the formalisation aspects noted from the ex-post supervisory controls will be included as part of the ongoing training courses and lessons learnt, thus leading to continuous improvement in the procurement process.

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

Details of the 2017 ex-post controls exercise can be found in Table 2.1.1.1-1.

³⁰ Includes payments carried out by JRC using cross sub-delegations received.

Table 2.1.1.1-1. Results of 2017 ex-post controls.

Sampled transactions	Sample size: number	Sample size: value (EUR)	% of total value of transactions	Detected error rate (% of total)
Payments	120	23 106 364	10.97 %	0 %
Procurement	59	8 155 784	1.55 %	0 %

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 %**.

The Assurance Statements from Sub Delegated Authorising Officers

Assurance statements were provided by the JRC's sub delegated authorising officers in compliance with the reporting requirements detailed in the 'Charter of tasks and responsibilities of authorising officers by sub delegation'³¹. The 121 officers concerned include all of the JRC Directors, most of the Unit Heads and other key decision-making staff. All officers provided an assurance statement in due time and all of them have assured the Director General that in exercising their duties:

- they have effectively managed the risks associated with their activities;
- they were not aware of any matters of importance which might compromise the sound management of appropriations or prevent the attainment of objectives;
- they have filed under their authority exceptions/non-compliance events linked to not respecting standard procedures, rules and regulations, if any;
- a request for written confirmation³² has never been formulated;
- they have not noted incidents which could damage the reputation of the organisation.

Around 80 % of the officers have completed the trainings in internal control and risk management, and the rest have committed to participate during 2018. Only seven officers, one of whom newly appointed, have not yet participated in the financial training on the expenditure lifecycle and the majority are expected to participate in 2018. Out of the other six, two are at the point of retirement and will not follow the training. Training on ICS was not available during 2017 due to the transition towards the new ICF. The EC trainings on ICF started around the last quarter of 2017.

During 2017, eleven authorising officers ceased to act as such, out of whom 7 left the JRC (4 on retirement); 16 new were appointed. Out of the 16 staff members that declared taking up new functions and duties in 2017, the 13 officers who should receive (predecessor existed) a complete report in writing on the situation, risks and problems related to their functions, did. The remaining 3 officers took up new functions where no predecessor existed.

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.

³¹ With particular reference to sections 4.1, 4.3 and 4.8

³² In accordance with the requirements of Article 66(8) of the Financial Regulation

Financial management and control of the JRC's revenue operations through contractual activities (Annex 5 ICT 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 revenue³³) 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 (as mentioned above under the description on the Procurement controls), i.e. exception reporting, PPAG controls for supplies/services procured for carrying out contractual activities, accounting controls, ex-post controls on related payments and procurement, and the AOSD statements. None of these controls unveiled errors with impact on compliance of the revenue transactions.

During 2017, as a result of the JRC's financial circuits, 5 % of the forecast of revenue transactions and 3 % of recovery orders³⁴ (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 2017, the independent auditor certified 16 financial statements submitted to the policy DGs, for a total amount of EUR 7.9 million. None of these independent controls unveiled errors with impact on legality and regularity of the revenue transactions.

According to the Financial Regulation, the appropriations inscribed for Administrative Arrangements with other Commission Services are valid for 5 years. In 2017, commitment appropriations of EUR 103.8 million and EUR 60.8 million payment appropriations have been generated. During the same period EUR 66.3 million and EUR 51.1 million have been used in commitment and payment appropriations respectively. The remaining appropriations in commitment and payments have to be used within the next 4 years and any unspent appropriation will be cancelled at the beginning of 2022. 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.

ii. 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,

³³ 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).

³⁴ 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.

the DGs' estimated overall amounts at risk and their estimated future corrections are consolidated. For the JRC, the estimated overall amount at risk at payment³⁵ for the 2017 expenditure is EUR 1 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 expenditure³⁶ during the year (EUR 207 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 corrections³⁷ for the 2017 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 0.93 million.

Details of the JRC's estimated overall amount at risk at closure and estimated future corrections can be found in Table 2.1.1.1-2.

³⁵ In order to calculate the weighted average error rate (AER) for the total *relevant expenditure* in the reporting year, the *detected* error rate has been used.

³⁶ '*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.

³⁷ 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 2.1.1.1-2. Estimated overall amount at risk at closure.

JRC	Payments made in 2017 (EUR)	<i>Minus</i> New ³⁸ prefinancing (EUR)	<i>Plus</i> Cleared ³⁹ prefinancing	= ' relevant expenditure ' ⁴⁰ for 2017 (EUR)	Average Error Rate (<i>weighted AER</i> ; %) ⁴¹	estimated overall amount at risk <i>at payment</i> (EUR)	Average Recoveries and Corrections (<i>adjusted ARC</i> ; %)	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		<i>As per ABAC DWH BO report on prefinancing</i>	<i>As per ABAC DWH BO report on prefinancing</i>	= (2)-(3)+(4)	<i>Detected error rates, or equivalent estimates</i>	= (5) x (6)	<i>based on 7Y-avg historic ARC (as per ABAC DWH BO report on corrective capacity)⁴²</i>	= (5) x (8)	= (7) - (9)
Total payments	210 670 923	(4 792 746)	884 949	206 763 126	0.5%	1 033 816	0.05%	103 382	930 434

³⁸ New PF actually paid by out the DG itself during 2017 (i.e. excluding any PF received as transfer from another DG)

³⁹ PF actually having been cleared during 2017 (i.e. their 'delta' in 2017 'actuals', not their 'cut-off' based estimated 'consumption')

⁴⁰ 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 2017. This is a separate and 'hybrid' concept, intentionally combining elements from the budgetary accounting and from the general ledger accounting.

⁴¹ 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 %.

⁴² 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.

2.1.1.2 Cost-effectiveness and efficiency

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

The principle of efficiency concerns the best relationship between resources employed and results achieved. The principle of economy requires that the resources used by the institution in the pursuit of its activities shall be made available in due time, in appropriate quantity and quality and at the best price. This section outlines the indicators used to monitor the efficiency of the control systems, including an overall assessment of the cost-effectiveness of controls.

i. Procurement in direct management mode

Cost-effectiveness of controls

The JRC has produced an estimation of the costs of control of the three main stages related to 'procurement in direct management mode'⁴³. The criteria for the calculation and the indicators used are shown in Annex 5 ICT No 1.

However, since a quantitative estimation of the volume of errors prevented and detected is not available, 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.

In consequence, as it is not possible to determine the cost-effectiveness of controls by comparing costs with benefits, 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 5 335 543 were invested in controlling 338 procurement procedures for contracts with a total value of EUR 166 129 224. Thus 3.21 % 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 10.8% compared to last year which is complemented by a decrease in the number of procurement procedures closed during the year. The decrease is mainly due to the fact that the contract value of the procurement procedures closed during the year was lower and a certain number of procedures were of a less complex nature. 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 (ICT 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 7 797 543 were invested in controlling 29 155 financial transactions worth EUR 210 670 923. Thus 3.7 % of the total payment amount was dedicated to control. Despite the increase of 4.3 % in the average cost of staff, the overall cost invested in controlling financial transactions has decreased by 1.27 % which is complemented by the fact that the number of financial transactions decreased by 5.33 % compared to last year. Each financial transaction costs an estimated EUR 267, which is 4.29 % higher when compared

⁴³ The costs of control have been estimated using DG Budget's guidance on the minimum set of cost-efficiency indicators.

to 2016.

- For supervisory ex-post measures an estimated EUR 93 759 were invested in controlling 179 financial transactions worth EUR 31 262 184. Thus 0.3 % of the total values of transactions checked ex-post were dedicated to control. Each transaction or procedure checked ex-post costs an estimated EUR 524, which is in line with the cost of a transaction or procedure checked last year and is considered as reasonable.

The overall cost of control related to 'procurement in direct management mode' in 2017 was EUR 13 226 846, which represent 6.28% of the total payments executed by the JRC during the year. The overall cost of control decreased by 5% compared to 2016.

The JRC concludes positively on the cost-effectiveness of the procurement control system and on its completeness and reliability.

The benefits of control in non-financial terms cover: rejection of unjustified purchases, better value for money, deterrents efficiency gains, limiting the risk of litigation and fraud, respect of contractual provisions, system improvements and, as mentioned above, compliance with regulatory provisions.

The JRC has reached a positive conclusion on the cost-effectiveness of the control system of 'procurement in direct management mode' and on its completeness and reliability.

Cost-efficiency

93 % of all invoices received in 2017 were paid on average 19 days after receipt which is within the contractual time limits according to the financial regulation and a value slightly lower than the 2016 and 2015 payment delays rate. This minor decrease compared to the average of the last 2 years (94 %) is partially attributed to some problems which the JRC faced during the course of 2017 as a result of the introduction of the Expert Management Internal (EMI) tool which is used for paying fee paid experts. In the meantime these problems have been solved. Constant efforts are made to ensure that the vast majority of the payments are made within the legal time limits. The JRC has reached a positive conclusion on efficiency of time to pay.

In 2017 the JRC paid 93 % of invoices on average 19 days after receipt. Positive conclusion on efficiency of time to pay.

ii. Revenue operations through contractual activities

Cost-effectiveness of controls

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 in Annex 5 ICT 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 30 030 were invested in assessing the risk and reviewing 168 contractual project proposals with a total value of EUR 116 478 307. 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 179 per proposal. For support to omission 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 0.09 % 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 15 015 were 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 89 per contract. For the financial circuits carried out on forecasting of revenue, an estimated EUR 27 750 was invested in controlling 207 forecasts of revenue (FORs) worth EUR 116 478 307. Thus 0.02 % of the total forecast of revenue amount was dedicated to control with an estimated cost of EUR 134 per FOR transaction.
- For the contract implementation phase, an estimated EUR 68 238 were invested in monitoring budget consumption of the contractual contracts and reviewing the recovery orders (ROs) issued, which represents 0.08 % of the RO values.
- As ex-post controls, an independent auditor carries out 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 amounted to EUR 24 000 representing 0.3 % of the value of contractual projects audited.

The overall cost of control related to 'revenue operations from contractual activities' in 2017 was EUR 193 812, which represents 0.22 % of total contractual project cashed value for the year. The overall cost of control indicator has dropped from last year's indicator value of 0.3 %, due to a reduction in the number of proposals for a similar cashed value.

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 (ICT No 2).

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.

The JRC has reached a positive conclusion on the cost-effectiveness of the control system of 'revenue operations through contractual activities' and on its completeness and reliability.

Cost-efficiency

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

The contractual cashing indicator (as a percentage of the institutional budget) has decreased from 24.11 % of last year to 23.51 %, 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.

iii. Conclusion on cost-effectiveness and efficiency

The main results and indicators on cost-effectiveness and efficiency are summarised in the following table (Table 2.1.1.2-1).

Table 2.1.1.2-1. Results of cost-effectiveness and efficiency.

Internal Control Template	Procurement in direct management mode	Revenue operations through contractual activities
Amount	EUR 210 670 923	87 571 357 ⁴⁴
Cost of ex-ante controls	EUR 13 133 086	EUR 169 812
Cost of ex-post controls	EUR 93 759	EUR 24 000
Estimated overall cost of controls	EUR 13 226 846 (6.28 %)	EUR 193 812 (0.22 %)
Cost-efficiency indicators	93 % of invoices paid within 19 days	Contractual cashing indicator of 24.11 %
Ratio of estimated cost of controls on procurement and revenue / relevant funds managed (total payments and revenue)	EUR 13 420 658 / EUR 298 242 280 = 4.5 %	

The JRC concludes positively on the cost-effectiveness and efficiency of the control system after carrying out an analysis of the evolution of the efficiency and cost-effectiveness indicators from 2016 to 2017, and took into account also the results obtained since 2014.

The JRC will elaborate and implement the necessary measures to continue analysing the evolution of these efficiency and cost-effectiveness indicators over time and/or to compare them with relevant benchmarks. The various simplification actions undertaken during 2017 are starting to have a positive impact on the cost-effectiveness of controls, for example the elimination of a redundancy in certified correct workflows of invoices (paper and electronic) which is estimated to save approximately 1 000 workflows per year. In addition increasing authorisation ceilings for deputy and unit head AOSs in the revised financial circuits (entered into force in January 2018) ensures that several hundreds of transactions per year are authorised closer to operational initiation and verification. This is in line with the requirements of Art.66.2 of the Financial Regulation.

Based on an assessment of the most relevant key indicators and control results, the JRC reached a positive conclusion on the cost-effectiveness and efficiency of its control system.

2.1.1.3 Fraud prevention and detection

The JRC has developed and implemented its own anti-fraud strategy (AFS) since 2013, elaborated on the basis of the methodology provided by OLAF. At the end of 2017, the JRC's anti-fraud strategy and its action plan were updated in order to contribute to the Commission's anti-fraud strategy update and take into account the latest OLAF's methodological guidance in this respect.

The implementation of the AFS and its complementary action plan is monitored regularly throughout the year and reported to the JRC's Internal Control Coordinator. The actions

⁴⁴ This value represents the revenue cashed from contractual activities in 2017, 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.

which had not been fully implemented were taken into account in the JRC's updated AFS. It is important to note that fraud risks are monitored as part of the JRC annual risk assessment exercise as well. The 2017 JRC risk assessment exercise did not identify any substantial changes in the assessment of the fraud risks.

In principle, the controls aimed at preventing and detecting fraud are similar to those intended to ensure the legality and regularity of the transactions. Still, each year the JRC assesses the risk of fraud in the context of its process-based risk management exercise. Activities and operations that are assessed to be potentially vulnerable to a higher risk of fraud are subjected to more in-depth monitoring and control.

In 2017, the JRC updated the Anti-Fraud Strategy and its complementary action plan.

The main focus of the action plan is on the reinforcement of the anti-fraud component in the organisation's business processes and on an awareness-raising campaign, including training, in the area of anti-fraud and ethics. During 2017, the awareness-raising campaign included the aspect of 'scientific integrity' which features as a key value in the JRC Strategy 2030.

As part of the annual assessment of the implementation of the Internal Control Standards within the JRC, with respect to the ethical climate, the anti-fraud awareness of staff was measured against a target of 4, using the rating scale of 1 for fully disagree to 5 for fully agree or equivalent. The results from the annual assessment demonstrated a rating of 3.97 for all staff, 4.45 for management and 3.75 for staff (other than management). Compared to last year, the 2017 the results evidenced a slight decrease in the anti-fraud awareness. It should be noted that as a result of the updated JRC's AFS a revised awareness campaign is ongoing that aims at improving these results.

At the end of 2017, 4 cases involving JRC were pending regarding OLAF and IDOC matters. One of these cases has been assessed by OLAF which finally decided not to open an investigation. Nevertheless, OLAF has suggested that this case can be investigated by IDOC. During the reporting year IDOC has closed definitively 4 other cases. All cases have no impact on the JRC assurance.

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 2017.

2.1.1.4 Other control objectives: safeguarding of assets

The JRC is spread over 6 sites in 5 different countries with a total number of fixed assets of about 54 000 with a value of EUR 203 million (as reported in the JRC's Balance Sheet in Annex 3, Table 4). The fixed assets are 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, i.e. accidents, unauthorised access, intentional acts against safety and security including against the protection of sensitive documents. Regular safety inspections are being carried out on JRC sites regarding laboratory facilities and hazardous materials, by the JRC itself, external consultants and visits by national authorities. Organisational measures are implemented to ensure that access to JRC sites and critical assets are controlled. Personal security clearances are issued to those staff required to deal with classified information. Certification of laboratories and institutes to internationally recognised quality management standards helps to offset risks and ensure compliance with norms and regulations.

The JRC assets comply with the following criteria: a) acquisition value above EUR 5 000; b) controlled by the JRC, c) expected to be used during more than one reporting period. Items with an acquisition value below the EUR 5 000 threshold are booked as expenses

in the accounts. Nevertheless the JRC records them in the Inventory System (ABAC ASSETS) in order to have control over sensitive items.

The organisation of asset management in the JRC is determined by the nature of the activities. There is a management centre per operational site, having functions as Inventoried Items Manager/Gestionnaire des Biens Inventoriés (IIM/GBI). Each site has a Write-Off Committee that supervises the site asset management activities and issues an annual activity report. The JRC asset manager and the JRC accountant provide support and coordination to the operational sites and liaise with the Commission Services in matters concerning asset management.

The regulations (ref. art. 250 of the RAP and art. 157 of the FR) stipulate that physical localisation checks of the inventoried items shall be carried out at least on a three-year basis, which is respected.

The JRC owns stock with a value of EUR 45 million (as reported in the JRC's Balance Sheet in Annex 3, Table 4).

The JRC site in Geel produces reference materials for sale. A specific IT tool, PROFIT, is used for the management of stock and sales of reference materials. The valuation of the JRC stock is carried out, according to International Public Sector Accounting Standards (IPSAS) rules at the net realisable value, which is estimated to be lower than the production cost. The stocktaking in 2017 was carried out in accordance with the approved sampling procedure using a method which had not been subject to a finding from ECA during their Statement of Assurance (DAS) audits.

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 JRC has a stock of nuclear fissile materials for research purposes in its sites in Geel, Karlsruhe and Ispra. A dedicated accounting tool is used to ensure that all requirements of the Euratom agency are met which guarantees the correctness of the stock movements of these materials.

The Central Workshop Store in Ispra manages a stock of raw-materials, using the store management application COSWIN, which is used in the scientific laboratories and for site management purposes.

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.

2.1.2 Audit observations and recommendations

This section reports and assesses the observations, opinions and conclusions reported by the auditors in their reports as well as the limited conclusion of the Internal Auditor on the state of control, which could have a material impact on the achievement of the internal control objectives, and therefore on assurance, together with any management measures taken in response to the audit recommendations.

2.1.2.1 IAS and former IAC audits

New audits during reporting period

During 2017, the IAS issued 2 new audit reports: one on IT Security on JRC ICT systems and one on scientific project management.

The 2 audits resulted into the formulation of 8 recommendations, out of which 5 were rated as very important (Table 2.1.2.1-1). No critical recommendations were identified. The JRC has drawn up the appropriate action plans to address the auditors' recommendations. Both action plans were assessed favourably by the auditors.

Table 2.1.2.1-1. Recommendations in new audit reports

New audits	Recommendations by rating	
	Very important	Important
IT Security on JRC ICT Systems	4	0
Scientific Project Management	1	3
Total	5	3
Grand total	8	

Four very important recommendations were issued from the audit on the IT Security on JRC ICT Systems, namely: No 1) Management oversight of IT Security; No 2) IT security considerations built into the design of new IT systems as well into the maintenance of existing systems; No 3) Deployment of security reference configurations and monitoring of new vulnerabilities, and No 4) Inventory of JRC IT systems and their security dependencies.

The IAS reported in its limited conclusion on the state of internal control that 'particular attention should be given to the combined effect of the four 'very important' recommendations on IT security, which led the IAS to conclude that the controls in place do not currently provide sufficient assurance that IT security risks are adequately mitigated.'

However, the JRC immediately after the submission of the IAS audit report⁴⁵ and as per the audit recommendation action plan scheduled deadline, established the ICT Governance to guarantee the oversight of IT Management. The Committee's decisions have and will determine the implementation of the 28 actions described in the JRC Action plan on IT Security; due to the nature of the process (important technical aspects, resources allocation and coordination with Directorate-General for Informatics – DG DIGIT), its implementation is scheduled to be completed by the end of 2018. Currently 30 % of the recommendations have been implemented.

The audit on scientific project management⁴⁶ lists 1 very important recommendation

⁴⁵ Finalised in January 2017

⁴⁶ Finalised in December 2017

(No 3) which refers to improving the process of monitoring the execution of the work programme and scientific work packages by designing and implementing adequate project management monitoring practices and by providing JRC-wide guidance for monitoring at work package, unit and scientific directorate levels. The appropriate JRC action plan was submitted to the IAS in mid-January 2018; clarifications were requested from the latter and the revised action plan was deemed to be satisfactory to mitigate the risks identified.

Finally, 2 more audits were announced, to be finalised within 2018: 'Nuclear Decommissioning & Waste Management – Programme implementation', which is currently at the preliminary survey stage and one on the state of play regarding the 'Synergies and efficiencies review'⁴⁷.

IAS follow-up audits

During the reporting period the IAS performed several follow-up audits (see Table 2.1.2.1-2). The most important developments, specifically for those audits having very important recommendations are:

i) The follow-up audit on 'Intellectual Property Rights (IPR)' was concluded by closing one very important recommendation as adequately and effectively implemented. This recommendation was overdue for more than 4 years and was the only pending one of this audit. It referred to the non-infringement of prior existing copyrights or other IPR from third parties before the final approval for publication. In order to achieve a more robust check on non-infringement of intellectual property rights on articles to be published, the JRC introduced an explicit requirement in the publishing procedure and in the supporting tool (PUBSY). The IPR issue is now checked by JRC approval actors.

ii) The audit 'Nuclear Decommissioning and Waste Management (NDWM) Programme - Financial Aspects', encompassing all JRC nuclear decommissioning activities, was issued by the former IAC in June 2015 and included 4 very important recommendations, namely Nos 1, 2⁴⁸, 3 and 5 and 2 important ones, Nos 4⁴⁹ and 6⁵⁰. During the 2016 follow-up audit performed by the IAS, recommendations 2 and No 4 were assessed as fully implemented whereas recommendation No 5, considered as partially implemented, was reopened and downgraded to 'important'. Recommendation No 6 was closed as obsolete. During 2017, the JRC implemented all pending recommendations: 2 very important (No 1 and No 3) and 1 (No 5) important which led the IAS to close the audit deeming all recommendations adequately and effectively implemented.

The IAS launched a new audit in 2017 on NDWM Programme Implementation to be concluded in the course of 2018.

iii) As regards the implementation of a very important recommendation issued by the IAS in October 2015 on Strategic Planning and Programming/Activity Based Management (SPP/ABM), a number of actions were undertaken to reinforce the quality control on the SPP Cycle. In particular, the indicator system was centralised under one Unit and indicator guidelines were drafted clarifying the roles and responsibilities of the process owners and of the coordinating unit. The indicator set used in the planning documents (Strategic Plan/Management Plan) was modified in response to the IAS recommendation regarding the consistency and completeness of indicators and targets. Discussions with DG Research and Innovation (RTD) were concluded regarding the calculation of the

⁴⁷ Corporate Audit across the EC.

⁴⁸ Procurement delays.

⁴⁹ Analysis of future decommissioning liabilities on plans proposing investments in nuclear infrastructure.

⁵⁰ JRC should clarify with Direzione Tecnica and Commissione Tecnologie Nucleari e Radioprotezione of UNI which requirements of the future standard 11510 are realistically achievable for the Ispra Site Nuclear Decommissioning Programme, on top of the existing regulatory requirements.

indicator 'Number of peer-reviewed publications in high impact journals' as recommended by the IAS. This recommendation was reviewed and closed by the IAS as adequately and effectively implemented.

iv) The follow-up audit on 'Decommissioning: Risk and project management at the Ispra site' concluded that the 1 very important recommendation, which had been reopened during 2016, should be closed, as adequately and effectively implemented. This recommendation, referred to the definition of a full strategy for guaranteeing a pool of qualified project leaders, comprising a plan for their training and motivation, and ensuring adequate back-ups. The requested remedial actions were implemented (training plan and the back-up scheme). All recommendations under this audit are now closed.

Overall, during the reference period the JRC submitted to the IAS for review 20 implemented recommendations out of which 5 very important. 13 of these recommendations were closed including 4 long overdue very important recommendations. In the beginning of 2018, the IAS review on the remaining 7 recommendations is ongoing.

Summary of the 'Nuclear Decommissioning and Waste Management (NDWM) Programme - Financial Aspects' audit recommendations and actions taken to implement them:

Recommendation No 1: The auditors observed that delays in the programme are the major cause of financial risk and requested the JRC to coordinate an in-depth review of the decommissioning budget. By the end of 2017, the JRC completed a full review of its NDWM Strategy of nuclear sites and the related budget, paying special attention to the assessment of fixed costs and the improvement of estimates. The exercise included all JRC sites with nuclear activities.

Recommendation No 3: In order to face the decreasing practical and regulatory support of the Italian authorities to the programme development, senior management was recommended to design a communication strategy towards the Italian authorities. Indeed, this strategy was adopted in view of improving interactions with both authorities and stakeholders.

Recommendation No 5: As human resources are essential for the long-term success of the Nuclear Decommissioning & Waste Management (NDWM) Programme, the JRC was advised to define a staffing strategy covering mid-term needs (5-10 years). The staffing strategy for the Ispra site (the major JRC site with nuclear research activities) was completed. By the end of 2016, the IAS reopened this recommendation by suggesting the extension of the adopted strategy to the other sites with nuclear research activities and downgraded the recommendation to 'important'. A staffing strategy document covering needs and expected development for all concerned sites was adopted at the end of 2017.

Table 2.1.2.1-2. State of play as at 15.03.18 of implemented and submitted to the IAS for review recommendations.

JRC Recommendations Implementation ⁵¹		Important	Very Important	Closed by the IAS	Pending IAS review
1.	Management of expert groups	3		3	
2.	Document Management	3		3	
3.	Decommissioning and Waste Management – Financial Aspects	1	2	3	
4.	Procurement management	2		2	
5.	Strategic Planning and Programming/Activity Based Management	4	1	3 ⁵²	2
6.	Intellectual Property Rights		1	1	
7.	Decommissioning Risks & Project Management -Ispra	1	1	2	
8.	Competitive activities	1			1
Total		15	5	17	3

The JRC still needs to implement 14 recommendations (Figure 2.1.2.1-1) out of which 5 very important and as already reported above none of these very important recommendations is overdue. The remaining 9 important recommendations refer to the following audits:

- Document Management⁵³ (2 recommendations),
- Intra-Muros Management⁵⁴ (1 recommendation),
- Competitive Activities (3 recommendations), and
- Scientific Project Management⁵⁵ (3 recommendations).

Conclusion

The significant number of measures the JRC has taken resulted in completing the majority of the overdue recommendations and considerably improved the situation compared to previous year (see Figure 2.1.2.1-1).

Significant improvement compared to 2016 but IT Security audit still entails an element of residual risk.

Beyond the quantitative improvement, the JRC enhanced its qualitative performance as well through the endorsement of appropriate measures to mitigate risks. All recommendations reviewed by the IAS in 2017 and at the beginning 2018 were closed.

To conclude, based on all work undertaken by the IAS during 2017, the latter expressed

⁵¹ By implementation means that the JRC has completed all mitigating actions agreed and has submitted these actions to the IAS for review. The outcome of the IAS review could be:

- a) to close the recommendation as adequately and efficiently implemented,
- b) to reopen it as non-efficiently implemented or
- c) to reopen and downgrade it (applicable to 'very important recommendations' only).

⁵² 1 Very important and 2 Important

⁵³ Audit issued by the former IAC

⁵⁴ Multi-DG audit

⁵⁵ Final IAS report issued on 15/12/2017

in its *limited conclusion on the state of internal control* that the internal control systems audited are partially effective since a number of 'very important' recommendations remain to be addressed in line with the agreed action plans (as described above). The residual risks related to these recommendations may affect one or several internal control principles and/or components.⁵⁶ As requested, particular attention is being given to the combined effect of the 4 very important recommendations analysed above for the audit on IT Security in the JRC ICT Systems for which the action plan is under implementation. The JRC is putting significant efforts in adequately and efficiently addressing the risks related to the ICT Management. Given that big part of the actions due for 2017 were implemented and the most crucial point of guaranteeing the oversight of IT Management was dealt with, the pending actions for this audit do not have an impact on the achievement of the internal control objectives.

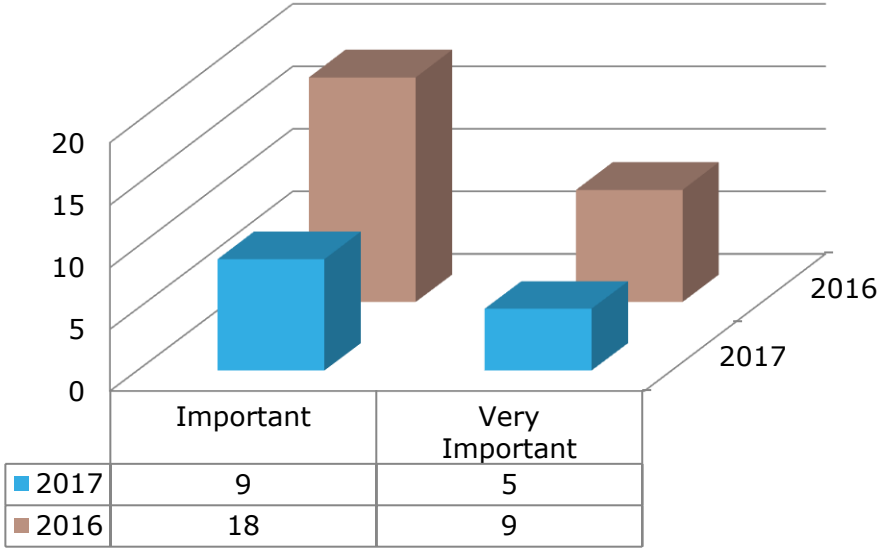


Figure 2.1.2.1-1. Overview of open audit recommendations in the JRC⁵⁷. 1 of the 2017 very important recommendations and 3 of the 2017 important were issued at the end of 2017.

2.1.2.2 ECA audits

ECA's Annual Report

As part of the Statement of Assurance for 2017 (DAS 2017), the ECA reviewed 2 JRC transactions for which the review is currently ongoing.

In the context of DAS 2016 (finalised during the first half of 2017), the ECA had reviewed 4 transactions (3 payments including the related procurement procedures and salary payments to grant holders) of the JRC. For these transactions, no finding was reported by the ECA.

Follow-up of ECA recommendations

During 2017 the JRC followed up and implemented the recommendation to the Special Report (SR) No 25/2016 'The Land Parcel Identification System: a useful tool to

⁵⁶ As the Commission's newly adopted Internal Control Framework will become fully applicable only as from 01/01/2018, 2017 is a transitional year for which the JRC has opted to report on the previous Internal Control Standards and not on the new Internal Control Principles.
⁵⁷ Cut-off day for 2016: 31/01/2017 and cut-off day for 2017: 31/01/2018

determine the eligibility of agricultural land - but its management could be further improved'. The ECA had specifically addressed to the JRC the improvement of the representativeness of the Quality Assessment (QA) samples. The revised sampling methodology considered the ECA's cost-benefit concerns and was fully implemented in the 2017 Land Parcel Identification System (LPIS) QA campaign.

The JRC is continuing its contribution as associated DG, together with other Commission services, in the implementation of 2 recommendations to SR No 14/2014 'How do the EU institutions and bodies calculate, reduce and offset their greenhouse gas emissions'.

Special reports issued by ECA in 2017

The JRC is an associated DG together with other Commission services in the implementation of 1 audit recommendation to the SR No 21/2017 'Greening: a more complex income support scheme, not yet environmentally effective'. The Special Report used a number of data from JRC studies to support and demonstrate the ECA's observations and the implication for JRC as a result of this report will be increased JRC support to the future CAP reforms and their implementation.

The JRC was quoted positively in the SR No 19/2017 'Import procedures: Shortcomings in the legal framework and an ineffective implementation impact the financial interests of the EU'. The JRC was not audited directly for this Special Report but it is clear from the report that the JRC tools were used extensively by the auditors in carrying out their audit. Indeed the Special Report recommends the JRC methodology for estimating fair prices (THESEUS) could be used as a basis to estimate the EU customs gap. Secondly, the ECA has confirmed the positive contribution of ConTraffic as a tool for the detection of customs fraud of type mis-description of origin.

Ongoing audits

The ECA is also carrying out the following audits for which JRC is involved as associated DG:

- Mitigating chemical, biological, radiological and nuclear (CBRN) risks from outside the European Union through the EU Centres of Excellence Initiative. This audit is a follow-up audit focusing on the actions taken to implement the recommendations in the SR No 17/2014 and also to look at the implementation of projects under the established initiative.
- Desertification in the EU. This audit will examine whether the risk of desertification in the EU is effectively and efficiently addressed.

2.1.2.3 Conclusion on the assessment of audit results

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

As a result of the assessment of the risks underlying the auditors' observations together with the management measures taken in response, the JRC management has come to the conclusion that the recommendations issued do not raise any assurance implications and are being implemented as part of the ongoing continuous efforts in terms of further improvements.

The JRC management concludes that audit recommendations issued do not raise any implications concerning assurance and are being implemented as part of the ongoing continuous efforts in terms of further improvements.

2.1.3 Assessment of the effectiveness of the internal control systems

The Commission has adopted an Internal Control Framework based on international good practice, aimed to ensure the achievement of policy and operational objectives. In addition, as regards financial management, compliance with the internal control framework is a compulsory requirement.

The Internal Control Framework (ICF) has been renewed in 2017⁵⁸ and therefore 2017 is a transitional year for which the JRC is reporting on the context of the previous Internal Control Standards. The JRC will carry out its assessment on the basis of the new framework in the context of the 2018 AAR.

In order to ensure a smooth and efficient transition to the new Internal Control Principles, the JRC has developed an implementation plan to fully integrate the revised framework with the existing JRC Integrated Management System (IMS). The new Commission's ICF will be implemented through the JRC's IMS thus allowing the JRC to combine requirements from different sources, such as ICF, ISO standards and legal requirements, in 1 management approach. The implementation plan has been developed according to 4 main phases, the plan-do-check-act cycle. The plan phase covered the preparation towards the new ICF which consisted in the appointment of the Director in charge of Internal Control and Risk Management (RMIC), the RMIC's endorsement of the JRC policy 'ICF 2017 integration to the JRC IMS' and communication to JRC senior management. In addition, the ICF monitoring criteria have been designed with key actors involved and reported as part of the JRC Management Plan 2018. The implementation plan includes actions which are ongoing in the form of an awareness-raising campaign, training initiatives and communication to staff through a revamped Internal Control page on the Connected@JRC platform.

The JRC has put in place the organisational structure and the internal control systems suited to the achievement of the policy and control objectives, in accordance with the standards and having due regard to the risks associated with the environment in which it operates.

The JRC has put in place the organisational structure and the internal control systems suited to the achievement of its policy and control objectives, in accordance with Internal Control Standards and having due regard to the risks associated with the environment in which it operates.

In line with the Commission Internal Control Standard 15 (ICS 15), the JRC performed an annual review of its implementation of the Commission's set of Internal Control Standards; this involved an analysis of the effectiveness and compliance of the standards. It was based on a review by the Internal Control Coordinator (ICC) staff using evidence from a variety of sources including: interviews and declarations from relevant key functions responsible for the implementation of the ICS, results from risk assessments carried out during the year, supervisory reports, audit results from IAS and the ECA, annual survey to assess the staff perception of the degree of implementation of the ICS, results from the Commission's staff satisfaction survey, JRC exceptions register and results of the ex-post controls. This has led to the 'top-down' assessment of the JRC's internal control status at the end of the reporting year, with respect to both the ICS compliance and the effectiveness of the control arrangements in place. Furthermore, the 'bottom-up' information on internal control issues received through the Assurance Statements from Sub-delegated Authorising Officers has been checked for confirmation or any counter-indications. Finally, the IAS's limited conclusion on the state of internal control in JRC has been taken into account as well.

⁵⁸ C(2017)2373 final, 19.4.2017

The functioning of the internal control system has been closely monitored throughout the year by the systematic registration of exceptions (under ICS 8). The underlying causes behind these exceptions have been analysed and corrective and alternative mitigating controls have been implemented when necessary. No internal control weaknesses (ICS 12) were reported during the year.

The analysis carried out and described above has enabled the JRC to conclude that overall the JRC's internal control system is satisfactory. Further enhancing the effectiveness of the JRC's control arrangements in place is an ongoing effort in line with the principle of the continuous improvement of management procedures. As a result, the following activities are ongoing and will be given again focus during 2018 also taking into account the transition to the new ICF:

- ICS 3: Mobility across the JRC is being pursued as continuous actions as part of the JRC strategy 2030 'Managing knowledge and competences' by the means of calls for expression of interest and 'Short-term mobility' options offered;
- ICS 12 and aspects of ICS 7 linked to ICT governance: Ongoing actions taking into account the risks linked to IT security and which are being extended to include the recommendations from the IAS audit on IT security in JRC ICT systems. The new JRC ICT Governance is being implemented during 2018. The reader is also referred to section 2.1.2.1 above.

The IAS, in its report to the Director General of the JRC, referred to the combined effect of the 4 very important recommendations on IT security which led it to conclude that the controls currently in place do not provide sufficient assurance that IT Security risks are adequately mitigated. However, this has no impact either on assurance or on the overall conclusion of the state of the JRC internal control.

Concerning the overall state of the internal control system, generally the JRC complies with the three assessment criteria for effectiveness:

- Staff having the required knowledge and skills;
- Systems and procedures designed and implemented to manage the key risks effectively;
- No instances of ineffective controls that have exposed the DG to the organisation's key risks.

The JRC has assessed the internal control system during the reporting year and has concluded that the internal control standards are implemented and functioning as intended. In addition the JRC is taking measures to further improve the effectiveness of its internal control systems as described above.

The JRC concludes positively that the internal control standards are implemented and functioning as intended.

2.1.4 Conclusions as regards assurance

This section reviews the assessment of the elements reported above (in Sections 2.1.1, 2.1.2 and 2.13) and draws conclusions supporting the declaration of assurance and whether it should be qualified with reservations.

The information reported in Section 2 stems from the results of management and auditor monitoring contained in the reports listed. These reports 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 Director General of the JRC:

- JRC's internal controls systems provide sufficient assurance to adequately manage the risks relating to the legality and regularity of the underlying transactions;
- JRC has implemented appropriate ex-ante and ex-post controls, to the extent that they remain cost-effective;
- 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;
- JRC's internal control systems provide sufficient assurance with regards to the achievement of the other internal control objectives; and
- Resources were used for the intended purposes, sound financial management was applied, and the non-omission of significant information was ensured.

On 22 February 2018, the JRC organised a meeting with participation from various actors involved in reaching a conclusion towards the reasonable declaration of assurance, e.g. the Director for Strategy and Work Programme Coordination (also in her role as Internal Control Coordinator), the Internal Control Correspondent, the Evaluation function, the ex-post and exception reporting owner and other JRC key actors. The purpose of this meeting was to analyse and to discuss in detail the evidence collected based on the elements supporting assurance. The group concluded that a) there are improvement areas ongoing which will be given again focus during 2018 (as mentioned in section 2.1.3 above), which have been brought to the attention of the Director General, and b) that on the basis of the analyses made and on the information available, no evidence justifying a reservation could be found.

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 Director General, in his capacity as Authorising Officer by Delegation has signed the Declaration of Assurance

DECLARATION OF ASSURANCE

I, the undersigned,

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 view⁵⁹.

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 limited conclusion of the Internal Auditor on the state of control and the lessons learnt from the reports of the Court of Auditors 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, 23 March 2018

Signed

Vladimir Šucha

⁵⁹ 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

Human resource management (HRM) is at the core of the Commission's change agenda⁶⁰. The JRC is expected to design and carry out a modern, flexible and people-centred HRM policy crafted to facilitate and ensure effective and efficient business operations and implementation of the JRC Strategy 2030. Therefore, the JRC aims at recruiting, training, assessing and retaining highly qualified staff. The JRC, as a people-centred organisation (JRC Strategy 2030, Chapter 10), also promotes inclusiveness and equal opportunity and cultivates a working culture in which staff care is central.

The JRC promotes inclusiveness and equal opportunity and cultivates a working culture in which staff care is central.

Since February 2017, the JRC participates in the **Commission-wide HR Modernisation Pilot** implemented based on the Communication on 'Synergies and Efficiencies in the Commission - New Ways of Working', SEC(2016)170. The new HR Service Delivery Model with the objective to harmonise and simplify HR process implementation by centralising activities to the DG HR Account Management Centre Directorate changed the way the Commission delivers HR service comprehensively. The Account Management Centres (HR.AMC.1-8) serve clusters of DGs and are responsible for effective and efficient operational HR service delivery in accordance with the rules. At Commission level, it was decided that the HR.AMC.8 serves the JRC only.

Every DG has an HR Business Correspondent (HR BC). Focusing on strategic, sensitive and organisational HRM, the JRC HR BC, supported by a small team, assists in setting the JRC strategic HR priorities and assists the JRC Director General in taking key HR decisions. Basing on the Commission's HR strategies, the mission of the JRC HR BC is to identify the JRC's HR needs and priorities and to translate and align them into HR policies and/or decisions supporting the JRC's business priorities and workforce needs. Hereby, close cooperation between the HR.AMC.8 and the JRC HR BC is fundamental.

For the implementation of the HR processes such as recruitment and performance, competence and career development, the JRC adheres to the **Commission's Talent Management Strategy** leveraging on the two transversal HR policies; promotion of staff mobility as a natural part of career development (as mobility contributes to excellence in management, the development of staff, staff motivation and to a collaborative corporate culture) and promotion of diversity and inclusion (as diversity improves the performance of the organisation in all aspects by enabling distinct views and approaches to be expressed and ensuring that the Commission is representative of the citizens it serves).

In 2017 the JRC contributed actively to the improved coordination of the Commission-wide HR actions on staff engagement and talent management and to the Commission's Health and Well-being Strategy.

In 2017, the JRC contributed actively to the improved coordination of the Commission-wide HR actions on staff engagement and talent management. The continuous development of the JRC Talent Management Programme played an important part of the JRC's HRM objectives also for 2017, where the JRC Talent

Management Programme launched in 2016 was concluded and its results enabled the creation of wider programmes targeting strategically important competence areas in the coming years.

⁶⁰ The Commission's change agenda refers to the Juncker Commission's 10 political priorities 2015-19 incorporated in the JRC Strategy 2030 ('ten priority nexus').

The Commission's new Diversity and Inclusion Strategy⁶¹ contains an action plan to approach the target of 40 % female representation in management functions by the end of 2019. To promote the JRC's talent pool of female staff, the JRC's Talent Management Programme, completed and evaluated in 2017, provided career guidance and training to female administrator-level staff. Support in the form of individual coaching and mentoring has been provided to female staff who have expressed development needs and management aspirations.

The promotion of female talented female staff to management positions will continue to be a JRC priority in the coming years. During 2018, a leadership training programme will be offered to recently appointed JRC Deputy Heads of Unit, which will also address female staff specific needs. In addition, measures allowing all staff members to combine better their private and professional life will be further enhanced and promoted, thus encouraging more females to apply for management positions.

To empower **staff mobility**, a dedicated working group identified a number of targeted actions resulting in the JRC Staff Mobility Package released in December 2017. The Package includes modalities to encourage staff mobility of all responsibility levels in the form of short-term mobility/temporary exchanges and longer-term mobility/job reassignments within and outside the JRC (i.e. voluntary staff mobility through JRC-wide Calls for Expression of Interest, short-term exchange programmes/temporary assignments outside the EU, job shadowing etc.). Within this package, the JRC Mobility Space published on the Connected@JRC online platform serves a 'first stop shop' providing an overview of mobility opportunities available to JRC staff.

In addition, the **Commission's Health and Well-being Strategy** and the related action plan 2017-2020 was released mid-2017 as a cross-cutting, multi-annual health and well-being programme based on 2 pillars: health (physical and mental health, physical activities) and well-being (working environment, work-life balance and social integration). The programme gave rise to the development of a tailored JRC 'Fit@Work policy' facilitating the JRC, in cooperation with other Commission services (DG HR.D, infrastructure services, etc.), to care for its staffs' health and well-being at work and to foster its staffs' ability to achieve a healthy life/work balance.

As outlined in the JRC Strategy 2030, the JRC has optimised the long-term alignment of JRC competences with the Commission's requirements ('ten priority nexus'). The JRC's new direction towards policy support and the implementation of an extensive JRC re-organisation in July 2016, still under implementation throughout 2017, brought far-reaching organisational changes, work-culture challenges and additional JRC competence requirements that have been reflected in the JRC's learning and development approach of 2017.

As outlined in the JRC Strategy 2030, the JRC has optimised the long-term alignment of JRC competences with the Commission's requirements ('10 priority nexus').

The JRC results in the EC Staff Satisfaction Survey 2016 (SSS 2016) were followed up rigorously during 2017. Following the Director General's call for action, in January 2017, ten working/reflection groups were created - 6 geographic groups for the respective JRC sites and 4 thematic groups, to follow the most problematic issues identified in the SSS 2016. A dedicated space was created on Connected@JRC where the reports of the groups were published. Additionally, a 'JRC Day' with workshops on all 6 JRC sites was organised in March 2017. JRC staff contributed to the identification of the main areas to be addressed ('management', 'career and mobility', 'knowledge sharing'/'communication' and 'well-being and physical working environment'). For continuous improvement, a profound long-term action plan was drawn up; its implementation was coordinated by HR.AMC.8 and the JRC HR BC.

⁶¹ Commission Communication C(2017) 5300 final

Being recognised for exceptional effort improves staff morale and helps create a better working environment. To recognise the achievements of staff, 16 JRC Annual Awards for Excellence (scientific excellence, technical development and/or innovation, young scientist, policy impact, excellence in administration and celebrating collaboration) were assigned during a formal award ceremony assisted by the JRC Director General and the Commissioner in July 2017. On the Connected@JRC platform, a specific space 'JRC Recognition of Achievements' was created dedicated to celebrate contributions made by JRC staff members across all areas of work.

A complete reporting on outputs identified in the 2017 Management Plan and on objectives and indicators set up in the Strategic Plan are available in tables in Annex 2.

2.2.2 Better regulation (only for DGs managing regulatory acquis)

N/A

2.2.3 Information management aspects

A corporate strategy for developing and managing data, information and knowledge, set out in 2016⁶² identified four main areas where improvements could be made: information retrieval and delivery, working together and sharing information and knowledge, maximising use of data for better policy-making, and creating a culture of knowledge sharing and learning. **The JRC has taken on an important role by leading or significantly contributing to actions across all four improvement areas identified in the Commission's corporate strategy.** Some important achievements in 2017 are the following:

- the newly launched Knowledge Centre on Territorial Development released a unified Web Portal, including a Urban Data Platform to support the Urban Agenda for the EU;
- the Knowledge Centre on Migration and Demography created a Dynamic Data Hub, providing up-to-date data and analysis of migration flows, trends and impacts;
- the Knowledge Centre on Disaster Risk Management produced a major state-of-the-art report on 'Science for disaster risk management 2017: knowing better and losing less';
- the Competence Centre on Composite Indicators developed a 'Social Scoreboard' to accompany the European Pillar of Social Rights;
- the newly launched Competence Centre on Modelling is running the Corporate Modelling inventory (MIDAS) whose use is now mandatory for identifying suitable models for impact assessments and documenting their use and driving a Community of Practice on Modelling;
- the Competence Centre on Microeconomic Evaluation is advising the Regulatory Scrutiny Board on quantification in Impact Assessments submitted by policy DGs.

In addition, the JRC has established an open group that brings together the Community of Practice of Data for Policy across the European Commission. The goal is to help find the people working on similar issues and discuss all issues related to Data and Policy.

⁶² Commission Communication C(2016) 6626 final.

JRC's results in knowledge management are also described in sections 1.1-1.5 (JRC contributions to general Commission objectives and its specific objective 10) and 2.2.6. describing JRC actions for enhancing efficiency through and of knowledge management activities.

The JRC's document management policy and strategy is implemented on the basis of a detailed yearly action plan, sustaining an increased compliance with corporate rules of the JRC records and files lifecycle, developing a service-oriented and networking approach with all stakeholders, and implementing a specific training and communication plan at all levels in the organisation.

As of end of 2017, the document management action plan is still ongoing to address recommendations of the audit on document management and its completion rate is 96 %. The IAS has closed 9 out of 11 recommendations as adequately and effectively implemented.

The ICS survey carried out at the end of 2017 confirmed a satisfactory staff perception of ICS 11 Document Management which also resulted in the similar survey carried out in 2016. From the survey it has resulted that staff perceived ICS 11 as the fourth best implemented standard in 2017 (third in 2016).

JRC's decision on the Document Management Correspondent appointment has set up the necessary grounds to foster increased information and knowledge sharing and reusability by other DGs. However, at the end of 2017, not all Document Management Correspondents had completed the planned filing plan review while others had not yet participated in the necessary training course.

A complete reporting on outputs identified in the 2017 Management Plan and on objectives and indicators set up in the Strategic Plan are available in tables in Annexes 2 and 12.

2.2.4 External communication activities

The JRC Strategy 2030 identifies three major target groups for external communication: EU political level, scientific community and the public large. It aims to improve the perceptions each of these groups have of the JRC to place it in the heart of EU policy-making, to ensure it can cooperate with the best talents and to provide transparency to citizens on the use of their taxes, as well as contributing to communicating the relevance and the added value of EU and its policies.

In 2017 the JRC's activities have been widely reported in the media and it has doubled its social media reach since 2016 placing it among the fastest growing EU social media presences in research and innovation.

In the run up to the negotiations on the multiannual budget, 2017 saw big efforts in JRC's outreach to the EU top political level and to the public at large while communicating with scientists interested in science for policy also remained strong. In particular, the JRC aimed at improving the quality and reach of the primary news products through strengthened coordination and better delivery.

Coordination with other departments was strengthened by focusing on co-operation with policy DG communicators, Cabinets and the Spokespersons' Service to produce silo-bridging news based on JRC science but also offering insights into how it shapes EU policy that serves citizens.

JRC's activities have been widely reported in the media and it has doubled its social media reach since 2016 placing JRC among the fastest growing EU social media presences in research and innovation.

Examples of JRC communication actions:

1) **60th anniversary of the JRC.** An exhibition celebrating the JRC's 60th anniversary and showcasing six decades of science and knowledge informing policies was set in the European Commission's Berlaymont building and attracted over 1000 visitors. The 60th anniversary was also celebrated with local events across all JRC sites. In Ispra (IT) under the theme of civil protection, the celebration highlighted the importance of collaboration with national authorities. It showcased what the JRC and the EU do to help Italy on priority issues like disaster risk management to build resistance against earthquakes, floods, forest fires and landslides. In Karlsruhe (DE) the celebrations focused on the EURATOM Treaty, particularly on the role and benefits of EURATOM supporting research, safety and safeguarding the peaceful use of nuclear energy in Europe. In Seville (ES), the JRC participated to the European Researchers night, which aims at promoting science careers and highlighting the crucial role science has to play in society. A '60 stories for the 60th anniversary' publication celebrates the JRC's 60 years in 60 short stories suggested by JRC staff.



Figure 2.2.4-1. On 25 March 1957, six countries signed in Rome the Treaty on the European Economic Community (EEC) and the Treaty on the European Atomic Energy Community (EURATOM). The latter established a Joint Nuclear Research Centre (JNRC) and gave it its first 5-year work plan. In 2017, the JRC celebrated its 60th anniversary.

© AP , 1957/Source: EC - Audiovisual Service / Photo: Mario Torrisi

2) **Promoting evidence-based policy-making.** Science is about facts, but policy-making needs to find a balance between facts and values. One of the ways to promote sound evidence-based policy-making is JRC's high-level annual conferences. The JRC 2017 edition, 'EU for facts', gathered leading experts in science, policy and the media to share ideas on charting a new course for organisations like the EU, which operate at the intersection of facts and politics. Economists, psychologists, philosophers, sociologists and natural scientists engaged with politicians, policy-makers and journalists. Keynote speakers included Vice-President Jyrki Katainen, former Commissioner and Director General of the WTO Pascal Lamy, and Sir Peter Gluckman, Chair of the International Network for Science Advice to Governments. Commissioners Tibor Navracsics, in charge of the JRC, and Carlos Moedas also attended, as well as four other former Commissioners. This event featured well in the social media, reaching 700 000 people (#EU4Facts) and received almost 7 million impressions.

3) Coinciding with the annual conference's main theme, the **JRC Annual Lecture 2017 'Ignorance and the community of knowledge'** explored how the illusion of understanding, common to all individuals, and the different weight values and logic have on influencing decision-making, are best addressed by knowledge communities driven by shared intention. The event was moderated by Simon Kuper, Financial Times journalist and co-author of *Soccernomics*, which tells the story of science in successful sports strategy.

A complete reporting on outputs identified in the 2017 Management Plan and on objectives and indicators set up in the Strategic Plan are available in tables in Annex 2.

2.2.5 Infrastructure

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 includes a specific chapter 11 'Infrastructure fit for purpose'. The strategy foresees the development of a single, consolidated, multi-year plan for the development of its infrastructure across all its sites and Directorates. This document is currently under preparation:

- The Site and Infrastructure Development Group has already drafted the plans for what concerns conventional infrastructure (office buildings) and the global vision to be followed at site level regarding e.g. energy efficiency and mobility.
- The needs in terms of research infrastructure will derive from the ongoing work of JRC Laboratory Coordination Board expected to deliver final input in the second half of 2018.
- Nuclear infrastructure needs are managed by Directorate G that is expected to finalise its input in the first half of 2018.

For what concerns the office buildings, the Directives on Energy Efficiency and Energy Performance of Buildings remain the legal basis when setting objectives within budget constraints.

The main infrastructural works delivered as scheduled in 2017 on the Ispra site concerned standard refurbishment actions on various buildings (Building 18 and 58c) together with the final delivery of the AMS Greenhouse tower (building 77r). In Petten, 2017 saw the extension of an already existing energy efficient A+ (NL Energy Performance Rating minimum required under 2015 Building Regulations) new Smart Grid Showcase Laboratory building 311 by a platform of 100 sqm. In Karlsruhe, since the application of Directive 2012/27/EU in 2012 the site reached with the new buildings within the last 5 years nearly 35 % of the total surface in the range of the national minimal standards in terms of energy efficiency on the basis of article 5 of the Directive.

Unlike other DGs, the JRC owns and manages buildings and related infrastructure on all its sites except Brussels.

The JRC Infrastructure Development governance structure has been fully implemented with the new organisational structure of JRC in 2016. In line with the JRC Strategy 2030, infrastructure development is now centralised in the Resources Directorate under the supervision of a single Senior Manager.

2.2.5.2 Decommissioning and Waste Management Programme

The review of the JRC decommissioning budget and strategy has been finalised in December 2017. It takes into consideration all nuclear installations, including those still in operation and a new facility currently under construction (Karlsruhe site). Accordingly, a new timeline has been defined. The new long-term budget forecast until completion of the programme (2017 to 2060) includes the updated budget forecast for Ispra, Karlsruhe, Geel and Petten.

Main outputs for 2017 broken down according to 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 new HFR Supplementary Research Programme (2016-2019) was adopted on 29 May 2017.

The bi-annual 'Report from the Commission to the Council and the European Parliament on the operation and research activities of the High Flux Reactor for the period 2014-2015' was drafted but has not yet been released due to the fact that the financial data for the year 2014-2015 was provided by NRG (NL) only in August 2017. The report is now expected to be released in early 2018.

A complete reporting on all outputs identified in the 2017 Management Plan and on all objectives and indicators set up in the Strategic Plans are available in tables in Annex 2.

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

Effective knowledge management is essential for modernising the way the European Commission operates, overcoming silo mentalities and connecting synergies between portfolios as envisaged by the President Juncker and set out in the 2016 Communication on Data, Information and Knowledge Management. JRC's 'Strategy 2030' has set the JRC on the right course to take on these challenges. A **horizontal knowledge management function** has been created 1) to coordinate related activities across JRC, developing common tools, best practices and platforms to facilitate knowledge management for policy, 2) to set up and operate Competence Centres on analytical tools and methods to support the conception, implementation and evaluation of EU policies, 3) to host the first laboratory for testing EU policies ('EU policy lab') and 4) to support EU policies in the respective thematic areas, drawing together a broad range of knowledge repositories and services.

At the same time, **the four Knowledge Centres launched so far around key policy areas** (disaster and risk management; migration and demography; territorial policies; and bioeconomy) have become an asset for the Commission services concerned, collectively involving so far 24 DGs and Services, allowing more effective and efficient use of the relevant information and knowledge; two more are in preparation and will be launched in the near future. The **four Competence Centres** created so far are providing services across the Commission, currently working directly with 20 Commission policy DGs and Services.

The **use of the Connected online platform maintained and developed by the JRC for the European Semester process** has been an important test case in a high profile business process, also with multiple DGs and politically sensitive deliverables. Since end 2016, more than 550 Semester users migrated to the platform and created over 3 000 pieces of new content under the 27 country spaces, accessible to the country teams.

Another example of sharing and saving on development costs can be found in the context of the **Environment Knowledge Community (EKC)**. The participating partners (DGs Environment, Climate Action, Eurostat, JRC and Research and Innovation and the European Environment Agency) aim to increasingly co-ordinate their planning for their knowledge activities so that they can avoid overlapping and identify synergies, in line with policy priorities. The JRC has developed for DG Environment the Environment Knowledge Browser (EKB), based on its own Project Browser, to support the planning and to provide an overview of all ongoing activities related to environment and climate carried on or funded by EKC partners. The newly developed browser was tested by DG Environment in December 2017 and EKC partners will feed the browser with their planned activities for 2018.

In line with the Communication on 'Synergies and Efficiencies in the Commission – New Ways of Working' (SEC(2016)170 final), the **JRC was appointed as the Business Domain Owner (BDO) of the eProcurement project** in March 2017 mainly thanks to

the JRC's strong expertise in procurement (being the DG with the highest number of procurement procedures per year under Title V of the FR) and with its recognised experience in acquiring a full spectrum of deliverables. The overall objective of the eProcurement project is to arrive at a complete business-and-IT solution by which the process for handling procurement information will be fully automated and integrated, limiting to a strict minimum the manual input of data, and promoting the alignment and reuse of such data along the different processes.

Since taking up its role as BDO, the JRC has worked to set up a proper governance structure for this project appointing the business process owners (BPOs)⁶³ for the five business processes. In addition to preparing a detailed project charter in agreement with the BPOs and DG Informatics (as main system supplier), the JRC coordinated the activities of the BPOs to ensure coherence in the business process definition. See section Annex 10.5 for more information on the eProcurement project, as part of the SEDIA programme, and the JRC's contribution to it.

As part of a strategy to **improve the efficiency of key processes in the JRC**, a bottom-up campaign was conducted in the spring of 2017 to generate ideas for simplification. The **simplification campaign** yielded 145 ideas from staff across 8 domains. In finance and procurement, where there were already ongoing efforts to increase efficiency, the campaign yielded additional ideas bringing the total to 44 of which 34 are already completed or in progress. As regards another important area, namely site management, 15 ideas are either implemented or considered as closed with another 12 on track to be implemented in the course of 2018. Overall, by the end of 2017, 50 % of the ideas retained were implemented and 75 % are planned to be completed by the end of 2018.

⁶³ JRC, DG Internal Market, Industry, Entrepreneurship and SMEs, DG for Budget, and the Office for Infrastructure and Logistics in Brussels