



# **2015**

# **Annual Activity Report**

**- annexes -**

**JOINT RESEARCH CENTRE**

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# ANNEXES

## ANNEX 1: Statement of the Resources Director

***"I declare that in accordance with the Commission's communication on clarification of the responsibilities of the key actors in the domain of internal audit and internal control in the Commission<sup>1</sup>, I have reported my advice and recommendations to the Director-General on the overall state of internal control in the DG.***

***I hereby certify that the information provided in Section 2 of the present AAR and in its annexes is, to the best of my knowledge, accurate and exhaustive."***

*Brussels, 3 May 2016*

*Jean-Pierre Michel*

*"Signed"*

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<sup>1</sup> Communication to the Commission: Clarification of the responsibilities of the key actors in the domain of internal audit and internal control in the Commission; SEC(2003)59 of 21.01.2003.

## ANNEX 2: Human and financial resources

### 1. Human Resources by activity – Execution 2015

Human Resources by ABB activity				
Code ABB Activity	ABB Activity	Establishment Plan posts	External Personnel	Total
10 01	Administrative expenditure of Direct research policy area	642	261	903
10 02	Horizon 2020 - Direct actions of the Joint Research Centre (JRC) in	806	778	1584
10 03	Euratom Programme - Direct actions	294	89	383
10 04	Joint Research Centre (JRC) other activities	1	0	1
10 05	Historical liabilities resulting from nuclear activities carried out by	48	11	59
<b>Total</b>		<b>1791</b>	<b>1139</b>	<b>2930</b>

#### **Notes:**

The figures in the column "Establishment Plan posts" correspond to the core staff (Officials and Temporary Agents) actually present and occupying posts on the authorised Establishment Plan of the JRC.

The figures in the column "External Personnel" include Grant Holders, Seconded National Experts and Contractual Agents, exclude Trainees and Intra-muros Providers.

The JRC does not use decentralised administrative appropriations. This kind of expenditure is covered under Budget Line 10 01 05 Support expenditure for Research and Innovation programmes in the 'Direct research' policy area.

## 2. Financial Resources by activity – Execution 2015

<b>Financial Resources by ABB activity (EUR Million)</b>				
<b>implementation of Commitment Appropriations (CA) (*)</b>				
<b>Code ABB Activity</b>	<b>ABB Activity</b>	<b>Operational expenditure</b>	<b>Administrative expenditure (**)</b>	<b>Total</b>
10 01 (Heading 5)	10 01 01/02/03 (Heading 5) Administrative expenditure of Direct research policy area	0	0	0
10 01 (Heading 1a)	10 01 05 (Heading 1a) Administrative expenditure of Direct research policy area	0	394.047	394.047
10 02	Directly financed research operational appropriations – Horizon 2020	35.515	0	35.515
10 03	Directly financed research operational appropriations – Euratom Programme	11.380	0	11.380
10 04	Joint Research Centre (JRC) other activities	33.217	0	33.217
10 05	Historical liabilities resulting from nuclear activities carried out by the JRC pursuant to the Euratom Treaty	30.282	0	30.282
<b>Total</b>		<b>110.394</b>	<b>394.047</b>	<b>504.441</b>

### **Notes:**

(\*) Including all credit types: voted budgetary appropriations, EFTA contribution, internal assigned revenue of the year, internal assigned revenue carried over, external assigned revenue (including the participation of CEEC countries) and JRC external assigned revenue (article 183 new FR).

(\*\*) The administrative expenditure includes also the salaries of all JRC staff (including scientists/technicians involved in direct research actions), as well as the operation of the research facilities spread around the various JRC sites (including new infrastructures).

## **ANNEX 3:      Draft annual accounts and financial reports**

### **Annex 3 Financial Reports - DG JRC - Financial Year 2015**

**Table 1 : Commitments**

**Table 2 : Payments**

**Table 3 : Commitments to be settled**

**Table 4 : Balance Sheet**

**Table 5 : Statement of Financial Performance**

**Table 6 : Average Payment Times**

**Table 7 : Income**

**Table 8 : Recovery of undue Payments**

**Table 9 : Ageing Balance of Recovery Orders**

**Table 10 : Waivers of Recovery Orders**

**Table 11 : Negotiated Procedures (excluding Building Contracts)**

**Table 12 : Summary of Procedures (excluding Building Contracts)**

**Table 13 : Building Contracts**

**Table 14 : Contracts declared Secret**

TABLE 1: OUTTURN ON COMMITMENT APPROPRIATIONS IN 2015 (in Mio €)					
			Commitment appropriations authorised	Commitments made	%
			1	2	3=2/1
Title 05 Agriculture and rural development					
05	05 07	Audit of agricultural expenditure financed by the European Agricultural Guarantee Fund (EAGF)	7.48	7.48	100.00 %
	05 08	Policy strategy and coordination of the 'Agriculture and rural development' policy area	1.773648	1.66118006	93.66 %
<b>Total Title 05</b>			9.253648	9.14118006	98.78%
Title 10 Direct research					
10	10 01	Administrative expenditure of the 'Direct research' policy area	435.2035828	394.0467154	90.54 %
	10 02	Horizon 2020 - Direct actions of the Joint Research Centre (JRC) in support of Union policies	105.3687846	35.5151002	33.71 %
	10 03	Euratom Programme - Direct actions	30.12970792	11.3800175	37.77 %
	10 04	Other activities of the Joint Research Centre	342.8443034	33.21652742	9.69 %
	10 05	Historical liabilities resulting from nuclear activities carried out by the Joint Research Centre pursuant to the Euratom Treaty	30.33372305	30.28232235	99.83 %
<b>Total Title 10</b>			943.8801017	504.4406829	53.44%
<b>Total DG JRC</b>			953.1337497	513.5818629	53.88 %

\* Commitment appropriations authorised include, in addition to the budget voted by the legislative authority, appropriations carried over from the previous exercise, budget amendments as well as miscellaneous commitment appropriations for the period (e.g. internal and external assigned revenue).

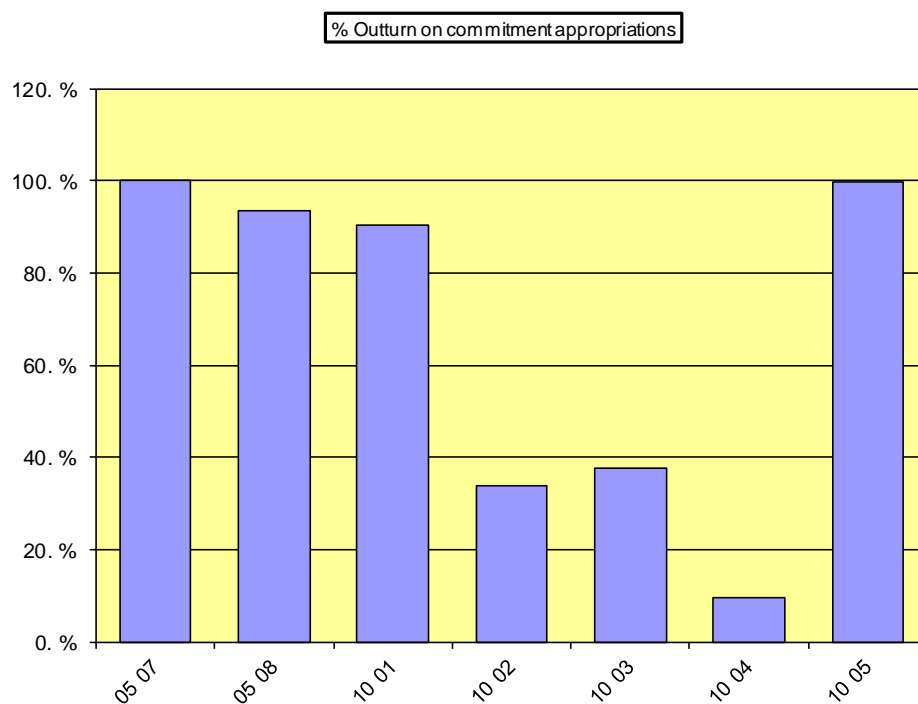


TABLE 2: OUTTURN ON PAYMENT APPROPRIATIONS IN 2015 (in Mio €)					
Chapter			Payment appropriations authorised *	Payments made	%
			1	2	3=2/1
Title 05 Agriculture and rural development					
05	05 07	Audit of agricultural expenditure financed by the European Agricultural Guarantee Fund (EAGF)	9.52990084	8.57057924	89.93 %
	05 08	Policy strategy and coordination of the 'Agriculture and rural development' policy area	1.68038312	1.49926497	89.22 %
<b>Total Title 05</b>			11.21028396	10.06984421	89.83%
Title 10 Direct research					
10	10 01	Administrative expenditure of the 'Direct research' policy area	497.0074739	392.8966719	79.05 %
	10 02	Horizon 2020 - Direct actions of the Joint Research Centre (JRC) in support of Union policies	109.8871987	42.4472022	38.63 %
	10 03	Euratom Programme - Direct actions	28.24959625	11.34353861	40.15 %
	10 04	Other activities of the Joint Research Centre	269.2578098	44.10961635	16.38 %
	10 05	Historical liabilities resulting from nuclear activities carried out by the Joint Research Centre pursuant to the Euratom Treaty	28.52394644	26.58548128	93.20 %
<b>Total Title 10</b>			932.926025	517.3825104	55.46%
<b>Total DG JRC</b>			944.136309	527.4523546	55.87 %

\* Payment appropriations authorised include, in addition to the budget voted by the legislative authority, appropriations carried over from the previous exercise, budget amendments as well as miscellaneous payment appropriations for the period (e.g. internal and external assigned revenue).

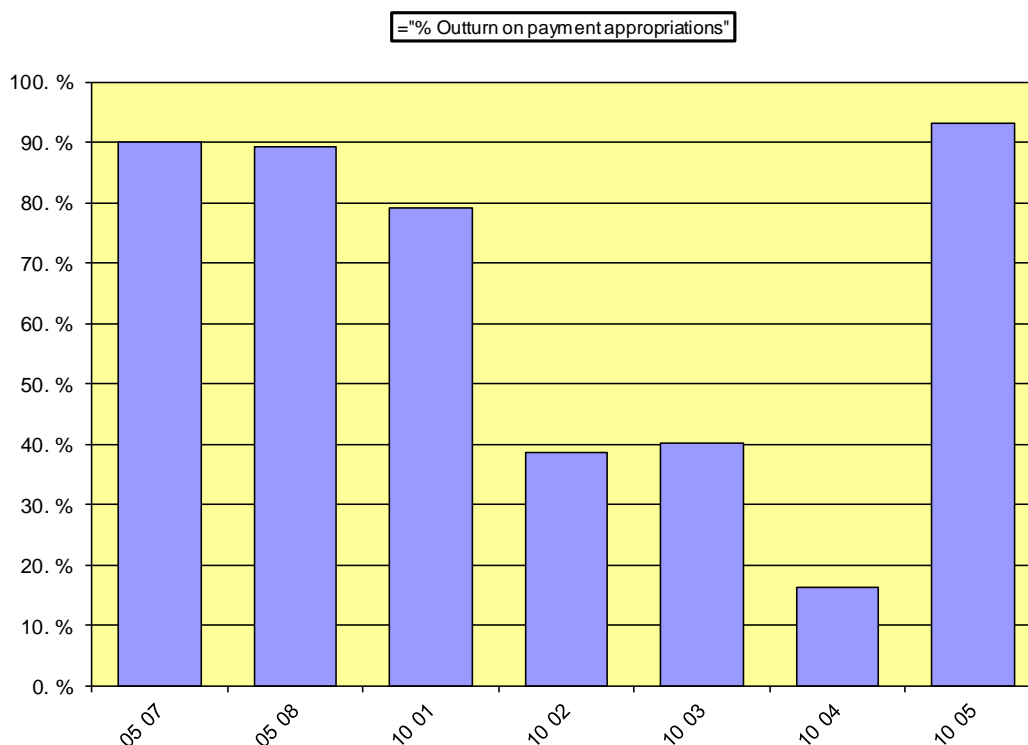




TABLE 3 : BREAKDOWN OF COMMITMENTS TO BE SETTLED AT 31/12/2015 (in Mio €)									
Chapter			2015 Commitments to be settled				Commitments to be settled from	Total of commitments to be settled at end	Total of commitments to be settled at end
			Commitments 2015	Payments 2015	RAL 2015	% to be settled	financial years previous to 2015	of financial year 2015 (incl corrections)	of financial year 2014 (incl. corrections)
			1	2	3=1-2	4=1-2/1	5	6=3+5	7
Title 05 : Agriculture and rural development									
05	05 07	Audit of agricultural expenditure financed by the European Agricultural Guarantee Fund (EAGF)	7.48	6.69	0.78877026	10.55 %	0.00	0.79	2.05
	05 08	Policy strategy and coordination of the 'Agriculture and rural development' policy area	1.66118006	0.04	1.6238098	97.75 %	0.12	1.74	1.65
Total Title 05			9.14118006	6.73	2.41258006	26.39%	0.12067847	2.53325853	3.69565558
Title 10 : Direct research									
10	10 01	Administrative expenditure of the 'Direct research' policy area	394.0205295	342.19	51.82729909	13.15 %	6.32	58.15	64.28
	10 02	Horizon 2020 - Direct actions of the Joint Research Centre (JRC) in support of Union policies	35.5151002	13.76	21.75668025	61.26 %	11.85	33.61	43.09
	10 03	Euratom Programme - Direct actions	11.3800175	5.24	6.13737467	53.93 %	3.52	9.65	10.46
	10 04	Other activities of the Joint Research Centre	33.21652742	16.20	17.01680943	51.23 %	5.75	22.77	37.34
	10 05	Historical liabilities resulting from nuclear activities carried out by the Joint Research Centre pursuant to the Euratom Treaty	30.28232235	9.46	20.82171844	68.76 %	28.98	49.80	52.75
Total Title 10			504.414497	386.85	117.5598819	23.31%	56.41627387	173.9761558	207.9146653
	Total DG JRC		513.555677	393.58	119.9724619	23.36 %	56.53695234	176.5094143	211.6103209

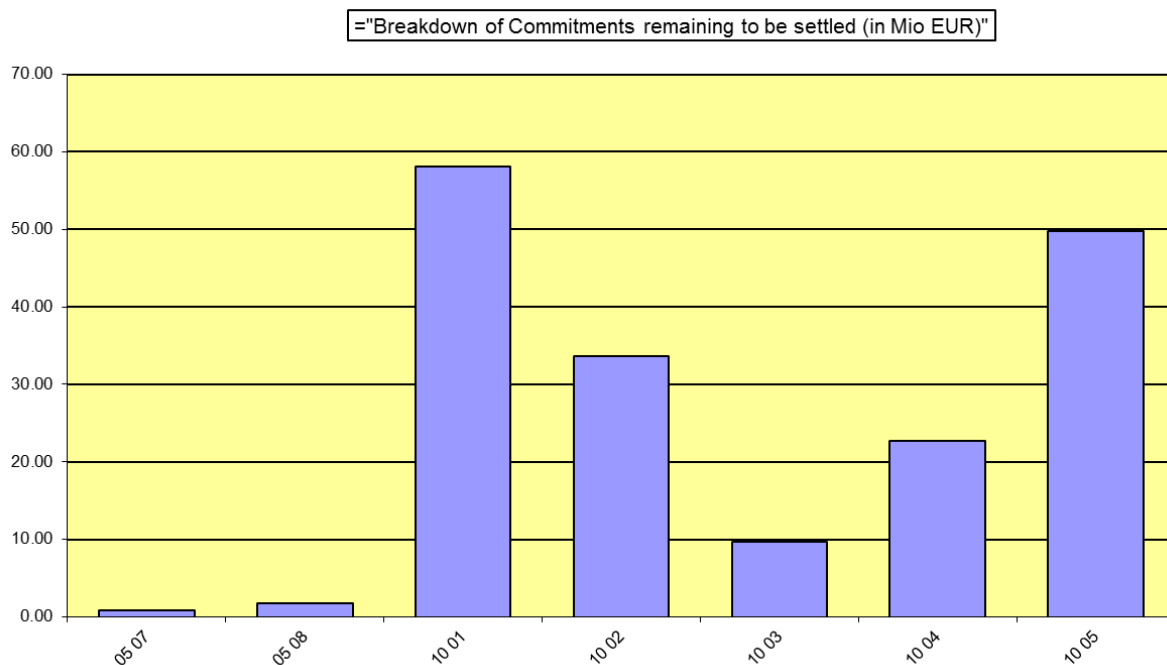


TABLE 4 : BALANCE SHEET

BALANCE SHEET	2015	2014
<b>A.I. NON CURRENT ASSETS</b>	<b>225,576,464</b>	<b>215,014,570</b>
A.I.1. Intangible Assets	2,308,797	2,083,310
A.I.2. Property, plant and equipment	220,975,614	210,639,207
A.I.5. LT Receivables	17,873	17,873
A.I.6. Non-Current Pre-Financing	2,274,180	2,274,180
A.I.7. OLD LT Pre-Financing		0
<b>A.II. CURRENT ASSETS</b>	<b>-606,080,106</b>	<b>-371,374,780</b>
A.II.1. Inventories	55,236,780	66,255,995
A.II.2. Current Pre-Financing	1,609,964	6,352,873
A.II.4. Exchange Receivables	-683,232,591	-464,580,625
A.II.5. Non-Exchange Receivables	20,194,325	20,393,570
A.II.7. Cash and Cash Equivalents	111,416	203,408
<b>ASSETS</b>	<b>-380,503,642</b>	<b>-156,360,210</b>
<b>P.II. NON CURRENT LIABILITIES</b>	<b>-1,052,760,534</b>	<b>-1,065,877,660</b>
P.II.2. Long-term provisions	-1,052,756,691	-1,065,873,817
P.II.3. Long-term financial liabilities	-3,843	-3,843
<b>P.III. CURRENT LIABILITIES</b>	<b>-55,324,531</b>	<b>-60,762,085</b>
P.III.2. Short-term provisions	-28,137,599	-28,817,938
P.III.4. Accounts Payable	-6,252,945	-11,010,495
P.III.5. Accrued charges and deferred income	-20,933,987	-20,933,651
<b>LIABILITIES</b>	<b>-1,108,085,065</b>	<b>-1,126,639,744</b>
<b>NET ASSETS (ASSETS less LIABILITIES)</b>	<b>-1,488,588,707</b>	<b>-1,282,999,954</b>
P.I.2. Accumulated Surplus / Deficit	3,811,286,573	3,487,586,320
Non-allocated central (surplus)/deficit*	-2,322,697,866	-2,204,586,366
<b>TOTAL</b>	<b>0</b>	<b>0</b>

It should be noted that the balance sheet and statement of financial performance presented in Annex 3 to this Annual Activity Report, represent only the assets, liabilities, expenses and revenues that are under the control of this Directorate General. Significant amounts such as own resource revenues and cash held in Commission bank accounts are not included in this Directorate General's accounts since they are managed centrally by DG Budget, on whose balance sheet and statement of financial performance they appear. Furthermore, since the accumulated result of the Commission is not split amongst the various Directorates General, it can be seen that the balance sheet presented here is not in equilibrium.

Additionally, the figures included in tables 4 and 5 are provisional since they are, at this date, still subject to audit by the Court of Auditors. It is thus possible that amounts included in these tables may have to be adjusted following this audit.

**TABLE 5 : STATEMENT OF FINANCIAL PERFORMANCE**

<b>STATEMENT OF FINANCIAL PERFORMANCE</b>	<b>2015</b>	<b>2014</b>
<b>II.1 REVENUES</b>	<b>-84,121,735</b>	<b>-84,233,318</b>
II.1.1. NON-EXCHANGE REVENUES	-271,183	-94,451
II.1.1.5. RECOVERY OF EXPENSES	-258,544	-94,451
II.1.1.6. OTHER NON-EXCHANGE REVENUES	-12,639	
II.1.2. EXCHANGE REVENUES	-83,850,552	-84,138,867
II.1.2.1. FINANCIAL INCOME	-475	-350
II.1.2.2. OTHER EXCHANGE REVENUE	-83,850,076	-84,138,517
<b>II.2. EXPENSES</b>	<b>282,582,812</b>	<b>407,933,571</b>
II.2. EXPENSES	282,582,812	407,933,571
II.2.10.OTHER EXPENSES	129,185,559	266,049,026
II.2.2. EXP IMPLBY COMMISS&EX.AGENC. (DM)	118,080,642	91,258,187
II.2.6. STAFF AND PENSION COSTS	35,285,965	50,612,319
II.2.8. FINANCE COSTS	30,646	14,038
<b>STATEMENT OF FINANCIAL PERFORMANCE</b>	<b>198,461,078</b>	<b>323,700,253</b>

*The negative balance of item A.II.4 "Exchange Receivables" in the Balance Sheet is due to the negative balance of the Intercompany accounts, specifically the "Ispra-Compte Liaison" which had a credit balance of 684,4 million euro as of 31/12/2015. The balance of this account is zero at Commission level. The estimate of the Decommissioning provision was reviewed in 2014: an increase of 158,7 million euro was booked. This explains the difference between 2014 and 2015 of the item II.2.10 "Other Expenses".*

It should be noted that the balance sheet and statement of financial performance presented in Annex 3 to this Annual Activity Report, represent only the assets, liabilities, expenses and revenues that are under the control of this Directorate General. Significant amounts such as own resource revenues and cash held in Commission bank accounts are not included in this Directorate General's accounts since they are managed centrally by DG Budget, on whose balance sheet and statement of financial performance they appear. Furthermore, since the accumulated result of the Commission is not split amongst the various Directorates General, it can be seen that the balance sheet presented here is not in equilibrium.

Additionally, the figures included in tables 4 and 5 are provisional since they are, at this date, still subject to audit by the Court of Auditors. It is thus possible that amounts included in these tables may have to be adjusted following this audit.

**TABLE 6: AVERAGE PAYMENT TIMES FOR 2015 - DG JRC**

Legal Times							
Maximum Payment Time (Days)	Total Number of Payments	Nbr of Payments within Time Limit	Percentage	Average Payment Times (Days)	Nbr of Late Payments	Percentage	Average Payment Times (Days)
15	1	1	100.00 %	9			
20	2	2	100.00 %	11			
30	25956	24401	94.01 %	15.93299455	1555	5.99 %	47.87845659
45	251	249	99.20 %	18.91566265	2	0.80 %	54
50	3	3	100.00 %	10.66666667			
60	224	216	96.43 %	24.30555556	8	3.57 %	90
90	42	39	92.86 %	43.35897436	3	7.14 %	98.66666667

Total Number of Payments	26479	24911	94.08 %		1568	5.92 %	
Average Payment Time	17.9791533			16.07703424			48.19834184

Target Times							
Target Payment Time (Days)	Total Number of Payments	Nbr of Payments within Target Time	Percentage	Average Payment Times (Days)	Nbr of Late Payments	Percentage	Average Payment Times (Days)
20	6	4	66.67 %	10.5	2	33.33 %	38.5
30	4050	3812	94.12 %	16.38195173	238	5.88 %	50.78991597

Total Number of Payments	4056	3816	94.08 %		240	5.92 %	
Average Payment Time	18.4060651			16.37578616			50.6875

Suspensions							
Average Report Approval Suspension	Average Payment Suspension Days	Number of Suspended Payments	% of Total Number	Total Number of Payments	Amount of Suspended Payments	% of Total Amount	Total Paid Amount
0	46	1856	7.01 %	26479	26,160,918	9.57 %	273,314,303

Late Interest paid in 2015			
DG	GL Account	Description	Amount (Eur)
JRC	65010000	Interest expense on late payment of charges	12 563.92
JRC	65010100	Interest on late payment of charges New FR	18 717.86
			31 281.78

TABLE 7 : SITUATION ON REVENUE AND INCOME IN 2015								
Chapter		Revenue and income recognized			Revenue and income cashed from			Outstanding balance
		Current year RO	Carried over RO	Total	Current Year RO	Carried over RO	Total	
		1	2	3=1+2	4	5	6=4+5	
40	MISCELLANEOUS TAXES AND DEDUCTIONS	21,387,721.53	0.00	21,387,721.53	21,387,721.53	0.00	21,387,721.53	0.00
41	CONTRIBUTIONS TO THE PENSION SCHEME	19,006,929.95	0.00	19,006,929.95	19,006,929.95	0.00	19,006,929.95	0.00
62	REVENUE FROM SERVICES RENDERED AGAINST PAYMENT	82,293,522.67	8,221,581.08	90,515,103.75	70,779,782.33	8,189,499.08	78,969,281.41	11,545,822.34
66	OTHER CONTRIBUTIONS AND REFUNDS	5,247,180.23	338,038.51	5,585,218.74	5,155,604.87	335,398.11	5,491,002.98	94,215.76
90	MISCELLANEOUS REVENUE	238,571.46	0.00	238,571.46	238,571.46	0.00	238,571.46	0.00
<b>Total DG JRC</b>		<b>128,173,925.84</b>	<b>8,559,619.59</b>	<b>136,733,545.43</b>	<b>116,568,610.14</b>	<b>8,524,897.19</b>	<b>125,093,507.33</b>	<b>11,640,038.10</b>

**TABLE 8 : RECOVERY OF PAYMENTS**  
(Number of Recovery Contexts and corresponding Transaction Amount)

INCOME BUDGET RECOVERY ORDERS ISSUED IN 2015	Error		Irregularity		Total undue payments recovered		Total transactions in recovery context (incl. non-qualified)		% Qualified/Total RC	
	Year of Origin (commitment)									
	Nbr	RO Amount	Nbr	RO Amount	Nbr	RO Amount	Nbr	RO Amount	Nbr	RO Amount
2005							1	1,451.98		
2010			1	12270.88	1	12,270.88	1	12,270.88	100.00%	100.00%
2011			7	70916.83	7	70,916.83	7	70,916.83	100.00%	100.00%
2012							1	2,332,500.00		
2013							1	2,817.50		
2014	1	4000	1	6800.44	2	10,800.44	10	141,695.35	20.00%	7.62%
2015	12	13490.48			12	13,490.48	24	171,977.01	50.00%	7.84%
No Link			10	53465.4	10	53,465.40	73	281,132.61	13.70%	19.02%
Sub-Total	13	17490.48	19	143453.55	32	160,944.03	118	3,014,762.16	27.12%	5.34%

EXPENSES BUDGET	Error		Irregularity		OLAF Notified		Total undue payments recovered		Total transactions in recovery context (incl. non-qualified)		% Qualified/Total RC	
	Nbr	Amount	Nbr	Amount	Nbr	Amount	Nbr	Amount	Nbr	Amount	Nbr	Amount
INCOME LINES IN INVOICES									5	7,831.98		
NON ELIGIBLE IN COST CLAIMS												
CREDIT NOTES									1368	23,389,600.98		
Sub-Total									1373	23397432.96		
GRAND TOTAL	13	17490.48	19	143453.55			32	160944.03	1491	26412195.12	2.15%	

**TABLE 9: AGEING BALANCE OF RECOVERY ORDERS AT 31/12/2015 FOR JRC**

	Number at 01/01/2015	Number at 31/12/2015	Evolution	Open Amount (Eur) at 01/01/2015	Open Amount (Eur) at 31/12/2015	Evolution
2005	1		-100.00 %	63,037.07		-100.00 %
2006	1	1	0.00 %	1,695.40	1,695.40	0.00 %
2008	1		-100.00 %	38,787.73		-100.00 %
2009	4	1	-75.00 %	160,044.70	436.04	-99.73 %
2010	1	1	0.00 %	945.00	945.00	0.00 %
2012	3		-100.00 %	-711.34		-100.00 %
2013	2	1	-50.00 %	22,245.23	17,082.00	-23.21 %
2014	67	1	-98.51 %	13,769,240.84	15,000.00	-99.89 %
2015		77			11,606,430.30	
	80	82	2.50 %	14,055,284.63	11,641,588.74	-17.17 %

**TABLE 10 : RECOVERY ORDER WAIVERS IN 2015 >= EUR 100.000**

	Waiver Central Key	Linked RO Central Key	RO Accepted Amount (Eur)	LE Account Group	Commission Decision	Comments

<b>Total DG</b>	
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<b>Number of RO waivers</b>	
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No data to be reported

**TABLE 11 : CENSUS OF NEGOTIATED PROCEDURES - DG JRC - 2015**

**External Actions > EUR 20,000**

<b>Negotiated Procedure Legal base</b>	<b>Number of Procedures</b>	<b>Amount (€)</b>
Art. 266.1(f)	1	33,190.00
<b>Total</b>	<b>1.</b>	<b>33,190.00</b>

**Procurement > EUR 60,000**

<b>Negotiated Procedure Legal base</b>	<b>Number of Procedures</b>	<b>Amount (€)</b>
Art. 134.1(a)	6	1,352,803.46
Art. 134.1(b)	19	6,209,927.94
Art. 134.1(g)(i)	1	139,463.13
Art. 135.1(a)	8	19,875,254.31
Art. 135.1(b)	1	598,784.82
Art. 135.1(c)	1	114,200.00
<b>Total</b>	<b>36.</b>	<b>28,290,433.66</b>

**TABLE 12 : SUMMARY OF PROCEDURES OF DG JRC EXCLUDING BUILDING CONTRACTS**

<b>External Procedures &gt; € 20,000</b>		
<b>Procedure Type</b>	<b>Count</b>	<b>Amount (€)</b>
(Ext. act) Service - Exceptional Negotiated Procedure with a single offer (Art. 266 RAP)	1	33,190.00
(Ext. act) Supply - Competitive Negot.Proc. with at least three candidates without pub.(Art.267.1(b)(ii)&2 RAP)	1	79,520.00
(Ext. act) Supply - International Open Procedure after publication of a contract notice (Art. 267.1(a) RAP)	1	248,453.92
<b>TOTAL</b>	<b>3</b>	<b>361,163.92</b>

<b>Internal Procedures &gt; € 60,000</b>		
<b>Procedure Type</b>	<b>Count</b>	<b>Amount (€)</b>
Call for expressions of interest - List of vendors (Art. 136.1(b) RAP)	1	96,300.00
Call for expressions of interest - Pre-selection of candidates (Art. 136.1(a) RAP)	1	104,500.00
Competitive Dialogue (Art. 132 RAP)	1	103,748.52
Exceptional Negotiated Procedure after publication of a contract notice (Art. 135 RAP)	10	20,588,239.13
Exceptional Negotiated Procedure without publication of a contract notice (Art. 134 RAP)	27	8,521,194.53
Negotiated Procedure with at least one candidate below 15000 EUR (Art 137.2 RAP)	2	206,573.65
Negotiated Procedure with at least three candidates below 60000 EUR (Art. 137.1 RAP)	1	70,000.00
Open Procedure (Art. 127.2 RAP)	106	120,054,622.59
Payment against invoices (Art. 137.3 RAP)	1	79,044.85
Restricted Procedure (Art. 127.2 RAP)	27	106,216,697.23
<b>TOTAL</b>	<b>177</b>	<b>256,040,920.50</b>



**TABLE 13 : BUILDING CONTRACTS**

<b>Total number of contracts :</b>	
<b>Total amount :</b>	

Legal base	Contract Number	Contractor Name	Description	Amount (€)

**No data to be reported**

**TABLE 14 : CONTRACTS DECLARED SECRET**

<b>Total Number of Contracts :</b>	
<b>Total amount :</b>	

Legal base	Contract Number	Contractor Name	Type of contract	Description	Amount (€)

**No data to be reported**

## **ANNEX 4:      Materiality criteria**

The objectives of the internal control system are defined in the Financial Regulation (cf. Art. 32). The Authorising Officer by Delegation (AOD) needs to define specific management targets and, in particular, needs to have objective criteria **for determining which weaknesses** should be subject to a formal reservation to his/her declaration.

The materiality criteria related to the JRC's budget and operations are applied to the results of ex ante and ex post controls, exception reporting, reports from authorising officers by sub delegation and work done by the IAS and other auditing bodies as well as feedback during the self-assessment of internal control. Three types of reservations may be associated with the activities of the JRC in case the thresholds set by the materiality criteria are exceeded:

### ***Materiality criteria for making a reservation in the context of Financial Management:***

The budget managed directly by the JRC each year is around EUR 404 Million. Around 58% of the budget is dedicated to staff costs. The remainder is dedicated to site and infrastructure management and to operational expenses e.g. purchasing equipment. In line with the guidelines annexed to Communication to the Commission, COM 28 of 21 January 2003, the JRC considers that any material loss exceeding 2% of the budget allocated to the ABB activity concerned would cause the AOD to make a reservation.

The reservations may be associated with the following financial management activities:

- Payment processing in which significant amounts of funds are inappropriately paid to beneficiaries. These include payments to staff and/or ineligible payments to suppliers.
- Procurement activities which result in a significant loss of funds from the JRC budget. Such activities may be associated with distortion of market conditions and not opening up the market to competition.
- Favours third parties to work with the JRC in the context of its competitive operations where for example insufficient amounts are charged by the JRC for its services.
- Reputational events creating lasting damage related to financial operations, including procurement. Reservations will be made if serious cases of fraud occur during the processing of financial transactions.

### ***Materiality criteria for making a reservation in the context of the core activities of the JRC:***

The JRC has the responsibility at Commission level for providing scientific and technical support to the European policy making process. Events that risk significantly undermining the credibility and or impartiality of the JRC's core research operations would be considered as reputational events that could lead to a reservation being made. This is relevant in cases where such operations would lead to lasting damage to the Commission's image or serious breaches on provisions of the Treaty.

The JRC is accountable for a wide range of administrative and support services. Events that damage the reputation of the European Commission in the long term associated with mismanagement and/or malpractice of the JRC in particular when legal provisions are not respected, would lead to a reservation being made.

The JRC has important responsibilities to ensure the safety and security both of its staff and the population in areas around the research centres. Reputational events occurring as a consequence of serious negligence, breaches in the application of safety legislation

or mismanagement, would lead to a reservation being made.

If the JRC was the subject of litigation and subsequently lost a legal case the matter would be assessed to determine whether the reputation of the European Commission had been significantly and adversely affected in the long term, this would lead to a reservation being made.

***Materiality criteria for making a reservation in the context of Control Systems Weaknesses and Auditing Activities:***

The JRC works to ensure that the Commission's internal control standards are implemented effectively. Should one control standard not be sufficiently well implemented, or should there be a serious error in the application of any of the control standards, a reservation would be made.

The JRC is periodically audited by the Internal Audit Service and the European Court of Auditors. Should a critical recommendation be issued by one of these bodies, a reservation would be issued if the recommendation had led to a significant loss or funds or caused lasting damage to reputation. In any case if the JRC did or could not address a critical recommendation appropriately, a reservation would be made.

## ANNEX 5: Internal Control Template(s) for budget implementation (ICTs)

### ICT N°1: Procurement in direct management mode

#### Stage 1 – Procurement

##### A - Planning

**Main control objectives:** Ensuring that the decision to tender is optimal

Main risks	Mitigating controls	Estimated coverage frequency and depth	Estimated costs and benefits of controls	Control indicators
<p>The needs are not well defined (operationally and economically) and that the decision to procure was inappropriate</p> <p>Discontinuation of the services provided or delays/extra work in the project execution due to a late contracting</p>	Preparation of detailed procurement planning and regular follow-up via Public Procurement Management Tool (PPMT)	<b>Coverage:</b> 100 % of the forecast procurements > EUR 15 000	<p><b>Costs:</b> Estimation of cost of operational and financial staff involved</p> <p><b>Benefits:</b> Rejection of unjustified purchases, avoidance of litigation and compliance with Financial Regulation and Procurement rules</p>	<p>Cost of control on procurement / Total contract value</p> <p>Cost of control on procurement / number of procedures closed during the year</p>
	Note to AO(S)D on justification (economic, operation) for launching a procurement process	<b>Coverage:</b> 100% of the forecast procurements		
	Preparation of detailed procurement planning and regular follow-up via PPMT	<b>Coverage:</b> 100 % of the forecast procurements > EUR 15 000		
	Continuous monitoring during the call for tender procedure for successful award of the contract and close monitoring of contract execution.	<b>Coverage:</b> All key procurement procedures having significant impact on the objectives of the DG		

**B - Needs assessment & definition of needs**

**Main control objectives:** Ensuring that the call for tender is optimally done

Main risks	Mitigating controls	Estimated coverage frequency and depth	Estimated costs and benefits of controls	Control indicators
The best offer/s are not submitted due to inadequate market analysis and / or poorly defined technical specifications	Financial circuit (OVA and or AOS approval and supervision of specifications)	<p><b>Coverage:</b> 100 % of the specifications are scrutinised</p> <p><b>Depth:</b> determined by the amount and/or the impact on the objectives of the DG if it goes wrong</p>	<p><b>Costs:</b> Estimation of cost of operational and financial staff involved</p> <p><b>Benefits:</b> limit the risk of litigation, limit the risk of cancellation of a tender and compliance with Financial Regulation and Procurement rules</p>	<p>Cost of control on procurement / Total contract value</p> <p>Cost of control on procurement / number of procedures closed during the year</p>
	Additional controls namely by procurement staff above the financial threshold of EUR 15 000	<p><b>Coverage:</b> 100 % of procedures &gt; EUR 15 000</p>		
	Public Procurement Advisory Group (PPAG) - ex-ante control	<p><b>Coverage:</b> Threshold (100 % <math>\geq</math> EUR 500 000 and 100 % of negotiated &gt; EUR 60 000) and random sampling (others &gt; EUR 60 000 &lt; EUR 500 000)</p> <p><b>Depth:</b> depends on the sensitivity Risk based approach focused in particular on the selection criteria</p>		

### C – Selection of the offer & evaluation

**Main control objectives:** Ensuring that the selection of the contractor is optimal

Main risks	Mitigating controls	Estimated coverage frequency and depth	Estimated Costs and benefits of controls	Control indicators
The most promising offer not being selected, due to a biased, inaccurate or 'unfair' evaluation process	Opening committee and Evaluation committee	<b>Coverage:</b> 100 % of the offers analysed <b>Depth:</b> all documents transmitted	<b>Costs:</b> Estimation of cost of operational and financial staff involved  <b>Benefits:</b> limit the risk of litigation and fraud, and compliance with Financial Regulation and Procurement rules	Cost of control on procurement / Total contract value  Cost of control on procurement / number of procedures closed during the year
	Public Procurement Advisory Group ex-ante control	<b>Coverage:</b> Threshold (100 % $\geq$ EUR 500 000 and 100 % of negotiated > EUR 60 000) and random sampling (others > EUR 60 000 < EUR 500 000) <b>Depth:</b> in terms of justification of the draft award decision		
	Opening and Evaluation Committees' declaration of absence of conflict of interest and confidentiality	<b>Coverage:</b> 100 % of the members of the opening and the evaluation committees		
Inconsistency between the signed contract, the specifications, the offer, the conclusion of the evaluation committee	Verification by procurement officers and financial verifying agents and authorising officers	<b>Coverage:</b> 100 % checked	<b>Costs:</b> Estimation of cost of operational and financial staff involved  <b>Benefits:</b> avoid	

Main risks	Mitigating controls	Estimated coverage frequency and depth	Estimated Costs and benefits of controls	Control indicators
and the awarding decision	Exclusion criteria documented	<b>Coverage:</b> 100 % checked <b>Depth:</b> required documents provided are consistent	contracting with 'excluded' suppliers that would not be able to fulfil the contract requirements	
	Public Procurement Advisory Group ex-ante control	<b>Coverage:</b> Threshold (100 % $\geq$ EUR 500 000 and 100 % of negotiated > EUR 60 000) and random sampling (others > EUR 60 000 < EUR 500 000) <b>Depth:</b> depends on the sensitivity Risk based approach focused in particular on the selection criteria		
	Early Warning System (EWS)	<b>Coverage:</b> 100 % checked		

## Stage 2 – Financial transactions

**Main control objectives:** Ensuring that the implementation of the contract is in compliance with the signed contract

Main risks	Mitigating controls	Estimated coverage frequency and depth	Estimated costs and benefits of controls	Control indicators
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Main risks	Mitigating controls	Estimated coverage frequency and depth	Estimated costs and benefits of controls	Control indicators
Contractor does not comply with the offer done / signed contract	Monitoring respect of contractual provisions	<b>Coverage:</b> 100 % monitored  <b>Depth:</b> follow-up of the deadlines and the deliverables mentioned in the contract	<b>Costs:</b> Estimation of cost of operational and financial staff involved  <b>Benefits:</b> Detect error before payment, sound financial management and respect of contractual provisions	Cost of control on the financial circuit / number of financial transactions
Amount paid is disconnected from the quality and the timing of the deliverables	Conform to the fact	<b>Coverage:</b> 100 % of transactions	<b>Costs:</b> Estimation of cost of operational and financial staff involved  <b>Benefits:</b> avoid paying undue amounts	Cost of control on the financial circuit / value of payment executed <sup>2</sup>
	Financial circuit: all steps financial and operational	<b>Coverage:</b> 100 % controlled  <b>Depth:</b> check of all required documents in the contract		
	Signature at higher senior management level for amounts > EUR 134 000	<b>Coverage:</b> 100 % of transactions > EUR 134 000  <b>Depth:</b> The depth depends on the risk criteria		

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<sup>2</sup> Excluded: payments done by the Paymaster's Office (PMO) (mainly related to salaries and business travel), and 'Hors Budget' Payments i.e. payments made to consolidate accounting data.



Main risks	Mitigating controls	Estimated coverage frequency and depth	Estimated costs and benefits of controls	Control indicators
	Sensitive functions	<b>Coverage:</b> AOSDs and OIAs mainly		
Risk of late interest payments and discontinuity of business because contractor fails to deliver due to delayed payments.	Close monitoring of every step in the payment process, in particular payment delays	<b>Coverage:</b> 100 % of transactions	<b>Costs:</b> Estimation of cost of operational and financial staff involved <b>Benefits:</b> Sound financial management and respect of contractual provisions	JRC Payments in time (in %) - According to the applicable financial regulation version

### Stage 3 – Supervisory measures

**Main control objectives:** Ensuring that any weakness in the procedures (tender and financial transactions) is corrected

Main risks	Mitigating controls	Estimated coverage frequency and depth	Estimated costs and benefits of controls	Control indicators
An error or non-compliance with regulatory and contractual provisions, including technical specifications, or a fraud is not prevented, detected or corrected by ex-ante control, prior to payment	Ex-post controls on procedures / contractors	<b>Coverage:</b> Risk based percentage or financial controllers check each other's work once a year  <b>Depth:</b> review of the procedures implemented (procurement and financial transactions)	<b>Costs:</b> estimation of cost of staff involved mainly linked to ex-post controls  <b>Benefits:</b> Irregular payments detected, issues are followed and addressed and improvement of processes and procedures	Detected error rate from ex-post controls: value of error(s) / total value of payments checked
	Whistle blowing (after yearly reporting of awarded contractors)	<b>Coverage:</b> potentially 100 %		Costs ex post controls / Total value of transactions checked by ex-post  Costs ex post controls / total number of transactions checked

Main risks	Mitigating controls	Estimated coverage frequency and depth	Estimated costs and benefits of controls	Control indicators
Management of the procurement is not improved in general	Review of ex post results	<p><b>Coverage:</b> 100 % at least once a year</p> <p><b>Depth:</b> look for any systemic problem in the procurement procedure and in the financial transaction procedure and any weakness in the selection process of the ex post controls</p>		by ex-post
	Review of exception reporting	<p><b>Coverage:</b> 100 % at least once a year</p> <p><b>Depth:</b> look for any weakness in the procedures (procurement and financial transactions)</p>		

## ICT N 2: Managing Income from Competitive Actions

This ICT applies to income generated by the JRC through providing, under contract, scientific and technical services to customers both within and outside the European Institutions.

### Stage 1: Contract Proposal Phase

**Main control objectives:** Ensuring the JRC only commits to revenue generating operations through competitive contracts when appropriate

Main risks	Mitigating controls	Estimated coverage frequency and depth	Estimated costs and benefits of controls	Control indicators
The risk of carrying out projects which are not in line with the JRC work programme and which do not meet customer expectations, might lead to reputational issues.	Risk assessment carried out on each competitive project proposal and reviewed by management	<b>Coverage:</b> 100% (risk assessment and project check list for all projects proposals).	<b>Costs:</b> Estimated time taken by responsible scientist and management to prepare and review risk assessment against project proposal value.	Cost of control on competitive project proposals / Total competitive project proposal value
	Project check list for each competitive project proposal is subject to management review.	<b>Depth:</b> all documents transmitted	<b>Benefits:</b> Only project proposals with an acceptable level of risk and which are in line with work programme which could meet customer expectations are accepted.	Cost of control on competitive project proposals / Number of proposals selected during the year
	For Commission customers project proposals – high level management review and hierarchical validation	<b>Coverage:</b> 100 % (all Commission project proposals).	<b>Costs:</b> Estimated time taken by each actor in the management review procedure.	Total cost of control of management review / Total project proposal value of Support to Commission contracts
		<b>Depth:</b> may be determined by the amount and/or the impact on the objectives	<b>Benefits:</b> Only project proposals with an	

Main risks	Mitigating controls	Estimated coverage frequency and depth	Estimated costs and benefits of controls	Control indicators
		of the DG if it goes wrong	acceptable level of risk and which are in line with work programme which could meet customer expectations are accepted.	
Financial risk on Third Party Work (TPW) contracts – risk of non-payment by third parties	50% up-front payment is requested on all TPW contracts.  Checking and follow-up of receipt of up-front payment by financial officers	<b>Coverage:</b> 100% check of receipt of TPW up-front payments.	<b>Costs:</b> Estimated time taken by competitive financial officers to request and monitor TPW up-front payment against project value  <b>Benefit:</b> reduced risk from third party default	Cost of control for up-front payment / Project value of all TPW contracts  Rate of default on TPW contracts
Financial loss due to underestimation of cost of deliverables	Approval of Cost Evaluation Form by Head of Unit.	<b>Coverage:</b> 100% (All cost evaluation forms authorised by the Unit Head)	<b>Costs:</b> Estimated time for Unit head to approve the project proposal cost evaluation.  <b>Benefit:</b> Reduced risk of financial loss due to overspending on competitive contracts	Cost of control / Value of cost evaluation form

## Stage 2: Contract Preparation Phase

**Main control objectives:** Ensuring all competitive contracts signed by the JRC for the provision of scientific/technical services meet the appropriate contract standards.

Main risks	Mitigating controls	Estimated coverage frequency and depth	Estimated costs and benefits of controls	Control indicators
Inappropriate contract wording may expose the JRC to additional liability.	Wherever possible standard templates are used. All contracts are checked and verified by the competitive financial officers and in particular for any deviation from standard clauses, and for any non-standard clauses an opinion of the legal unit may be sought.	<b>Coverage:</b> 100% (all contracts reviewed at the level of the competitive financial officers).	<b>Cost:</b> Estimated time taken for the competitive financial officers to verify all contracts.  <b>Benefit:</b> The JRC is not exposed to any additional liability	Cost of control / Total value of contracts signed  Total cost of controls / number of contracts signed
Failure to properly forecast revenue in the associated initial Forecast of Revenue (FOR) may result in inadequate credit commitments being available.	All FORs are checked by the Financial Initiating Agent (FIA), verified by a financial verifying agent (FVA) and authorised by the authorising officer (AOS) who is also responsible for the legal commitment (i.e. signing the contract)	<b>Coverage:</b> 100% as all FOR are checked, verified and authorised (Financial Circuits).  <b>Depth:</b> The depth depends on the risk criteria	<b>Cost:</b> Estimated time of staff involved, (FIA; FVA & AOS).  <b>Benefit:</b> Elimination of errors on FOR, respect of financial circuits.	Cost of control / Total value of FORs signed  Cost of control / number of FORs

### Stage 3: Contract implementation phase

**Main control objectives:** To guarantee the correct financial management of all revenue generating operations through competitive contracts

Main risks	Mitigating controls	Estimated coverage frequency and depth	Estimated costs and benefits of controls	Control indicators
Failure to cash appropriately might lead to financial and reputational loss.	Budget consumption is verified by the competitive financial officers (FIAs) prior to billing the customer.  All Recovery Orders (ROs) are checked by FIA against contract and budget consumption, verified both by the FVA and authorised by the AOS.	<b>Coverage:</b> 100% (all ROs are checked, verified and authorised). – Financial circuits  <b>Depth:</b> The depth depends on the risk criteria	<b>Cost:</b> Time taken by, FIA, FVA and AOS to verify ROs against the total value of ROs issued.  <b>Benefit:</b> Correct billing of customers, sound financial management and respect of contractual provisions.	Total cost of controls / Total value of recovery orders
	Independent audits are systematically carried out For Framework Programme (FP) contracts with a reimbursable value > €375.000	<b>Coverage:</b> Independent audits of FP contracts with a reimbursable value > € 375,000  <b>Depth:</b> The depth depends on the risk criteria	<b>Cost:</b> Total cost of audits.  <b>Benefit:</b> reduced risk of errors for contracts with a reimbursable value > EUR 375 000, system improvements and compliance with FP provisions.	Costs of audits / Total value of competitive projects audited

<b>Main risks</b>	<b>Mitigating controls</b>	<b>Estimated coverage frequency and depth</b>	<b>Estimated costs and benefits of controls</b>	<b>Control indicators</b>
Risk of late interest payments and discontinuity of business because contractor fails to deliver due to delayed payments.	Close monitoring of every step in the revenue process, including competitive cashing rates	Coverage: 100 % of RO transactions	<p><b>Costs:</b> Estimated time of staff involved, (FIA; FVA &amp; AOS).</p> <p><b>Benefits:</b> Sound financial management and respect of contractual provisions</p>	JRC competitive cashing (in %) - up to 15% of the institutional budget

**ANNEX 6: Implementation through national or international public-sector bodies and bodies governed by private law with a public sector mission (if applicable)**

N/A

**ANNEX 7: EAMR of the Union Delegations (if applicable)**

N/A

**ANNEX 8: Decentralised agencies (if applicable)**

N/A



## ANNEX 9: Evaluations and other studies finalised or cancelled in 2015

Reference No of Annex 4 MP2015	Title	Reason <sup>1</sup>	Scope <sup>2</sup>	Type of evaluation or other study			Associated DGs	Costs (EUR)	Comments	Reference	Cancelled
				Focus <sup>3</sup>	Author <sup>4</sup>	Type <sup>5</sup>					
I. Evaluations finalised or cancelled in 2015											
a. evaluations finalised in 2015											
	Ex-post evaluation of FP7 JRC activities	Legal obligation to provide independent feedback to the budgetary and legislative authorities, other stakeholders and the general public on the JRC activities in FP7.	JRC direct actions under FP7 both nuclear and non- nuclear	R	E	E	n.a.	150000		"Ex-post evaluation of the direct actions of the Joint Research Centre under the Seventh Framework Programmes 2007-2013"; EUR 27 343 EN; <a href="http://publications.jrc.ec.europa.eu/repository/bitstream/JRC96870/kjna27343enn.pdf">http://publications.jrc.ec.europa.eu/repository/bitstream/JRC96870/kjna27343enn.pdf</a>	
	JRC Productivity and Impact Evaluation (PRIME)	To provide regular evaluation based input to the SPP cycle and JRC senior management strategic decision making	JRC direct actions under Horizon 2020/EURATOM	P/R	I	E	n.a.	n.a		JRC Productivity and Impact Report; Ref. Ares(2015)2611400 - 22/06/2015; internal report Results from PRIME 2014;	
	JRC work programme ex- ante assessment, pilot exercise	Optimisation of work programme definition	JRC direct actions under Horizon 2020/EURATOM	p	I	I	n.a.	n.a		n/a	
b. Evaluations cancelled in 2015											
N/A											

Table A9-1: Evaluations finalised in 2015

Reference No of Annex 4 MP2015	Title	Reason <sup>1</sup>	Scope <sup>2</sup>	Type of evaluation or other study			Associated DGs	Costs (EUR)	Comments	Reference	Cancelled
				Focus <sup>3</sup>	Author <sup>4</sup>	Type <sup>5</sup>					
II. Other studies finalised or cancelled in 2015											
a. other studies finalised in 2015											
59	Inventory of critical raw materials used in the EU Defence Sector	O- Support to EU Raw Materials Initiative	The aim is to compose an inventory of raw materials that are used by the EU defence sector, including air-, land- and sea-based platforms; weapons (air-launched, infantry and naval); and communications (satellite, etc.).	R	E	R					
60	Compressor Station Facility Failure Modes: Causes, Taxonomy and Effects	O- Support to Third Package of legislation on the internal energy market and the Infrastructure Package/Energy Security Strategy	To support development of the EU gas transmission network modelling tools by providing an identification of the most relevant hazards and to characterise their risk in terms of likelihood and especially effect on specific network infrastructure.	P	E	I	n.a.	60 000			
62	A complex steady state and dynamic model of an electricity system	O- Support to Third Package of legislation on the internal energy market and the Infrastructure Package/Energy Security Strategy	To develop a test-model for the dynamic simulation of a given transmission system.	P	E	I	n.a.	60 000			
64	Information system on Distribution Systems Operators (DSO Observatory)	O- Support to Third Package of legislation on the internal energy market and the Infrastructure Package/Energy Security Strategy	To build a techno-economic information system on Distribution Systems Operators (DSO Observatory) to complement the databases, inventories technical and economic models dealing with power systems already used in the JRC	P/R	E	I	n.a.	90 000			
65	Development of a "Strategy for retaining critical competences in nuclear safety in the EU"	JRC direct actions under Horizon 2020/EURATOM	Nuclear competences in the EU	P	E	I	n.a.	25 000		JRC, 2015, Retaining critical competences in nuclear energy sector: national initiatives and best practices, instruments and tools	

Table A9-2: Studies finalised in 2015

Reference No of Annex 4 MP2015	Title	Reason <sup>1</sup>	Scope <sup>2</sup>	Type of evaluation or other study			Associated DGs	Costs (EUR)	Comments	Reference	Cancelled
				Focus <sup>3</sup>	Author <sup>4</sup>	Type <sup>5</sup>					
II. Other studies finalised or cancelled in 2015											
a. other studies finalised in 2015											
67	Extension of the European natural gas transmission infrastructure model (EUGas) to 10 EU countries	O- Support to Third Package of legislation on the internal energy market and the Infrastructure Package/Energy Security Strategy	Extend the EU Gas hydraulic model to other 10 Member States by collecting demand/supply data, and implementing the hydraulic model for each Country.	P	E	I	n.a.	180 000			
70	Compressor station failure consequence study	O- JRC H2020 Direct Actions	To support development of the EU gas transmission network modelling tools	P	E	I	n.a.	12 500			
71	PMP technical support	O	Provision of technical/scientific support for the Particulate Measurement Programme (PMP)					59 000	Planning a framework contract to provide the STU with highly qualified technical and scientific support in remaining and new issues related to nano-particle emissions from light duty vehicles and heavy duty engines		
72	Strategy for Open Education	Other - contribute to formulation of policy initiatives in the area of Open Education	Qualitative (in-depth case study analysis of 7 universities) and quantitative (5 country survey of all initiatives) analysis of Open Education	R	E	I	EAC	110 000	Study to collect and analyse data	Ares(2015)3815197	
74	Entrepreneurship Competence	Other - contribute to formulation of policy initiatives in the area of Digital Competence for Entrepreneurship	Qualitative inventory, review and case study analysis of initiatives formulating competences for business	P/R	E	I	EMPL	60 000	Study to collect and analyse data	Ares(2015)2625551	
75	Nielsen Music database	Other - contribute to revision of Copyright Directive	Purchase of data to allow the empirical analysis of legal and illegal use of digital content (music)	R	E	C	MARKT	60 000	Purchase of Data to Analyse	n/a (database)	
76	Mobile phone and Internet access GFK database	Other- contribute to analysis of barriers to DSM	data from 1 country and 2250 users of both mobile and fixed-line Internet	R	E	C	CNECT	60 000	Purchase of Data to Analyse	n/a (database)	
77	ICT-enabled Open Innovation	Other - contribute to the analysis of Open Systems of Innovation towards enhanced Growth in the EU	Qualitative study (12 cases) of ICT-enabled systems of Open Innovation based on interviews in a few EU MS.	R	E	I	CNECT	60 000	Study to collect and analyse data	Ares(2015)6009099	

Table A9-3: Studies finalised in 2015

Reference No of Annex 4 MP2015	Title	Reason <sup>1</sup>	Scope <sup>2</sup>	Type of evaluation or other study			Associated DGs	Costs (EUR)	Comments	Reference	Cancelled
				Focus <sup>3</sup>	Author <sup>4</sup>	Type <sup>5</sup>					
II. Other studies finalised or cancelled in 2015											
a. other studies finalised in 2015											
79	On- and Off-line sales in Europe	Other - contribute to DSM strategy and white paper (May 2015)	online & offline sales, covering 2008-14 (monthly), 10 different product categories, for as many EU MS as possible.	R	E	C	CNECT	300 000	Purchase of data to analyse	Ares(2015)5185356	
87	Feasibility study and analysis of methods for detection of declining trees from very-high spectral resolution imagery	Support to DG SANCO in combating the spread of the Pine Wood Nematode		P/R	E			15 000	ST		
88	Feasibility study on the improvement of the Global Forest Trade Model of JRC in support of the EU Forest Bioeconomy	Support to JRC modelling activities in the context of the EU Forest Bioeconomy		P/R	E			15 000	ST		
93	Regional food security and common market policy of East African Community (EAC)	To advise upon implementation of policies, both within EAC and to the EU		P/R	E	I	DG DEVCO	220 000			
96	Substitution of critical raw materials in permanent magnets in wind turbines and electric vehicles, and in phosphors and LEDs for lighting	O- support to Raw Materials Initiative	Assess the issues related to substitution of nine critical raw materials in permanent magnets (Nd, Pr, Dy) in the wind energy and electric vehicle sectors and in phosphors and LEDs (Eu, Tb, Y, In, Ga, Ge) in the lighting sector.	P	E	o	n.a.	80 000			

Table A9-4: Studies finalised in 2015

Reference No of Annex 4 MP2015	Title	Reason <sup>1</sup>	Scope <sup>2</sup>	Type of evaluation or other study			Associated DGs	Costs (EUR)	Comments	Reference	Cancelled
				Focus <sup>3</sup>	Author <sup>4</sup>	Type <sup>5</sup>					
II. Other studies finalised or cancelled in 2015											
b. other studies cancelled in 2015											
61	Interdependencies Between Natural Gas and Power Grids: Critical Failure Modes Classification	O- Support to Third Package of legislation on the internal energy market and the Infrastructure Package/Energy Security Strategy	To analyse and model critical infrastructures in the presence of interdependencies in order to know how such interdependencies may contribute to the occurrence of large outages.	P	E	I	n.a.	60 000			Cancelled (the budget was not anymore available)
78	Discrete Choice Model for Health Technology Assessment	Other - contribute to the EIP-AHA through developing a Monitoring Analytical Framework for Impact Assessment	Develop a Decision Analytic Model to estimate the impact of EIP-AHA activities on: (i) health & QoL; (ii) sustainability of health systems.	R	M	C	SANCO + CNECT	60 000	Develop model, collect data, pilot test model		x
90	Complementing forest biomass estimates with additional variables (forest increment, forest management, biomass compartments)	Support the JRC biomass assessment study		P/R	E			180 000	SC20-38843		Cancelled in 2015. Modified into a study to support the development of the European Forestry Dynamics Model (to be launched in 2016)
92	Feasibility study on wood life cycle in EU28	Support the JRC biomass assessment study		P/R	E			15 000	Study Contract		x
94	Links between statistical and administrative data at farm level	Support expanding farm level data collection - important for agricultural statistics		P/R	E	I	DG AGRI DG ESTAT	68 000			Cancelled in 2015. Modified into a study to assess farm level tools capabilities, their principles and standards, their possible usage in future CAP (launched in 2016)

Table A9-5: Studies cancelled in 2015

## ANNEX 10: Specific annexes related to "Management of Resources"

### 1. Credits cross-sub-delegated

- Cross-sub-delegations received

The JRC received cross sub-delegated authority to use the budgetary resources of other Directorates General and services of the Commission. Such authorisation is linked to specific research projects or actions. The services and amounts concerned are summarised in the table below.

DG/Service	Associated Budget in 2015 <sup>3</sup> (C1 commitment accepted) In EUR 1 000s	Nature of Service managed by the JRC
DG AGRI	4.278	Assigned to the Institute for Environment and Sustainability (IES) for the Union participation at the World Exposition 2015- 'Feeding the Planet - Energy for Life' in Milan.
DG CLIMA	0	Assigned to the Institute for Environment and Sustainability (IES) for the Pilot Project "Making efficient use of EU climate finance: using roads as an early performance indicator for REDD+ projects".
DG DIGIT	1.725	Assigned to the Institute for Environment and Sustainability (IES) for Action 1.17 "Reusable INSPIRE Reference Platform" and action 2.13 "EULF".
DG NEAR	90	Assigned to the Policy Support Coordination Directorate for the "TAC - Travel Accommodation and Conference facility for Western Balkans and Turkey".
DG GROW	13.794	Assigned to the Institute for the Protection and Security of the Citizen (IPSC) and to the Institute for Environment and Sustainability (IES) for the programme "Copernicus"
DG ENV	0	Assigned to the Institute for Environment and Sustainability (IES) for the project "Future legal basis on harmonised EU forest information".
DG HOME	0	Assigned to the Institute for the Protection and Security of the Citizen (IPSC) and to the Institute for Energy and Transport (IET) for the project "EPCIP".
DG MARE	n.a. (*)	DG MARE granted a cross sub delegation to the Institute for the Protection and Security of the Citizen (IPSC) to enter into legal commitments in the context of production of scientific advice by the Scientific, Technical and Economic Committee for Fisheries (STECF).  (*)This sub-delegation is limited to the signature of legal commitments, no budgetary sub-delegation was given. The JRC organizes the committee meetings including the expert invitations. Payments are executed by DG MARE and the PMO. The IR (art 4.1) specifically allows for the AOSD to be different in case of provisional commitments. In this case, both the commitments on the global envelope and on the operational line are provisional commitments.

<sup>3</sup> When the budget is zero, it means that no C1 commitments were accepted in 2015 but RAL management only

DG RTD	0	Assigned to the Institute for Prospective Technological Studies for the project "Research and Innovation Observatory".
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Table A10-1: Cross Sub-Delegations received

### • Cross-sub-delegations given

The JRC has provided sub-delegations to other DGs of the European Commission for the following budget lines:

- 10 02 01 "Horizon 2020 — Customer-driven scientific and technical support to Union policies".

DG/Service	<b>Associated Budget in 2015</b> (C1 commitment accepted) In EUR 1 000s	<b>Nature of Service managed by the Other Services</b>
DG ESTAT	40	Contribution of the JRC to the purchase and annual update of geographic database

Table A10-2: Cross Sub-Delegations given

### • Co-delegations

The JRC has put in place Horizontal co-delegations<sup>4</sup> (art. 3.2 of the Internal Rules) with other Directorate Generals of the European Commission for the following budget lines:

- 10 01 05 "Support expenditure for operations of Direct research, policy area"
- 05 07 01 02 "Monitoring and preventive measures — Direct payments by the Union"
- 05 08 03 00 "Restructuring of systems for agricultural surveys"

DG/Service	<b>Associated Budget in 2015</b> (C1 commitment accepted) In EUR 1 000s	<b>Nature of the Co-delegated Service</b>
DG AGRI <sup>5</sup>	7.480	Control with Remote Sensing Programme - Acquisition of satellite imagery under the 2015 Control with Remote Sensing (CwRS) work programme and their free of charge supply to the MS.
DG AGRI	1.773	AGRI4CAST project – Implementation of the Operational MARS Crop Yield Forecasting System, The project results in the production of monthly MARS Bulletins, bi-weekly briefings on agro-meteorological conditions to AGRI, and additional ad-hoc analyses upon request.

<sup>4</sup> 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)

<sup>5</sup> The two co-delegations with DG AGRI are Horizontal Co-Delegation type I (Art. 3.2 of the Internal Rules) for which the Fund Management Centre in ABAC is "JRC" and as a result appear in Tables 1 to 3 of Annex 3 even though the budget title is DG AGRI's (i.e. 05) and not JRC (i.e. 10).

DG BUDG	93	Contribution to DG BUDG Services related to ABAC
DG DGT	150	Contribution of the JRC to DGT Translation Services
DG HR	100	The JRC social costs in Ispra managed by the Medical Services
DG HR	300	Contribution to the cost of the Medical Services in the sites
OIB	330	Contribution to the Ispra costs related to canteen & cafeteria, childcare and lodging managed by OIB

Table A10-3: Horizontal Co-Delegations given

The JRC has put in place Vertical co-delegations (art. 3.2 of the Internal Rules) with other Directorate Generals of the European Commission for the following budget lines:

- 10 01 05 "Support expenditure for operations of Direct research, policy area"

DG/Service	<b>Associated Budget in 2015</b> <i>(C1 commitment accepted)</i> <i>In EUR 1 000s</i>	<b>Nature of Co-Delegated Service</b>
DG HR	0	Payment of Interim staff in Brussels
PMO	0	Payments of core and contractual staff expenditure

Table A10-4: Vertical Co-delegations given

## 2. Expenditure operations

The JRC carries out its expenditure operations through procurement operations. An internal control template (ICT) covering JRC's procurement is available in Annex 5 of this AAR.

The table below depicts the type of procurement procedures larger than EUR 60 000 carried out during 2015. Due to the intrinsic nature of its operations, the JRC has a higher than normal proportion of negotiated contracts.



<p><b>Management mode:</b> Direct centralised</p> <p><b>Key figures:</b></p> <ul style="list-style-type: none"> <li>There were 162 large value (&gt; EUR 60 000) contract tenders valued at approximately EUR 242 million<sup>6</sup></li> <li>19% of the files were awarded through negotiated procedure.</li> </ul>	<table border="1"> <caption>Procurement Procedures Data</caption> <thead> <tr> <th>Procedure</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Open</td> <td>65%</td> </tr> <tr> <td>Negotiated</td> <td>19%</td> </tr> <tr> <td>Restricted</td> <td>15%</td> </tr> <tr> <td>Competitive Dialogue</td> <td>1%</td> </tr> </tbody> </table>	Procedure	Percentage	Open	65%	Negotiated	19%	Restricted	15%	Competitive Dialogue	1%
Procedure	Percentage										
Open	65%										
Negotiated	19%										
Restricted	15%										
Competitive Dialogue	1%										

Table A10-5: Procurement procedures (> EUR 60 000) carried out in 2015

### 3. Revenue operations

The JRC has a mandate to carry out revenue generating operations through competitive activities, which is enshrined in a series of Council Decisions and Resolutions:

- The Council Resolution of 29 June 1988 introduced the concept of competitive activities performed by the JRC for third parties and in support of the Commission. It clearly differentiated between the JRC's institutional task of executing specific research programmes and its work for 'other Commission services and for third parties'.
- The Council Decision of 3 May 1989 formalises the concept of the JRC performing third party and support to the Commission activities and clearly indicates that this will be 'against payment'.
- The idea is further developed in the Council Resolution of 29 April 1992 in which the Council indicates that it 'considers that the JRC should further optimize the use of available staff and equipment in fields where it has the competence and should, in addition to its task of executing specific research programmes and exploratory research, seek to pursue its work of providing services'.
- In the Council conclusions of 26 April 1994 on the role of the Joint Research Centre the Council reaffirms that the JRC must 'pursue and reinforce its move towards a more competitive approach on the basis of a genuine customer/contractor relationship' according to a set of guidelines provided in annex to the conclusions.

Competitive activities 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. Three distinct types of competitive activities exist:

#### 1. Support to Commission services

Support actions carried out by JRC for other Commission services for work that is additional or complementary to the institutional Work Programme. An Administrative Arrangement (AA) is negotiated with the other Commission DG

<sup>6</sup> The amount of EUR 277 Million is higher than the annual budget because the associated contracts run over several years.

setting out the legal, financial and technical framework of the support to be offered.

## 2. Indirect Actions within the scope of the research framework programmes

Indirect Actions are calls for proposal launched by the research family DGs, or their agencies, within the scope of Research Framework Programmes. The JRC participates under the same conditions and with the same rights and obligations as any other research body.

## 3. Third Party Work

Third Party Work is carried out for clients outside the Commission and in accordance with the Council Decision of 1989 and with Article 183 FR and Article 256 RAP for the JRC, allowing the JRC to provide services to third parties.

Table A10-6 below depicts the competitive contracts signed during 2015, the type and their value.

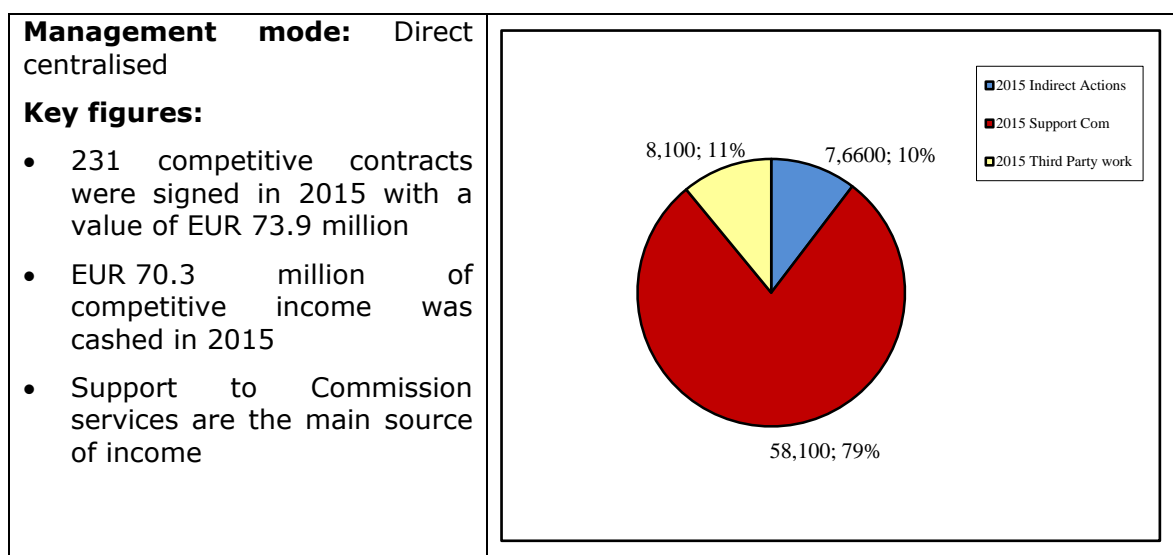


Table A10-6: Competitive contracts signed by the JRC in 2015

The additional income generated through competitive 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 competitive activities is available in Annex 5 of this AAR.

## 4. JRC Financial Circuits and Segregation of Duties<sup>7</sup>

### Basic principles

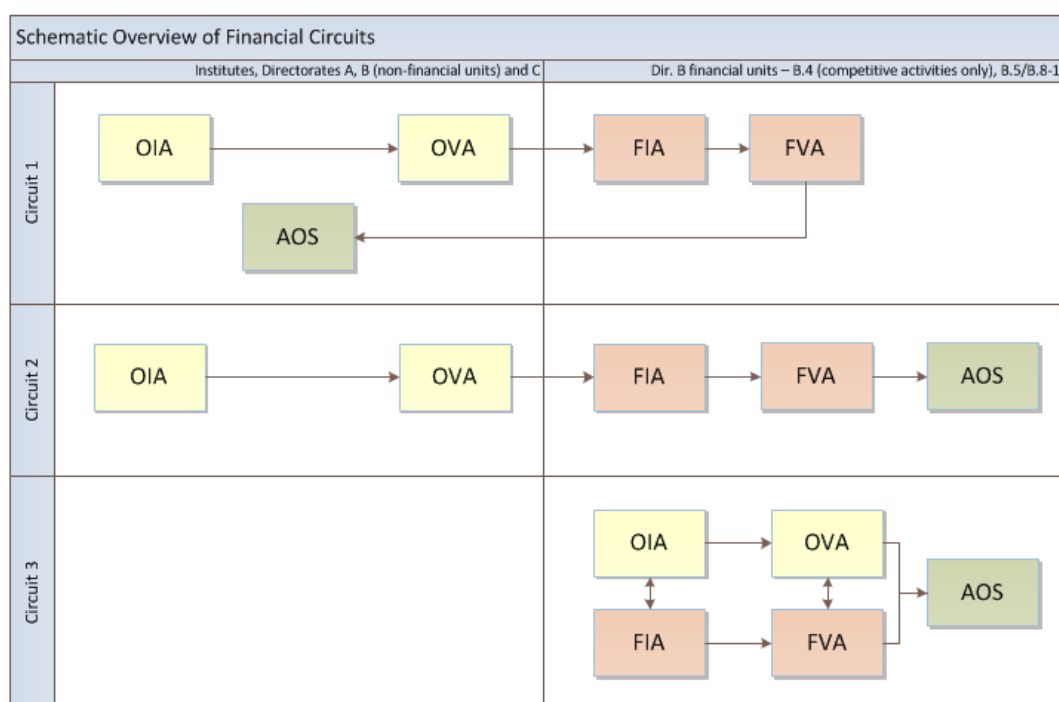
- **Four eyes principle/Segregation of duties:** before an operation is authorised, all aspects of this operation (both operational and financial) have to be verified by at least one member of staff other than the one(s) who initiated the operation. Therefore, the initiating and verifying function on one side, and the initiating and authorising function on the other side, can never be combined (Art. 66.5 FR).

<sup>7</sup> Extract from the "JRC Financial Circuits and Segregation of Duties" (Ref. Ares(2015)3238388)

- **Independence of the verifier:** the person executing the verifying function for an operation cannot be in a subordinated role to the person who initiates this operation (Art. 66.5 FR).
- **Single signature:** except in well-defined cases (as defined in Art. 97 RAP) the budgetary and legal commitment relating to the same transaction has to be signed by the same authorising officer.

## Basic circuits

The AOD can decide on the Financial Circuit(s) to be applied for the transactions under his/her responsibility. At the JRC, the type of financial circuits chosen is determined by the nature of the financial transaction which is undertaken, as well as by geographical considerations. In any event, all staff having the role of financial agents, Financial Initiating agent (FIA) and Financial Verifying agent (FVA), are based in the Financial Units of the Resources Directorate. A schematic representation of the JRC circuits can be shown as follows:



**Circuit 1** is the model which is used for the majority of transactions at the JRC. In this model there is a clear segregation between the operational and financial roles, respectively, and FIA/FVA are hierarchically independent from the AOS. It concerns transactions relating to:

- Scientific activities.
- Site management such as infrastructure and maintenance.
- Decommissioning activities.
- Centrally managed operations (<€134.000), such as training, informatics, communication etc.
- Income-generating transactions (Forecasts of Revenue, Recovery Orders).

In case of transactions <€134.000 managed by the institutes involving two or more actions from the same institute, the AOS will be the Head of the Unit in which the OIA is placed. The other Unit Heads are to be appropriately involved in the workflow.

**Circuit 2** is used when the operational actors are situated in a different unit than the financial actors, the AOS being a hierarchical superior to the FIA and the FVA. It can cover the following transactions:

- Activities managed within the Resources Directorate for an amount  $\geq \text{€}134.000$  (in these cases the AOS is the Resources Director).
- Activities involving more than one Directorate, where OIA and OVA are situated in Institutes/Directorates other than the Resources Directorate.
- Low-risk transactions (e.g. validation of payment orders for reimbursement of candidates/experts).
- Mass upload for payments (applied for Grantholder and trainee salary payments, reimbursement of candidates or experts). The workflow can represent a variation to circuit 2 in the sense that the OVA function can be carried out in the financial unit.

**Circuit 3** is applied where all operational and financial initiating and verifying functions are carried out within one or more units within Directorate B, the AOS being the hierarchical superior of the Operational and/or Financial Agents. It can cover the following transactions:

- Activities on administrative or staff-related budget lines.
- Activities of primarily technical nature on scientific budget lines (e.g. decommitment operations for low amounts, GL account re-booking, re-booking of amounts within a commitment, FDI extension, negative payment/repayment, correction of recovery context).
- Activities of primarily technical nature related to revenue (e.g. De-forecast and reforecast for guarantee funds (multi institute), budgetary shifts during a contract (multi institute), GL account corrections (multi institute), De-forecast at end of contract).

Depending on the risk involved as well as the complexity of the transaction being processed, this circuit allows for the number of financial agents to be reduced to a minimum of two persons: one person combining the OIA/FIA responsibilities, and a second combining the OVA/FVA/AOS responsibilities.

In some cases, an additional verification function can be carried out by an agent from a different unit. This is for example the case for purchases of IT goods/services, where such additional verification is formalised in the financial system through validation by a central IT Resources Manager (IRM).

## **ANNEX 11: Specific annexes related to "Assessment of the effectiveness of the internal control systems"**

N/A

## **ANNEX 12:                      Performance tables**

Since performance tables have been presented throughout the body of this AAR, in line with the standing instructions, Annex 12 is left blank.

## **ANNEX 13:                      Additional JRC tables**

The JRC Core indicator table (Table 13-1) and an overview table showing the links among the defined JRC Specific Objectives 1 to 3, the ABB activities, financial programmes, JRC General Objectives, Horizon 2020 specific objectives, JRC Key Orientations and Commission priorities, as well as the indicators used for evaluation purposes (Table 13-2) can be found in the following pages.

MP 2015 core indicators						
Management information need	Indicators	Definition	Value 2014	Value 2015	2015 Target	Comments
Perspective 1: Outputs & impact						
Impact of policy support						
SPP Key performance indicator 1 General Objective 1 & 2	Policy support impact	"Proportion of actions with tangible specific impacts on European policies resulting from technical and scientific policy support provided by the JRC"	100% (PRIME 2014)	N/A	suspended	This indicator is calculated using the JRC WP structure that has radically changed in 2014 with the introduction of the multi-annual work programme. Given the new WP structure, the calculation of this indicator is now considered hardly relevant, whilst being very difficult perform. This indicator has therefore been removed in the MP 2016.
		And "Number of occurrences of tangible specific impacts on European policies resulting from technical and scientific policy support provided by the JRC"	338 (PRIME 2014)	372 (PAR 2015)	300±10 (PRIME 2014) Long-term: 288	
Policy support productivity						
Specific objectives 1 and 2	Policy related ouputs (old name: Policy support deliverables)	Number of policy related outputs	1725	1613	1560 2014-2015: 3096	
Scientific productivity						
SPP Key performance indicator 2 Specific objective 1, 2 and 3	Peer-reviewed publications listed in SCI-e and SSCI (old name: Peer-review ed publications listed in ISI)	Scientific article contributions to periodicals or conference proceedings published as journals, the titles of which are listed in the Thomson-Reuters Science Citation Index Expanded (SCI-e) and/or Social Science Citation Index (SSCI)	720	699	620 Long-term: 655	
Foresight and Horizon scanning						
	Reports and identification of new research areas	Number of reports	2 Foresight study 2 Horizon Scanning Bulletins	2 Foresight studies 0 Horizon Scanning Bulletins (no longer produced)	1 Foresight study 3 Horizon Scanning Bulletins	
Income from additional activities						
SPP Key performance indicator 4 Specific objectives 3, 13	Contractual income (old name "Cashed competitive income")	Annual cashed income from activities outside institutional budget	18.6%	18.9%	15% of institutional budget	
Scientific collaboration and networking						
SPP Key performance indicator 3 Specific objective 3	Peer-reviewed publications co-authored with non-JRC authors	Proportion of peer-reviewed publications co-authored with non-JRC authors/total number of peer-reviewed publications	80%	72%	72±3%	
	International collaborations	Proportion of peer-reviewed publications co-authored with organisations from countries outside ERA/total number of peer-reviewed publications	24%	24%	21±3%	
Public visibility						
General objectives 1 & 2	Press coverage	Number of coverage pieces in top tier media	140	142	150	The new JRC website "Science Hub" was launched on 1 May 2014. Three major changes occurred: (1) change of website; (2) change of the statistical tool for access counting; (3) no more distinction external/internal pageviews/visits. Hence targets, and past / current indicator values are no longer comparable.
	Access to JRC websites	Number of page views on the JRC website	3.5 million	7.7 million	2.5 million	
		Number of visits to the JRC website	1 million	2.8 million	1 million	

Table A13-1. MP 2015 JRC core indicators

Management information need	Indicators	Definition	Value 2014	Value 2015	2015 Target	Target related comments
<b>Perspective 2: Organisational efficiency</b>						
<b>Staff structure</b>						
<i>Specific horizontal objective 11</i>	Proportion of local support staff	Ratio of local support and coordination staff with respect to overall JRC workforce	7.4%	7.1% (23/01/2015)	7.4%	Commission target
<b>Recruitment</b>						
<i>Specific horizontal objective 12</i>	Timeliness of recruitment of officials (internal/external procedure)	Average number of working days from the publication of the deadline of the vacancies until the date of distribution of relevant administrative act	51/160	Internal/External 43/114	≤60/≤120	
<b>Payments</b>						
<i>Specific horizontal objective 13</i>	Timeliness of payments	Proportion of payments done within legal time limits	94%	94%	≥95%	
<b>Procurement</b>						
<i>Specific horizontal objective 13</i>	Quality of procurement procedures submitted to the PPAG	Proportion of positive opinions of the Public Procurement Advisory Group (PPAG)	95%	95%	≥95%	
<b>Internal Control</b>						
<i>Specific horizontal objective 14</i>	IAC recommendations implemented	% of accepted audit recommendations effectively implemented (data established following follow-up audit)	88%	86%	>90% implemented	
<b>Perspective 3: Working environment</b>						
<b>Staff satisfaction</b>						
<i>Specific objective 11</i>	Overall job satisfaction	Overall job satisfaction of JRC staff based on EC Staff Opinion Survey	68%	N/A (no survey in 2015)	72.2%	Commission target
<b>Equal opportunities</b>						
<i>Specific objective 12</i>	Gender balance in AD-grade positions	Number of women/(Number of women + men) in senior management, middle management and AD-non-management, respectively positions"	20%senior management 17.65% middle management 24.07% AD-non-management * In 2014, up to 01/12, there were no nominations to senior management level and 0% of women were nominated to middle management positions. During the 1st semester 2014, 21.7% of women were recruited in AD non-management positions.	27.3% senior management 16.4% middle management 24.27% AD non-management In 2015, there were was one nomination of a female to senior mgmt level and 0% of women were nominated to middle mgmt positions. 32% of all newly recruited staff in AD-non mgmt positions were women	No specific target for JRC (senior management) 21.3% (middle management) No specific target for JRC (AD-non-management)	
<b>Staff development</b>						
<i>Specific horizontal objective 12</i>	Training evaluation	Average response of participants on how well learning objectives were met	81%	83%	85%	

Table A13-1 (continued). MP 2015 JRC core indicators



ABB activity	Financial Programme	General Objective (GO)	Specific Objective (SO)	Contribution to H2020 SO	Contribution to JRC KO	Contribution to EC priorities	Indicators
Direct actions of JRC in support of Union policies (non-nuclear)	Horizon 2020	1	1.1	17	Agriculture and Rural Development (1.1)	1	1. Policy support impact 2. Peer-review publications listed in ISI
					Education, Culture, Youth and Sport (1.2)		
					Environment (1.3)		
					Maritime Affairs and Fisheries (1.4)		
					Health and Food Safety (1.5)		
					Regional Policy (1.6)		
					Research, Science and Innovation (1.7)		
					Transport (1.8)		
			1.2		Digital Economy and Society (2.1)	2	
			1.3		Climate Action (3.1)	3	
			1.4		Energy (3.2)	4	
					Internal Market, Industry, Entrepreneurship and SMEs (4.1)		
			1.5		Intellectual Property Rights (4.2)	5	
					Economic and Monetary Union (5.1)		
					Employment, Social Affairs, Skills and Labour Mobility (5.2)		
					Financial Stability, Financial Services and Capital Markets Union (5.3)		
			1.6		Taxation and Customs Union (5.4)	6	
			1.7		Trade Policy (6.1)	7	
			1.8		Justice, Consumers and Gender Equality (7.1)	8	
			1.9		Migration, Home Affairs and Citizenship (8.1)	9	
Global safety and security (9.1)							
International Cooperation and Development (9.2)							
1.10	Associated and Neighbourhood Countries (9.3)	10					
	Interinstitutional networks (10)						
	Participation in Horizon 2020 projects (10)						
1.11	Support to member states (10)	Cross-cutting					
	Cross-cutting activities (11)						
Direct actions of JRC in support of Euratom Programme (nuclear)	Euratom	2	2.1	9	Nuclear safety and security (3.3) + Global Safety and Security (9.1)	3 + 9	1. Policy support impact 2. Peer-review publications listed in ISI
			2.2	10			
			2.3	11	Nuclear safety and security (3.3)	3	
			2.4	12			
			2.5	13			
Direct actions of JRC in support of Union policies + Direct actions of JRC in support of Euratom	H2020 + Euratom	1 + 2	3	9-13, 17	All the above (1-11)	All the above (1-10)	1. Peer-review publications listed in ISI 2. Peer-review publications co-authored with non-JRC authors 3. International collaborations

Table A13-2. Links between the defined JRC Specific Objectives 1, 2 and 3, the ABB activities, financial programmes, JRC General Objectives, Horizon 2020 specific objectives, JRC Key Orientations and Commission priorities, as well as the indicators used for evaluation purposes

## **Annex 14: Examples of policy support taken from the JRC Work Programme**

### **Jobs, Growth and Investment**

*Strengthening Europe's competitiveness and stimulating investment to create more jobs is a top priority for the European Commission. Sustainable growth requires smart measures that will not create debts, and is the best use of the available public funds to boost private investment in the real economy. In order to succeed, the Commission is focusing on improving the investment environment and strengthening fund absorption. New, sustainable and job-creating projects that will help restore Europe's competitiveness are being identified and promoted.*

*During 2015, in support of this endeavour, the JRC continued its work on the circular economy and carried out a series of research activities on aspects of economic policy, regional competitiveness and employability criteria. The JRC also explored the link between exports and jobs, analysed the impact of investments at country and local level, and looked at healthcare as a precondition for a productive and active population.*

### **Supporting a circular economy**

In response to some of today's key challenges, the aim of circular economy strategies is to extend the value of products and resources, whilst minimising waste generation. On 2 December 2015, the Commission published an ambitious programme in this area.

The JRC is supporting these efforts throughout the product value chain, from production to consumption, repair, remanufacturing, waste management and the use of secondary raw materials. It has, for instance, developed methods like the Product Environmental Footprint and the Resource Efficiency Assessment of Products to evaluate the environmental performance of products, goods and services. The JRC's European Platform on Life Cycle Assessment (EPLCA) provides information on the use of energy, of raw materials and the generation of emissions in production and consumption processes. In addition, the JRC has developed guidelines for a more sustainable waste management system, created indicators to monitor the environmental impact of waste management in cities, and analysed chemicals in products in order to develop toxicity-impact categories in view of facilitating recycling and the use of secondary materials. It also supports the implementation of the Ecodesign and Ecolabel initiatives.

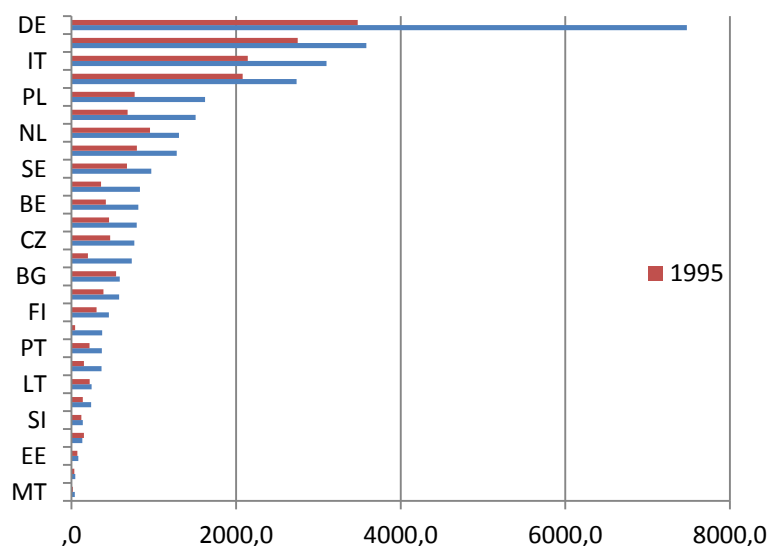
The JRC's work on food waste, raw materials and bio-based products is linked to the priority areas identified in the circular economy package as issues that require targeted action. Furthermore, the JRC provides monitoring tools, such as the Raw Materials Information System and the Bioeconomy Observatory. These aim to provide information on resources and consumption patterns in order to identify opportunities for recovering and saving materials and to find solutions to reduce the excessive waste of resources.

## WHAT IS THE CIRCULAR ECONOMY?



## EU exports matter for jobs and income back home

The JRC, together with the Commission's Directorate-General for Trade, analysed the complex interactions between trade activities, the job markets and income for all EU Member States. The findings revealed that EU exports support more than 31 million jobs in the EU and almost 20 million jobs outside the Union. EU-based companies export goods and services all around the world. These exports generate jobs and income not only in the exporting countries but elsewhere, too. For instance, car makers export around the world, and many car parts are produced in other countries, supporting and generating jobs and value in those economies. EU exports are becoming increasingly important for supporting jobs in Europe and, on average, export-related jobs are better paid than the jobs in the rest of the economy.



*EU employment supported by extra-EU exports by exporting Member State, 1995 and 2011 (1 000 jobs)*

## Smart specialisation for increased competitiveness

The JRC-managed Smart Specialisation Platform (S3P) helps EU countries and regions to develop, implement and review their research and innovation strategies (RIS3). In 2015,

a specific initiative on energy was launched (described in more detail in 'Smart specialisation to help EU regions develop low-carbon solutions' under the section two). The platform has been arranging a number of events related to strategy development, different steps of the Smart Specialisation process (e.g. monitoring, evaluation, and entrepreneurial discovery process (EDP), sectorial issues like Smart Specialisation in Blue Growth, the role of specific actors, like the role of research organisations in RIS3. The S3P has also supported interregional collaboration in macroregions notably Danube and the Baltic Sea Region. Similarly, through direct promotion and interaction with the Interreg and with inter regional initiatives like the Vanguard Initiative. Except for these hands-on activities there have been a number of publications on related topics e.g. Research and Technology Organisations and Smart Specialisation, and Monitoring Mechanisms for Smart Specialisation Strategies. In 2015, the data for Eye@RIS3 (an online database to help strategy development) was completed. Through Eye@RIS3, regions can introduce their priorities directly in the database and thus produce a realistic map of research and innovation strategy development. The resulting overview of the regions' priorities will enable others to position themselves, to find their unique niches and to seek out potential partners for collaboration. A first analysis of the data shows that the most common RIS3 priority areas in the EU are energy, health, information and communication technologies, food, advanced materials, services, tourism, sustainable innovation, advanced manufacturing systems, and the cultural and creative industries. The analysis also shows that few regions have developed similar priority combinations, but there are groupings around a number of popular categories and connected to key EU objectives. While most regions have, to date, defined a wide range of smart specialisation priorities, many of these are increasingly focusing on key enabling technologies (KETs), rendering the new database also useful for implementing the EU's KETs strategy and fostering transregional cooperation.

The JRC and the Directorate-General for Regional and Urban Policy have supported Greek authorities as a pilot action in order to help entrepreneurs and authorities to find out in which areas they should prioritise and further specialise if they wish to strengthen their competitive advantage. The project, carried out over a period of 15 months, has put into practice concepts developed via the work of the JRC's Smart Specialisation Platform, developing a highly interactive "hands-on" approach. Its core aim has been to enhance collaboration and engagement between the key stakeholders of the region's research and innovation system, which was a precondition to identify and exploit the region's potential for innovation based economic growth. Project impacts include the building of trust across communities of stakeholders, the engagement of a wider number of actors in the policy making process, the implementation of a genuine 'entrepreneurial discovery process' (EDP), additional support to internationalisation, and the actual implementation of those changes through concrete acts, such as calls for proposals and project selection criteria, incorporating the elements of smart specialisation and the outcome of the EDP.

### **Tackling macroeconomic imbalances**

A key factor in assessing the sustainability of a country's external position is its capacity to finance the purchase of external goods and services through its exports. This is why an increasing amount of attention and effort is being given to the definition of suitable indicators of external competitiveness which may be used to identify potential imbalances or unsustainable long-term trends. The external position of a Member State may be affected by several factors, stemming from both the demand and the supply of the economy. Demand being typically associated with import growth and the latter with export performance. The JRC has provided analysis on the supply side of the economy, and specifically on the ability of Member States to compete in export markets through the development of better products. In this way, it has contributed to the 'country-specific recommendations' (CSRs) for several Member States by providing the Directorate-General for Economic and Financial Affairs (DG ECFIN) with updated indices of external competitiveness.

## Country-specific recommendations – assessing the impacts of tax reforms

The JRC's fiscal and modelling experts worked closely with the Commission's DG ECFIN to assess the fiscal and equity impact of tax and structural reforms undertaken by Member States. This work was instrumental in the preparation of the country-specific recommendations in the context of the European Semester, the EU's annual cycle of economic policy coordination. Among other things, the JRC looked into work-related tax incentives and their impact on individuals' disposition to work. It also applied its modelling capacities to assess recent reforms adopted by the Member States.

The Commission reviewed Member States' economic policies and their measures to boost jobs and growth, focusing on three mutually reinforcing pillars: boosting investment, implementing structural reforms, and pursuing fiscal responsibility. As regards the latter, the effort is put on striking a balance between the short-term stabilisation and long-term sustainability of public finances. In particular, Member States with high deficits or debt levels need to make further efforts to fix their budgets and to make their tax systems more growth and job-friendly. The JRC is contributing to this endeavour by providing a comprehensive picture of the wide range of impacts that tax policy reforms can have on countries such as France, Germany, Romania, Lithuania and Estonia. It shows, for instance, that work-related tax incentives can have a significant effect on how much, if at all, certain individuals decide to work. At least a quarter of the extra tax revenue raised by lowering work-related tax incentives tends to get lost, as individuals react by working less or withdrawing altogether. The successful implementation of the 2015 country-specific recommendations will be key to supporting Europe's return to jobs and sustainable growth.

## Impact assessment of EU investments and territorial policies

JRC models and tools are widely used by policy-makers to assess the impact of place-based investments and policy development. The Land-Use-based Integrated Sustainable Assessment (LUISA) modelling platform enables the analysis of the evolution of European territories at different levels, from macro-regions and countries to regions and urban areas. The platform is based on a number of indicators that can provide projections up to the year 2050 and can measure the impact of economic performance (e.g. the provision of production factors such as employment, investments, energy, or the manufacturing of products and services such as food, fuels or consumer goods). Besides socio-economic indicators the LUISA platform also includes a set of indicators which assess the impact on biodiversity and ecosystem services. Examples are crop pollination by insects, nature-based recreation in forests and mountains, or the regulation of urban air quality by urban trees and parks. Understanding better how job creation, economic growth and human well-being rely on natural capital helps decide regional investments in green infrastructure and sustainable solutions in cities (e.g. urban renewal and industrial reconversion).

In 2015, the LUISA platform contributed to establishing a knowledge base to assess the impact of energy-efficiency investments in buildings in European cities. Further JRC models, like the Regional Holistic Model (RHOMOLO), which is a macroeconomic model implemented at the regional and sectoral level for the whole EU, are used extensively to assess the impact of cohesion policy and the impact of investments made by the European Investment Bank (EIB) on growth and employment.

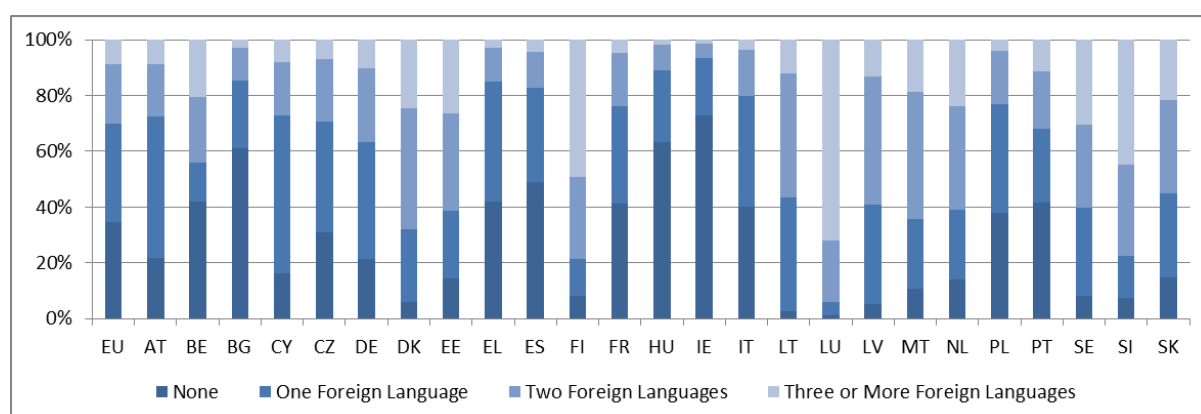
The JRC and the Directorate-General for Regional Policy (DG REGIO) have also developed the Europe 2020 Index, which measures the progress of EU countries, regions and cities with respect to the 2020 targets for employment, education, poverty, innovation, climate change and energy sustainability. The urban and regional dimensions reveal differences, with capital regions usually outperforming others, but also gaps among regions within a single Member State. These gaps suggest that some policies should be adapted to the particular situation of a city or a region. A new concept could be developed to turn cohesion policy into a performance-based funding scheme, with the eligibility of regions being based on their GDP and the funding determined by their performance in relation to Europe 2020 targets.

## Analysing how education and skills contribute to employability

Skills are instrumental in improving individuals' employment opportunities and hence increasing countries' productivity and economic growth while ensuring social cohesion. The JRC's Centre for Research on Education and Lifelong Learning (CRELL), is working closely with the Commission's Directorate-General for Education and Culture to help policy-makers and Member States to enhance the quality of education and training systems.

In 2015, JRC experts looked at how education, training, and cognitive and behavioural factors can contribute to employability. Based on surveys, the scientists investigated the influence of numeracy and literacy skills in employment, as well as the level of formal education. As expected, a higher level of skills and formal education correlates significantly with a higher market success across the EU.

Using data from a survey on education in 25 Member States, the JRC also looked into the relationship between knowledge of languages and the likelihood of finding a job. According to the study, adults who know one or more foreign languages are more likely to be employed than those who do not know any foreign language. The study proved this relationship to be true even for basic competences. In the EU-25, 34% of the population does not know a foreign language.



To help design policies for better competitiveness, labour productivity and job quality in the transport sector, the JRC also carried out an analysis of employability in this sector for the Commission's Directorate-General for Transport and Mobility. The results show that mobile and technical staff with medium to high skills are expected to be in greater demand than staff with administrative and low skills. The main challenge will be to help staff with an existing specialisation that does not match the new requirements to adapt.

## Better healthcare standards

Efficient healthcare and diagnosis help individuals to have the best chance of leading a healthy and productive life. The JRC has been active in analysing standards in health services for cancer and producing reference materials for diagnostics.

A survey on the use of ISO standards in breast cancer care services in Europe found that, in 76% of the countries examined, at least one healthcare organisation is accredited or holds an accredited certificate of conformity to the respective standard. This reflects the need to consider existing practices when developing a European quality assurance scheme for breast cancer services.

In collaboration with other research institutes, the JRC has developed and certified a set of six plasmid certified reference materials (CRMs) for the standardisation of chronic myeloid leukaemia treatment. JRC scientists have also characterised and certified the mass concentration of the cancer marker beta-2-microglobulin as an additional parameter in the certified reference material for proteins in human serum. In the field of autoimmune diseases, the first serum protein certified reference material important for diagnosis and monitoring conditions, such as microscopic polyangiitis and Churg-Strauss syndrome, was also released in 2015.



## A Resilient Energy Union

*The EU needs to pool its resources and combine its infrastructures to make a real Energy Union, which aims to further integrate the internal energy market while diminishing dependence on fuel and gas imports. Renewable energies and energy efficiency are also priorities for the Commission, and the JRC's work fully supports the efforts being made to make energy more secure, affordable and sustainable.*

*In 2015, the JRC inaugurated a new state-of-the-art laboratory dedicated to electric vehicles and smart grid interoperability. This lab will cooperate with its US partner to ensure solutions are harmonised on both sides of the Atlantic. A smart specialisation platform on energy is being developed to support EU regions in fostering innovative low-carbon solutions. JRC work has also focused on the security of gas supply, photovoltaics and the urban application of smart grids.*

### New lab for the interoperability of electric vehicles and smart grids

Interoperability within and between electric vehicles and the smart grid is a key issue for the deployment and full exploitation of transport electrification and modernisation of the electricity system. Under the auspices of the Transatlantic Economic Council, the JRC is working with the US Department of Energy to find harmonised solutions on both sides of the Atlantic.

A new European Interoperability Centre was inaugurated in 2015. Located at the JRC's site in Ispra (Italy), it will cooperate with a twin facility at the Argonne National Laboratory in the US. The European centre combines four state-of-the-art laboratories focusing on the energy efficiency of electric and hybrid vehicles, their interoperability with smart grids, electromagnetic compatibility, and battery testing (the latter is located in Petten, the Netherlands). It will enable the testing of system architectures, technologies and communication protocols. The resulting harmonised standards and test procedures should minimise trade and technical barriers both for the EU and the US, while promoting innovation.



Electric and Hybrid Vehicles Testing at JRC's vehicle emissions laboratory (VELA 8)

### Smart specialisation to help EU regions develop low-carbon solutions

The European Smart Specialisation Platform on Energy, set up by the JRC, will support regions and Member States in using Cohesion Policy funding more effectively to promote sustainable, secure and affordable energy. The platform will help regions to share their expertise on energy investments and particularly on the deployment of innovative low-carbon technologies.

Based on cooperation between the Directorate-General for Energy (DG ENER), Regional and Urban Policy (DG REGIO) and the JRC, the platform aims to boost economic growth in the regions by facilitating the coordination, rationalisation and implementation of the regional strategies in a collaborative setting. By supporting the optimal use of Cohesion Policy funds for sustainable energy projects, the platform will directly contribute to the European Energy Union Strategy. It also aims to better align innovation activities in the field of energy at national, regional and local level with a view to setting up a joint strategic agenda on energy priorities.

## **Strengthening the security of energy supply**

Energy security is high on the EU political agenda and constitutes one of the five dimensions of the Energy Union. Its aim is to secure energy supply for households, transport and industry in the required form and at affordable prices, and to cope with shortages and disruptions. The JRC is using its scientific competence to help EU countries to strengthen their energy security by providing guidance and advice in implementing the relevant legislation and supporting standardisation.

The JRC was heavily involved in the stress tests concerning gas supply that were carried out in 2014, and contributed to check whether 38 European countries (EU Member States and Energy Community Contracting Parties) were able to cope with disruptions to gas supply from Russia. It has also been conducting for several years (2011 -2015) a critical review of Member States' risk assessments, preventive action plans and emergency plans regarding gas supply in support of the Directorate-General for Energy. On the basis of this work, the JRC has proposed to improve the way in which the ability of a given national gas infrastructure to satisfy gas demand in the case of supply disruption is calculated. The new model-based standard will take into account the physics of the gas network, and not only the basic supply and demand parameters. The JRC also proposed templates for developing risk assessments and plans at national and regional level.

As regards electricity supply, the JRC has carried out national and regional analysis, especially of the systems in Cyprus and the Baltic States. In light of the foreseen policy initiative on the security of electricity supply, the JRC has prepared infrastructure and market modelling approaches to be employed in risk and adequacy assessments. JRC research and results have fed into the on-going revision process for sectorial legislation, such as the Regulation 994/2010 on Security of Gas Supply and the Communication proposing a strategy on new LNG and gas storage. The JRC has also supported the evaluation of gas and electricity Projects of Common Interest (PCIs) using a detailed techno-economic methodology. These projects are crucial for guaranteeing market integration across the Member States, the best use of renewable sources, and the security of supply. Last but not least, the JRC has supported Ukraine in the area of energy security by contributing to the development of its Winter (2015 - 2016) Energy Action Plan and the Transition Plan for Ukrainian Energy independence.

## **Smart grids in Europe: outlook and urban application**

Smart grid laboratories offer research infrastructure for technology and solution testing and development, which is necessary before the large-scale roll-out of new technologies. They are an essential enabler for the modernisation of the European (energy?) grid. A new JRC report identifies trends and gaps in smart grid research and innovation.

According to the report, a smart grid laboratory needs on average an initial investment of around EUR 1 million to set up the facilities, with large projects requiring up to EUR 30 million. They mainly serve industrial customers, followed by transmission system operators, academia and governments.

JRC scientists are also investigating whether smart grid technologies can be profitably scaled up to large cities. To this end and for the first time, the JRC – in collaboration with Rome's electricity distribution company – applied its cost-benefit analysis to a full-scale smart grid urban project. Conclusions showed a positive outlook, both from the private investors' and the societal perspective. The JRC methodology proved to be able to assess the financial and economic viability of smart grid projects and to help distribution system operators make investment decisions.

## **PV trends and improved measurements**

Solar photovoltaic (PV) energy is the third most important renewable energy source in terms of globally installed capacity, after hydro and wind power. The rapidly expanding markets in China, Japan and the USA have more than compensated for a significant market contraction in Europe, which fell from a record 18.5 GWp in 2011 to less than 7



GWp in 2014 – a similar level is expected in 2015. However, Europe remains a leading region in the research and development of photovoltaic technologies.

The JRC organised a round-table debate with EU level and national authorities, as well as industrial and financial stakeholders, to discuss possible ways to support the recovery of the European photovoltaic industry and to retain Europe's prominent place in PV technology research. JRC studies have also highlighted the wide range of deployment conditions and market share across the EU. These issues must also be addressed if Europe is to achieve its long-term energy transition goals.

JRC scientists also demonstrated that the uncertainty in measuring power generation from a photovoltaic cell can be more than halved, thus bringing an economic benefit to manufacturers and investors alike. Photovoltaic solar panels are traded on the basis of their maximum power output. Manufacturers include a margin on this value to allow for small variations in manufacturing and measurement. The possibility to tighten this margin (typically a few per cent) brings economic benefits.

## Forward-looking climate change policy

*Climate change was a key issue for the European Union in 2015, when the EU played a key role in brokering the historic agreement in Paris, where 195 countries adopted the first-ever universal, legally binding global climate deal. The EU is at the forefront of the fight against climate change and has established itself as a key player in the negotiations under the United Nations Framework Convention on Climate Change (UNFCCC). The work carried out by the JRC has been instrumental in delivering scientific evidence and technical assistance to EU policy-making. JRC studies have provided, among others, new data on global emissions and sources of urban pollution, projections of future emissions and their impact and guidance on how to report on greenhouse gas (GHG) emissions from land use, land-use change and forestry and a quantitative analysis of the contribution of the land use and forestry sector to the Paris Climate Agreement*

### Shaping EU climate policy

The EU's climate action relies on solid scientific evidence to inform its decisions. The JRC study: '[Global energy and climate outlook: road to Paris](#)' was used to prepare the EU's vision for a new international agreement, including its Intended Nationally Determined Contribution (INDC). The JRC estimated the climate and economic consequences of a potential international agreement at COP21 in Paris. The authors concluded that global efforts to put economies on track for low-emission development, along with the integration of climate action into economic policy, can simultaneously deliver on climate goals and improved energy security and efficiency, without significantly hampering economic growth.

### Global growth in CO<sub>2</sub> emissions almost stalled in 2014

After a decade of rapid growth in global carbon dioxide (CO<sub>2</sub>) emissions (with an average annual rate of 4%), much smaller increases were registered in 2012 (0.8%), 2013 (1.5%) and 2014 (0.5%) respectively. In 2014, when the emissions growth was almost at a standstill, the world's economy continued to grow by 3%. Thus, the trend over the past three years has sent an encouraging signal on the decoupling of CO<sub>2</sub> emissions from global economic growth. Nevertheless, it is still too early to confirm a positive global trend. The EU continued to show leadership in reducing CO<sub>2</sub> emissions with a 5.4% decrease in 2014 compared to the previous year, and despite an overall increase of 1.4% in the GDP. The report by the JRC and the Netherlands Environmental Assessment Agency (PBL) presents the results of the Emissions Database for Global Atmospheric Research (EDGAR) version 4.3.

### Guidance for land use, land-use change and forestry emissions reporting

New accounting rules impose more stringent requirements for the reporting of GHG

emissions and removals from the land use, land-use change and forestry (LULUCF) sector. The JRC analysed the preparedness of EU countries to comply with these requirements and concluded that some of them will face certain challenges. In addition to identifying recommendations and priority actions on this area, it also provided ad-hoc support to seven countries: Croatia, Estonia, Greece, Italy, Latvia, Poland and Romania, in order to improve their LULUCF monitoring, reporting and verification activities.

Moreover, the JRC's work on land-use sector contributed to the Paris Climate Agreement.

### **Measuring the impact of increased use of renewables on GHG emissions**

A new JRC report has confirmed the potential of renewable energies for climate change mitigation. Results show that they represented annual GHG emission savings of 8.8 % between 2009 and 2012 in the electricity, heating and cooling, and transport sectors. Nearly two-thirds of the total savings were attributed to Germany, Sweden, France, Italy and Spain. According to the report, renewable electricity accounted for the highest contribution from renewable energies to climate change mitigation in the EU in 2012, representing 64% of the emission savings, due to the high penetration of wind and solar power. Renewable heating and cooling, and renewable transport followed with 31% and 5% of the savings respectively.

### **Impacts of climate change**

JRC work on predicting and making impact assessments of extreme weather events caused by climate change helps to tailor appropriate adaptation measures and to enhance resilience. The recent JRC study on spatial patterns of European droughts under a moderate emission scenario concluded that Southern Europe is likely to experience longer, more frequent and severe droughts in the near future (2041–2070), increasing in the period 2071–2100. Extreme weather events not only threaten lives, but also economies. In another study, the JRC analysed the potential impact of climate change on tourism in the EU and provided long-term demand projections. Estimations show that by the year 2100 the climate could lower tourism revenues by up to 0.45% of GDP per year in Mediterranean EU regions, while regions in northern Europe could gain up to 0.32% of GDP. In parallel, the study Ensemble flood risk assessment in Europe under high end climate scenarios shows that by the end of the century the socio-economic impact of river floods in Europe is projected to increase by an average 220% due to climate change alone. Estimates of population annually affected by floods range between 500 000 and 640 000 in 2050, and up to 950 000 in 2080, as compared to 216 000 in the current climate.

### **JRC to evaluate Member States' air quality data**

Although climate and air quality have been traditionally considered as different policy areas, strong synergies and some trade-offs exist between the reduction of GHG emissions and air pollutants.

Revised European legislation on air quality improves rules on the collection, sampling and analyses of outdoor air pollutant data in order to prevent or at least reduce their harmful effects on human health and the environment. To this end, the JRC was mandated to organise and evaluate quality assurance programmes for national reference laboratories in this domain. Member States have until 31 December 2016 to bring into force the laws, regulations and administrative measures necessary to comply with the provisions of the new Directive. Intercomparison programmes are already being organised regularly by the JRC in collaboration with the network of national air quality reference laboratories, known as the AQUILA network.

## **A connected Digital Single Market**

*A connected Digital Single Market may generate up to EUR 250 billion of additional growth in the course of the next five years. Investing time and resources to ensure interacting, borderless digital services will result in hundreds of thousands of new jobs, mainly for younger jobseekers, a vibrant knowledge-based society and social progress. The Commission's strategy is focusing on six areas that will put Europe at the forefront of this digital revolution: building trust and confidence, removing restrictions, ensuring access and connectivity, building the digital economy, promoting e-society, and investing in world-class ICT research and innovation.*

*Through its research activities, the JRC is addressing aspects and challenges in all the above areas. In 2015, it analysed the online services market, used behavioural sciences to improve online privacy, and carried out experiments to convert the radio spectrum into a resource for broadband mobile access. The JRC's research also showed that SMEs made the best use of European funding for ICT research.*

### **Online services and trade: building blocks for the Digital Single Market policy**

The long-awaited Digital Single Market Communication was published in May 2015. In this context, the JRC provides support to policy makers with research on a vast array of related topics such as cross-border e-commerce, online trade and services, copyright and intellectual property rights, eHealth, digital competence and data protection.

JRC research shows that the online services market is very fragmented geographically. Europeans surf mostly on US-based websites, which account for about 54% of online activity, while activity on EU-based websites accounts for 42%. Only 4% of the EU's online services activity takes place on websites from other parts of the world. A large number of highly diversified local online services websites attract relatively little traffic, while a small number of truly global giant service providers account for the bulk of all activity. Moreover, less than 1% of online suppliers actually deliver their services to all 28 Member States. In fact, two-thirds of the suppliers active in the EU cover no more than four countries.

The Commission's proposal for online consumer protection was also informed by JRC research into the economic impact of technology – the shift from offline to online shopping, and the effects of reducing barriers to online trade. European surveys combined with econometric modelling enabled an estimate to be made of the impact on both consumers and producers of removing the main perceived barriers. The impacts of cross-border e-commerce on trade costs, price competition, retail price margins and household consumption were evaluated. The research showed that shifting from offline to online retail induces considerable welfare redistribution from the retail to the manufacturing sectors, and especially to households. The results of the policy simulations revealed that additional measures to facilitate cross-border e-commerce between EU Member States could give a 0.3% boost to household consumption. EU production as measured by GDP would increase by 0.04 %.

### **SMEs make best use of European ICT research funding**

The JRC's long-standing collaboration with the Directorate-General for Communications Networks, Content and Technology (DG CNECT) has focused on improving understanding of innovation in the ICT sector. In 2015, Innovation Radar analysed research and innovation projects funded by two main European research programmes: the Seventh Framework Programme for Research and Innovation (FP7), and the Competitiveness and Innovation Framework Programme (CIP). The objective was to identify high-potential innovations and the key innovators behind them. The research also sought to elicit the most important success factors and areas of improvement.

It concluded that small and medium-sized enterprises (SMEs) are the best performers in EU research programmes. They deliver 41% of the high-potential innovations generated in ICT-related EU funded research and innovation projects, despite accounting for a mere 14% of the total funding. However, a greater focus on technology than on business

strategies is one of the main bottlenecks when it comes to getting these innovations on to the market. In fact, reaching the market is not a smooth process for innovators: a quarter of already mature innovations have yet to be exploited. Of those innovations planned for commercialisation, only 30% have produced or will produce a market study while a business plan is on the agenda for only 27% of the projects. The European Commission is already improving links between innovators in EU funded research projects and services that help such innovators prepare to 'reach the market'.

### **Using the radio spectrum for broadband mobile access**

The Radio spectrum is the basis of all wireless services, including 4G mobile broadband. Smartphones, tablet computers and Wi-Fi technology all depend on wireless connectivity and thus on the radio spectrum. In Europe, the total volume of services that depend on radio spectrum availability is estimated to be worth at least EUR 200 billion annually.

The JRC and Italian spectrum regulators conducted tests on a novel regulatory concept, known as Licensed Shared Access (LSA). Initial experiments showed that the LSA methodology can provide additional radio spectrum for broadband use with a throughput of up to 10 MB/s even at locations 1 km away from a very-low-power base station, where the received signal power is extremely low. In indoor environments, the throughput can be as high as 150 MB/s, allowing several simultaneous broadband users in small enterprises or homes to benefit from the new spectrum-sharing technology.

In 2016, the Commission is proposing an overhaul of EU telecoms rules, including more effective EU-level spectrum coordination. Creating the right conditions for digital networks and services to flourish is a key objective of the Commission's plan for a Digital Single Market.

### **Behavioural studies in support of online privacy**

Long, detailed and technical privacy notices are the current answer to online privacy issues. In practice, users frequently allow websites to collect information without really knowing or understanding the conditions. To elicit alternatives, JRC scientists studied whether web design affects users' disclosure of personal data. Using behavioural sciences, a JRC study looked at how individuals react to different types of privacy notices. Specifically, the authors analysed users' reactions to the modified choice architecture (i.e. the environment in which decisions take place) of web interfaces. Tests of different designs with over 3 000 users from the UK, Italy, Germany and Poland showed that the web interface affects decisions on disclosing personal information. The study also explored differences related to country of origin, gender, education level and age. A depiction of a person's face on the website led people to reveal more personal information. In addition, this design choice and the visualisation of the user's IP or browsing history had an impact on people's awareness of a privacy notice. If confirmed, these features will be particularly relevant for habitual and instinctive online behaviour.

## **A deeper and fairer Economic and Monetary Union**

*Europe needs a deeper and fairer Economic and Monetary Union (EMU) to preserve the stability of the euro and to enhance the convergence of economic, fiscal and labour market policies across the Member States. The EU is making headway with the reinforcement of economic governance and the launch of the banking union. However, large disparities in economic performance, close to 18 million unemployed and an increased risk of social exclusion demonstrate the need for further progress.*

*It was against this background that in 2015 the JRC provided solid scientific support for Commission initiatives towards completing the banking union and a better understanding of the impact of fiscal measures on economic and societal outcomes. The JRC also*

contributed to the social impact assessment of the third Greek stability programme and estimated structural deficits within the EU's economic governance framework.

## Completing the banking union

The Commission set an ambitious objective to establish a banking union based on a single rulebook for the EU's financial sector. It aims to create a single supervisory and a single resolution mechanism and setting up a common European deposit insurance scheme. The JRC has been present every step of the way to provide solid scientific support in designing, testing, implementing and reviewing the policy initiatives needed to make the banking union a reality.

During 2015, the JRC provided its expertise to the Directorate-General for Financial Stability, Financial Services and Capital Markets Union (DG FISMA) for determining the rules of calculating banks' risk-based contributions to the Single Resolution Fund. With the system due to be launched in 2016, the Single Resolution Board asked the JRC to assist them further in its practical implementation. The JRC also conducted surveys and analyses of Deposit Guarantee Schemes (DGS) and supported the Commission in developing a methodology for assessing the compliance of individual schemes with the relevant legislation. Furthermore, it provided quantitative analysis of the risk-coverage and risk-sharing characteristics of national DGS versus a pan-European deposit insurance scheme. As follow-up work to the single rulebook, the JRC contributed to the *ex-post* preliminary review of the capital requirements legislation and its impact on bank capital structure over the period 2004-2014. In addition, it provided analyses to inform the debate on making the bail-in features of the bank recovery and resolution directive operational.

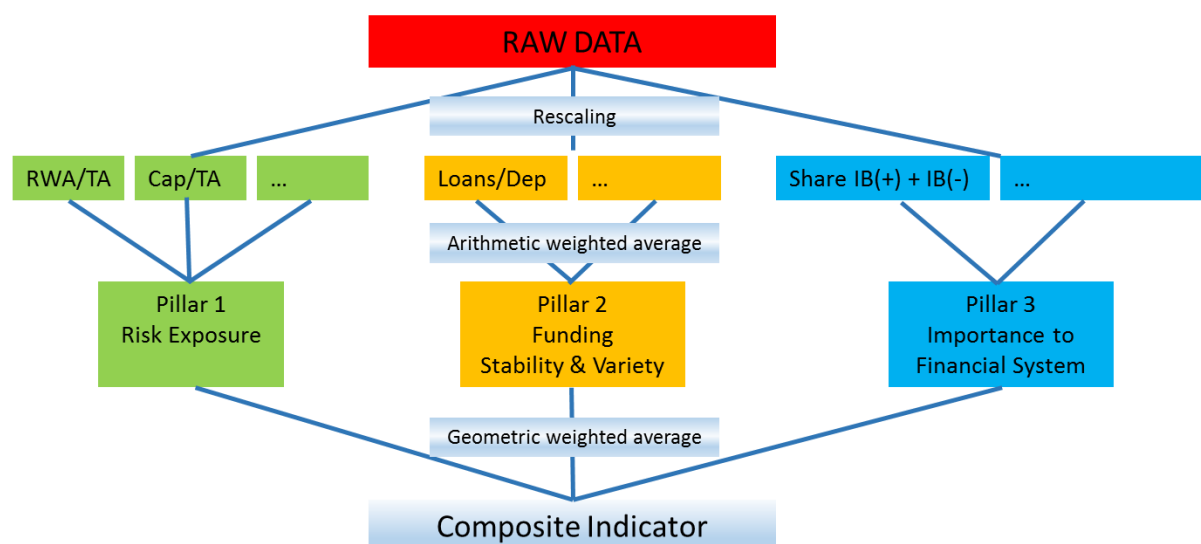


Figure 1: Steps to build a composite indicator from selected balance sheet data to measure individual bank risk profile

## Fair and efficient corporate taxation in the EU

The Commission has set out a corporate taxation action plan to reform the EU corporate tax framework in order to tackle tax avoidance, ensure sustainable revenues, and promote a fairer business environment, especially for SMEs. The JRC is contributing to the impact assessment of the forthcoming Commission proposal for corporate tax base harmonisation in the EU. This follows the objectives set out in the June 2015 Communication on a fair and efficient corporate tax system. In this context, the JRC will assess the economic and fiscal impact of policy options aimed at harmonising corporate tax bases as well as tackling debt bias and loss carry-forward rules.



Additional support has also been provided on specific policy issues. For instance, at the request of the Directorate-General for Taxation and Customs Union, the JRC analysed the effect of 'patent boxes' i.e. special tax regimes for intellectual property revenues, thus building on its know-how in the area of innovation and R&D. Results show that instead of boosting research and innovation, tax breaks on profits from locally patented intellectual property have essentially been used by multinationals to lower their tax bills.

Another important aspect of corporate taxation is the tendency of corporate tax systems to favour debt over equity, where JRC researchers have found that removing the debt bias could lead to substantial public finance savings due to increased financial stability.

## **Understanding the societal and economic impacts of fiscal policy measures**

Fiscal measures, i.e. government spending and taxation, have broad implications for the overall economy and the behaviour of economic actors far beyond their direct fiscal effect. In order to support EU efforts to achieve growth-friendly fiscal consolidation with a strong emphasis on social fairness, the JRC has been at the forefront of research into the impact of tax reforms on equity and poverty and their behavioural implications.

For example, in collaboration with the Directorate-General for Economic and Financial Affairs (DG ECFIN), the JRC has assessed the poverty and equity impacts of tax reduction and in-work benefits on low-income workers as well as housing taxation. Broader support has also been provided to other DGs in the area of taxation. In addition, to support Member States in the revision of their tax structures, the JRC is developing methodologies based on the EUROMOD microsimulation model to assess the behavioural response of individuals and households to taxes and social benefit reforms. For instance, recent JRC research suggests that tax policies providing financial incentives to low-income workers can yield a double dividend both in terms of increased employment and extra tax revenues, thanks to their beneficial impact on labour supply. Finally, the JRC has simulated fiscal options for the social impact assessment of the third stability support programme for Greece, carrying out ongoing research in partnership with the Commission's Secretariat-General and DG ECFIN aimed at optimising the equity of fiscal reforms in Greece.

## **Reinforced economic governance**

In 2015, the JRC continued to support the Commission in its assessments of the macroeconomic imbalance procedure, a key contribution to the in-depth reviews and country-specific recommendations. Results of the JRC's work on a new global multi-country model (GM) developed with the Directorate-General for Economic and Financial Affairs (DG ECFIN) fed into policy discussions on the divergent adjustment paths of the euro area and the US, and the importance of shock transmission between different regions. The GM has been used to provide content for the autumn economic forecast and simulations for the quarterly reports on the euro area.

The JRC also continued its work on estimating structural deficits within the context of the Stability and Growth Pact, participating in the Output Gap Working Group, training Commission and Member State officials on the methodology of calculating output gaps, and organising an international conference on the subject with participants from central banks, finance ministries and international organisations from all over the world.

## **A deeper and fairer internal market with a strengthened industrial base**

*The EU's single market is a strong asset in times of increasing globalisation. The Union needs to build on this strength and fully exploit its potential in order for EU companies and industry to thrive in the global economy. European policy-makers are focusing on creating an environment that will reinforce a strong and high-performing industrial base. Key to this objective are investments in new technologies, an improved business*

*environment, easier access to markets and finance - particularly for SMEs - as well as workers with the skills required by industry.*

*Notably, in 2015 was the support given by JRC in drafting regulations for the new on-road tests for cars, analysing the competitiveness of the EU's oil-refining sector and testing the precision of Galileo signal receivers. It also contributed to the ongoing revision of nanomaterial definition and strengthened the industrial base with two new state-of-the-art technologies stemming from nuclear research.*

### **Capping road transport emissions - new on-road tests for cars**

JRC studies found that laboratory tests do not accurately capture vehicle emissions, including nitrogen oxides (NO<sub>x</sub>), under real driving conditions. The European Commission took action and focused its efforts on developing complementary on-road tests, with the intention to introduce Real-Driving Emissions (RDE) tests in the future which have to be passed by new car models before they are allowed to be placed on the EU market.

The JRC has been essential in this development, by demonstrating the feasibility of on-road tests for cars with portable equipment and by leading the drafting of the technical specifications for the new RTD test procedure, based on the JRC's technical expertise and measurements. In 2015 important milestones were achieved with the approval of two regulatory packages by the Member States at the Technical Committee on Motor Vehicles. In both cases, the JRC was heavily involved and provided scientific support. The first package describes the test procedure and the requirements for measurement instruments. The second defines binding emission limits, their application dates and additional boundary conditions. In 2016, the JRC will lead the technical development and drafting of two additional RDE packages focused on the measurement of particle number emissions with portable equipment and the surveillance of vehicles already in use.

The JRC's vehicle emissions laboratory (VELA) allows emission tests to be carried out on a wide variety of engines and vehicles (from motorbikes to trucks or electric cars). VELA looks at new technological options to reduce vehicle emissions, increase energy efficiency and, in particular, the environmental aspects of advanced technologies and fuels. The findings provide scientific support for the development or revision of EU Directives/Regulations and for the assessment of new measurement techniques and procedures.



Portable Emissions Measurement Systems (PEMS) offer a modern and innovative counterpart to check the impact of emissions from combustion engines upon the environment.

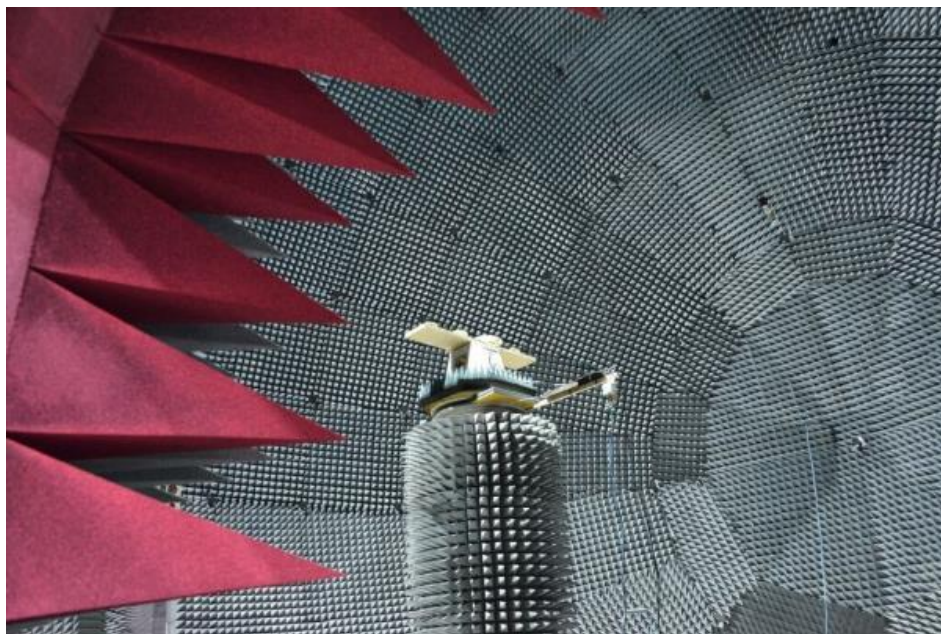
### **The EU petroleum-refining sector: fitness check**

The JRC did a thorough analysis of the EU's oil-refining sector as part of the Commission's 'fitness check' initiative which aims to keep current legislative measures fit for purpose. The pieces of refining relevant legislation examined referred to renewable energy, energy taxation, the EU Emissions Trading System, fuel quality, clean and energy-efficient vehicles, industrial emissions, strategic oil stocks, marine fuels, energy efficiency, and air quality. The analysis shows that the legislation has delivered its objectives at the sectoral level and that the costs can be considered proportionate relative to the benefits achieved, although at an estimated total cost to the sector equivalent to 47 eurocents per barrel of processed input during the study period. The identified cost impact of the regulation on refineries primarily implies the diversion of some revenues towards regulatory compliance investments and operating costs rather than towards other investments, and operational adjustments to improve competitiveness. The more efficient refineries have been able to absorb these costs and remain profitable, but this has not been the case for some others. According to the analyses in the report, a number of other factors also had an influence on the economic performance of the EU refining sector, some of which are plant-specific, while others are external, including the relatively high level of input costs of refineries and, in particular, energy costs.

### **Galileo: high-precision receivers ready for navigation**

Galileo will provide Europe with independent and precise satellite navigation for a vast range of applications in the aviation, maritime and road sectors. It is expected to reach its full deployment in 2020 when 30 satellites will be in orbit. At the request of the Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) and working with the European Global Navigation Satellite Systems Agency (GSA), the JRC conducted an extensive testing campaign of the very first Galileo receivers used in professional applications where centimetre-level positioning accuracy is needed (e.g. oil and gas industries, railways sector, or reference networks for offshore precise-point positioning services). Sample receivers from manufacturers in the EU, USA, Russia and Japan were tested both in the JRC's test facilities under controlled conditions and in the field, with the receivers installed on a vehicular platform picking up live signals broadcast by Galileo's four in-orbit validation satellites. The tests showed that most of the receivers perform in line with the specifications provided, confirming that the high-precision receiver market is ready to exploit the benefits of Galileo well before the full constellation is deployed.





View of the JRC's anechoic chamber with the test bed used to measure the Galileo professional receivers, showing the four Global Navigation Satellite System antennae on the tower of the European Microwave Signature Laboratory.

### **Defining nanomaterials**

The exact definition of a nanomaterial represents the gateway to their wider production, use and safety assessment for human health and the environment. The Commission is currently reviewing its regulatory definition and the outcome is expected in 2016. The JRC has looked into science-based options to improve the clarity and practical application of the Commission's recommendation. The JRC advice was to change the scope of the definition concerning the origin of nanomaterials, which addresses natural, incidental and manufactured nanomaterials. It also advised that the use of size as the sole defining property of a nanoparticle, as well as the range of 1 nm to 100 nm to define a nanoscale, should be maintained.

As identified by the JRC, further options to consider include a possible variation in the current 50% threshold for the particle number fraction (i.e. if more than half of the particles have one or more external dimensions between 1 nm and 100 nm then the material is a nanomaterial). Variable thresholds may allow regulators to address specific concerns, but could also confuse customers and lead to an inconsistent classification of the same material based on the field of application.

### **New information system on raw materials**

The Raw Materials Information System (RMIS), set up by the JRC, is a comprehensive online repository of information on policies, activities, indicators and data related to the European non-energy-related raw materials sector. It supports the EU Raw Materials Initiative and the activities of the European Commission's Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW), notably for the European Innovation Partnership (EIP) and the European Raw Materials Knowledge Base (EURMKB), and aims at tackling the pressure on valuable resources and their efficient use to benefit EU economies.

### **From nuclear research to indoor localisation and surgery technologies**

JRC scientists assist policy-making in creating a fertile R&D environment and innovative technologies. The precision and accuracy embedded in nuclear research have resulted in innovative solutions for indoor localisation and less invasive surgeries.

Over the past decade, providing accurate position information on people and objects indoors, where GPS signals are not available, has proved challenging and a large-scale commercial solution has yet to be found. Using the Sensor Tracking and Mapping (STeAM) system – a portable device built for nuclear facilities and developed in-house at the JRC – a team won an indoor localisation competition. The system uses a 3D laser scanner to acquire 10 frames per second as the user explores the environment and provides the current location and a map of the environment in real time. A patent application for this technology has been submitted.

Another JRC invention will soon be used by hospitals for minimally invasive robotic surgery. TELELAP ALF-X is an advanced multi-port robotic system that will provide surgeons with eye control of the camera and touch sensation during surgery. The system is built on the GENERIS software which is used to control mechanical 'arms' during work with highly radioactive material in storage areas.

## **An area of justice and fundamental rights based on mutual trust**

*Combating discrimination and cross-border crime, such as human trafficking, smuggling and cybercrime, is a shared European responsibility that must be addressed while guaranteeing fundamental rights and values, including the protection of personal data.*

*The JRC's scientific work has contributed to this endeavour, for example, by analysing the available technology for automatic fingerprint identification that could be used at borders to reinforce security in the Schengen area, by developing a new method of verifying vessel positions that would help fight maritime crime, and by proposing new approaches for a quicker recognition of new drugs, which represent a real challenge for customs authorities and forensic laboratories. The JRC's long-standing expertise in analysing container data has also contributed to new legislation that will facilitate fraud investigations linked to international trade. Last but not least, the JRC has studied how children interact with digital technologies, and has developed new tools to empower and help them enjoy a safe and responsible digital life.*

### **Towards automatic fingerprint identification for the Schengen Area**

The Schengen Information System (SIS) supports external border control and law enforcement co-operation in the Schengen states. The current system provides the possibility to process biometric data related to wanted or missing persons in order to support the work of the police and border guards, although it is not yet able to identify a person on the basis of his/her fingerprints. This next step would require the implementation of what is known as an Automatic Fingerprint Identification System (AFIS).

In 2015, the JRC carried out a study for the Directorate-General for Migration and Home Affairs (DG HOME), assessing whether fingerprint identification technology is sufficiently mature to be integrated into the SIS, as legally requested. The study provides a list of recommendations to support the successful deployment and use of this technology, and concludes that it has reached sufficient levels of readiness and availability to be integrated into the SIS provided that recommendations are implemented during the roll-out and utilisation of the new functionality.

### **Tracking cargo containers to fight customs fraud**

A new Regulation adopted in 2015 empowers EU authorities to systematically collect and use container status messages (CSM), i.e. electronic records that describe the logistics and routes followed by cargo containers. Access to such data will help customs

authorities to understand the routes followed by the containers and help them in fraud detection and investigations, for example in cases of misdeclaration of the origin of imported goods or cases of smuggling fake products.

In collaboration with the European Anti-Fraud Office (OLAF), the JRC has worked extensively on how to exploit CSM data for customs anti-fraud purposes. The results of the JRC research and the scientific evidence provided by long-term pilot projects led the Commission to bring forward a legislative proposal that would enable Member States and OLAF to systematically use CSM. The technologies, know-how and experience in handling CSM data, developed by the JRC through its experimental ConTraffic platform, will be used by OLAF to efficiently implement this new legislation. Meanwhile, the JRC is continuing research into new methods to assist authorities in this area. Further uses of this data will also be explored, notably for security and safety, and real-time operations. The focus will be on data mining, new automated analysis techniques, and domain-specific visual analytics methods.

## **Fighting maritime crime**

Maritime piracy, the trafficking of migrants and smuggling are well-known security threats at sea. The EU Maritime Security Strategy and its Action Plan recognise the key role of scientific research and innovative technologies in achieving more efficient and effective maritime security operations. The JRC is developing advanced technologies to independently verify the self-reporting systems on vessels and to help detect non-reporting ships, which might be involved in illegal activities.

In 2015, the JRC, in collaboration with the Italian Coast Guard service, developed a new method to verify whether ship positions reported by means of the automatic identification system (AIS) are correct. The AIS system, originally designed to help ships avoid collisions, is being used more and more to locate ships at sea. The JRC method enables the validation of reported data and detection of unintentionally incorrect, jammed or deliberately falsified information reported by ships. The new method is cost-effective as it only requires a generic network of AIS base stations and no additional sensors or technologies. It will be further tested in other countries and expanded to verify GSM signals in order to help detect small boats, which typically do not use the AIS.

The JRC has developed a method to verify in real time the correctness of vessels position reported through the Automatic Identification System (AIS): blue indicates the AIS declared positions, green indicates the positions verified through radiolocation techniques.

## **Fast recognition of new drugs**

New substances are discovered on the illicit drug market every week, which creates an enormous challenge for customs controls and forensic laboratories. JRC research work on speedy recognition of new psychoactive substances is supporting the EU's fight against illicit drugs.

In 2015, the JRC developed analytical strategies that enable faster identification and characterisation of unknown organic chemical substances, and it worked closely with a project group for CLEN (the Customs Laboratories European Network) on designer drugs and other illicit products on the implementation of these tests. The 'routine' analytical methods applied in Member States' control laboratories are generally efficient for the recognition of substances which are already known. However, the chemical identification of many unknown substances suspected to be new psychoactive drugs requires the use of more sophisticated analytical techniques such as nuclear magnetic resonance (NMR) and mass spectroscopy (MS). These approaches have been tested in the JRC laboratories and the efficiency of the proposed analytical strategy has been successfully demonstrated on several unknown substances used as test cases. Through this activity, the JRC is supporting the Directorate-General for Taxation and Customs Union (DG TAXUD) and CLEN in establishing a harmonised approach and improved data sharing for the quick

identification of chemicals by customs authorities.

### **Towards safer internet use by children**

Children and young people are very active users of digital technology. However, even if they use smartphones, tablets and computers every day, they are not always fully aware of the risks they may encounter while being connected to the Internet, such as cyberbullying or viewing inappropriate content. Parents and teachers need practical tools to empower them to help children become smarter, responsible, and respectful digital citizens. This has been confirmed by a pilot study conducted by the JRC in 2015 which explored how young children under the age of eight and their families engage with digital technologies. Among other findings, the study recommended that industries develop technologies specifically tailored for children including, for example, clear child-friendly warnings and quality labels.

In 2015, to help parents and teachers to actively guide children in their digital activities, the JRC developed and tested Happy Onlife, a game and toolkit which includes a quiz and other educational activities for children.

### **A stronger global actor**

*When it comes to foreign and security policies, the European Union needs better mechanisms to anticipate events early and to swiftly identify common responses. This includes bringing together, more effectively, the different policies and tools that contribute to Europe's external action. The EU has a strong record of international cooperation. It provides development support to a large number of countries in the world and also assists them in responding to man-made or natural crises. The Sustainable Development Goals agreed by the UN in 2015 are a key milestone.*

*In 2015, the JRC contributed in several ways to making the EU a stronger global actor. For example, it created a new online knowledge centre to help EU countries and beyond to better manage disaster risk and, with its early-warning and monitoring systems, it supported the EU's response to several disasters as well as its efforts to achieve the new Sustainable Development Goals agreed at UN level. The JRC's expertise in nuclear safety and security also contributes to enhancing the Union's role in this area.*

### **Minimising the risk of disasters – new knowledge centre**

Between 2002 and 2012, natural disasters caused the death of more than 100 000 people annually across the world. Demographic growth, urbanisation, and increasingly interconnected economies magnify the exposure to disasters, requiring new approaches to disaster risk management. Existing knowledge must be better used and the interaction between researchers, policy-makers and end-users should be enhanced.

To address these challenges, the JRC, working in close collaboration with the Directorate-General for Humanitarian Aid and Civil Protection (DG ECHO) and other Commission services, launched the Disaster Risk Management Knowledge Centre in 2015. This centre aims to help EU countries respond to emergencies while preventing and reducing the impact of disasters. By creating a network of scientists and policy-makers, the centre will facilitate access to knowledge and translate complex scientific data and analyses into usable information at all stages of disaster risk management – from prevention to recovery at all levels – local, national, European and global. This virtual centre will provide EU Member States with technical and scientific advice on their risk assessment methodologies. By promoting more systematic and reinforced science to policy interface and fostering the creation and sharing of new knowledge, it will also support the United Nations Sendai Framework for Disaster Risk Reduction.



## **Supporting EU disaster-response operations**

The Copernicus Emergency Management Service (EMS), coordinated technically by the JRC, is one of six services offered by Copernicus – the European Union’s Earth Observation Programme for global environmental monitoring, disaster management and security. The service supports all actors involved in the fields of crisis management, humanitarian aid, and disaster risk reduction, preparedness and prevention. It is based on two main components: early warning and mapping. Early warning services provide alerts related to floods, forest-fire danger predictions as well as near-real-time assessment of forest fire impacts. The mapping component provides maps and analyses based on satellite imagery before, during and after a disaster.

On 25 April 2015, for instance, seven minutes after the powerful earthquake that struck Nepal, a red alert for international assistance was issued by the UN/JRC Global Disaster Alert and Coordination System (GDACS). GDACS uses modelling tools to estimate the potential impact of natural disasters on populations at risk. As such, it is a unique system that is routinely used by many humanitarian organisations to plan relief intervention. In the days following the alert, the Copernicus EMS produced damage assessment maps and situation reports that helped to define the areas most affected in order to facilitate response efforts.

## **UN’s Sustainable Development Goals and related JRC work**

The 2030 agenda for sustainable development, agreed by world leaders at a United Nations (UN) summit in September 2015, is a milestone for international efforts to end poverty, fight inequality and injustice, and tackle climate change. Through its support to EU policies on development, the JRC participates in the wider efforts to achieve the 17 goals agreed. These include ending hunger, creating conditions for affordable and clean energy, and exploring options in the fight against climate change.

To help reduce hunger and food insecurity, the JRC monitors crop growth and forecasts yields, and it is at the forefront of international scientific developments on food and nutrition security information and analysis. It also participates in the Integrated Food Security Phase Classification (IPC) initiative, which classifies food insecurity situations. The IPC is used to prioritise aid interventions by governments, NGOs, UN agencies and international donors, such as the European Commission and USAID. In relation to affordable and clean energy, the JRC’s African Renewable Energy Technology Platform (AFRETEP) brings together 43 African and 26 European countries to map the most economically viable options for rural electrification. On climate mitigation, the global index designed by the JRC in support of EU’s Global Climate Change Alliance+ (GCCA+) programme will help the most vulnerable countries respond to climate change in the period up to 2020. It was presented during the UN Climate Conference, COP21, in Paris during 2015.

## **Increasing nuclear security with new tools and methods**

The identification of uranium and plutonium is a key element of nuclear safeguards, helping to avoid the use of nuclear material for illicit activities. The new JRC capability to determine the production date of nuclear material will enhance the reliability of the systems set up by the European Atomic Energy Community (Euratom) and international safeguard authorities to verify declarations about nuclear activities.

In 2015, the JRC produced the first two uranium reference materials, IRMM-1000a and IRMM-1000b, for determining production dates. These are used to validate measurement procedures in nuclear forensics, safeguards and security, so that the ‘age’ of uranium samples can be determined with good precision. These reference materials are also traceable within the International System of Units (SI). Prior to their release, the JRC organised a proficiency test with selected laboratories, confirming their ability to accurately determine the production date of uranium samples.

International safeguards inspections will also benefit from the new neutron resonance

densitometry (NRD) method jointly developed by the JRC and the Japan Atomic Energy Agency (JAEA). This method solves an issue that has challenged experts to date, as it allows to accurately quantify the amount of uranium and plutonium in complex materials such as debris from melted nuclear fuel from the damaged Fukushima Daiichi reactor cores.

*The JRC produced the first two uranium reference materials required to validate measurement procedures in nuclear forensics, safeguards and security, so that the 'age' of uranium samples can be determined.*

### **Towards a new generation of nuclear energy systems**

The Generation IV International Forum, of which the European Atomic Energy Community (Euratom) is a member, is leading international collaborative efforts to develop next-generation nuclear energy systems that can help meet the world's future energy needs. Generation IV designs will use fuel more efficiently, reduce waste production, be economically competitive, and meet stringent standards of safety and proliferation resistance.

The JRC acts as an implementing agent for Euratom, coordinating the efforts of both the Euratom research programme and that of the EU Member States (excluding France which is an individual member of Generation IV International Forum (GIF), integrating research and development carried out by contributing national research bodies, and informing them about progress. Through its institutional research, the JRC also contributes to different topics related to the nuclear safety and security of the selected Generation IV systems, including safety and operation, thermal hydraulics, materials, fuels, nuclear data, proliferation resistance, and physical protection. JRC research results provide valuable input on various types of reactors to the European system demonstrators.

## Annex 15: Examples of tangible specific impacts on European policies resulting from technical and scientific policy support provided by the Joint Research Centre

Impact title	Category	Impact description	Mandate
Contribution to the SWD on the monitoring of key Features of an EU Urban Agenda	Anticipation, conception, adoption of EU policy	The Europe 2020 Index supports policy-makers in measuring the distance to the EU targets for smart and inclusive growth. An earlier version of the Europe 2020 index fed into the 6th Report on Economic, Social and Territorial Cohesion (July 2014). The 2015 version of the index has been further developed to provide more evidence in highlighting challenges faced by national, regional and local authorities in overcoming the impact of the financial and economic crises and it is cited in the Commission Staff Working Document on the Results of the Public Consultation on Key Features of an EU Urban Agenda (SWD(2015) 109 final).	The JRC has developed the Europe 2020 Index, upon request of DG REGIO, in the context of the AA 33322 (project entitled "Regional Human Development"). Mandate: to develop a number of regional composite indicators covering dimensions of well-being and development.

Table A15-1. Examples of impacts related to the work of the units reporting directly to the Deputy Director-General

Impact title	Category	Impact description	Mandate
New GMO Certified Reference Materials for the implementation of EU legislation released	Implementation, monitoring, evaluation of EU policy	JRC-IRMM is a Reference Material Producer (RMP) accredited to ISO Guide 34 and ISO/IEC 17025 and develops Certified Reference Materials required from EU legislation for a wide range of application fields. GMO companies wishing to authorise a GMO event for the EU market need to ensure that (among other issues) a (C)RM is available. A contract ensures that intellectual property right issues regarding the later distribution of the CRMs are preserved. In 2015 two new sets of GMO CRMs were developed and released on request of the Biotech industry (VCO-01981-5 maize developed by Genective, 4114 maize event developed by Pioneer). A total of 7700 units of GMO CRMs were distributed to official EU control laboratories in 2015 as well as to the industrial GMO testing laboratories world-wide.	Regulations (EC) No 1829/2003 and (EC) No 619/2011 demand the availability of (Certified) Reference Materials (CRMs) prior to the authorisation of a GMO as food and feed product on the European Market. In the EU official food control laboratories accredited to ISO/IEC 17025 take care of the implementation of these regulations. JRC-IRMM released in 2015 two new sets of GMO CRMs which were produced on request of the Biotech industry (VCO-01981-5 maize developed by Genective, 4114 maize event developed by Pioneer). According to ISO/IEC 17025 the use of these CRMs is mandatory.
New ISO Guides on reference materials published	EU and global standardisation and international harmonisation	The published ISO guides are the basis of reference material production, regardless of application area. Reference materials are explicitly or inherently required quality assurance tools in many sectorial EU legislations (water quality, GMO, food, health, etc.), and the published guides ultimately support the production of reference materials in all these areas, either as part of JRC's workprogramme or as activity of other reference material producers, ensuring harmonised approaches, consistent quality and global recognition of the reference materials for the users.	MoU between JRC and DG ENTR (now GROW) Annex 1: "The JRC should play an active role in the European standardisation system. In particular it should ... participate in the activities of the European Standardisation Organisations, providing scientific input in its areas of expertise ..." JRC-IRMM has a lot of expertise as a Reference Material Producer. The published ISO Guides are relevant guidance for any reference material producers.
EURL-Feed Additives Authorisation (EURL-FAA): Evaluation reports of analytical methods	Implementation, monitoring, evaluation of EU policy	The authorisation of feed additives requires the availability of the EURL report confirming the applicability of the analytical method for official control purposes. Based on EFSA's opinion and the EURL report, DG SANTE along with the Member States decides to grant or to deny authorisation of the feed additive.	Legal mandate by Regulation (EC) No 1831/2003 and Regulation (EC) No 378/2005
Support to the implementation of a coordinated control plan by the EU Member States to detect mislabelled fish	Implementation, monitoring, evaluation of EU policy	The coordinated control on fish products is part of the on-going Commission's action against fraudulent practices in the food chain and allowed to identify species substitution in fishery products of white fish species. By engaging in their Administrative Assistance and Cooperation duties, the "Food Fraud Contact Points" help to improve the capability of competent authorities to: •detect and prevent violations of food chain rules, also across borders and in potential cases of "food fraud"; •collect the information which is needed (in accordance with applicable national rules) to further refer a case to investigation/ prosecution. Finally, the results showed certain limitations in the testing methodology.	Based on its experience in the fight against food fraud the JRC was requested by DG SANTE to make a comprehensive review of existing analytical methods to detect fish species substitution. The review was used as background document for the Coordinated Control Plan Fish Species Substitution, supporting in this way the implementation of European Commission, Council Regulation (EC) No 1224/2009 and European Commission, Council Regulation (EC) No 1005/2008.
Clarification of anomalies in the Community method which establishes import duties for milk fat containing processed agricultural products.	Anticipation, conception, adoption of EU policy	The content of butyric acid in processed agricultural products containing not only milk fats but also other fats is among others used to establish the agricultural element for tariff classification of processed agricultural products. The JRC-IRMM in support to DG ENTR (now GROW) investigated the reason for the depletion of butyric acid in dairy products which could bias the results of the standard method to be used according to Regulation (EC) No 900/2008. On the basis of our studies it was confirmed that the method gives biased results in low-fat dairy products. COMMISSION IMPLEMENTING REGULATION (EU) 2015/824 amends Regulation (EC) No 900/2008 to take account of the reduced butyric acid content in the fat of skimmed dairy products. JRC is mentioned in the first page of the amended Regulation.	The Administrative Arrangement (AA) n° 33423 between DG Enterprise (DG ENTR, now DG GROW) and DG Joint Research Centre (DG JRC) had the aim (i) to elucidate the reasons for the underestimation of the milk fat content in processed agricultural products (PAPs) with high protein contents, (ii) to characterise the magnitude of the underestimation across relevant dairy products, and (iii) to propose a solution for the estimation for customs tariffs, which are among other provisions, based on the milk fat content of the concerned PAPs.

Table A15-2. Examples of impacts related to the work of the Institute for Reference Materials and Measurements



Impact title	Category	Impact description	Mandate
Safety evaluation of MOX fuel rods in the MYRRHA Reactor when in contact with Lead Bismuth Eutectic Coolant during a pin breach	Support to specific countries/regions and international bodies (other than standardisation or crisis support)	JRC-ITU performed two types of tests enabling the evaluation of the safety of MOX fuel in contact with lead bismuth eutectic coolant in the event of a pin breach incident. The impact impacts for the Belgian safety authorities are - Lead bismuth shows no interaction with MOX under normal operation conditions, so that leakage of the fuel from the pin into the coolant following a fuel pin breach under normal operational conditions is not a relevant accident evaluation criterion. - Plutonium – bismuth nor plutonium lead compounds are not easily formed	This work was performed through the SEARCH project funded in part by an Indirect Action supported by DG RTD.
Nuclear Forensic Support to EU Member States and Countries outside the EU	Ad-hoc support (including crisis management)	In 2015 the investigation of samples from several incidents seized in Ukraine (already several years ago) were completed. The samples from Ukraine were analysed in much detail. The material had been shared with Livermore National Laboratory (USA) and with IAEA. Following completion of the analysis, results were compared with the other labs (including the Ukrainian). The Ukrainian authorities were provided with the results which served for supporting the further investigation. Moreover, the results served for demonstrating complementary laboratory capabilities, strengths and weaknesses in analytical performance and advantages of international collaboration in nuclear forensics.	There are different legal bases in place: with Germany, there is a framework agreement in place, with Hungary, Lithuania, Slovakia Czech Republic and others we have collaboration agreements and with other States we provide nuclear forensic support on the basis of specific request.
Assessment of thermal properties of Minor Actinide Bearing Fuels - Contribution to ERA and SNETP-ESNII	Support to specific countries/regions and international bodies (other than standardisation or crisis support)	The JRC-ITU Units E03 and E04 contributed to the assessment of minor actinide fuels to be used in the ASTRID reactor in France, within the framework of the Indirect Action CP-SFR. The data are a first of a kind, for which the JRC-ITU is the only institute in Europe capable of preparing such samples and performing measurements thereon.  The output is a direct contribution to the Sustainable Nuclear Energy Technology platform, and in particular to the pillar ESNII (European Sustainable Nuclear Industry Initiative).  They provide the key data to enable the licensing of these innovative fuels, and will be used in design and assessments of reactor concepts by MS authorities and technical safety organisations (cf SNETP deployment strategy).	CP ESFR was a programme stemming from FP7, but finally completed in the frame of H2020.  ESNII is the Industrial Initiative following the SET PLAN with respect to sustainable nuclear energy. CP ESFR is a direct contribution thereto.
Monitoring environmental artificial radioactivity in the EU in support to DG ENER	Implementation, monitoring, evaluation of EU policy	Environmental monitoring data are sent by the EU national Competent Authorities via a specially for this purpose developed software, called REM Data Submission Tool, into the REM databank. Besides the daily support and management of the information system (Radioactivity Environmental Monitoring database - REMdb), regular training courses for MSs and extra-EU countries are organised at JRC-Ispra. In 2014 two sessions (21-22 and 28-29 October) and in 2015 one session (9-10 June) were organised to which 18 participants from Albania, Estonia, Greece, Former Yugoslavian Republic of Macedonia, Hungary, Iceland, Italy, Latvia, Lithuania, Poland, Portugal, Romania, Serbia, Slovak Republic and the UK, participated to the 2 days course. On the initiative of JRC, in agreement with DG ENER, the EURATOM art 35-36 working group meeting was established in 2013; the 3rd WG meeting was held in Ispra (10-12 March 2015). This working group, composed of 6 external experts, each of which represents max. 5 EU MSs, and the EC (DG JRC and ENER) meets max twice per year to discuss the technical details to improve environmental monitoring reporting, also in the context of making the reporting more accessible by the general public. The REMdb system is continuously improved to handle the environmental data collection and subsequent reporting: to this extent an administrative arrangement with DG ENER provides additional important resources for the IT development.	JRC has to collect, validate and report the radioactivity environmental monitoring data from the EU MSs (articles 36 and 39 of the Euratom Treaty). Recommendation 2000/473/Euratom provides more detailed instructions for the EU MSs. This activity is also linked to emergency information exchange and hence the need also is described in the Council Decision 87/600 (ECURIE and the subsequent EURDEP system).
International Nuclear Decommissioning and Waste Management Education	Implementation, monitoring, evaluation of EU policy	The International ND&WM Summer School enabled 80 students and young professionals to enhance their practical knowledge in the nuclear decommissioning and waste management through high levels lectures, practices on case studies and technical visits to facilities under decommissioning. The ND&WM Summer School serves a more general and wide audience. They very few education programmes (such as in universities) that cover such a large number of expertise required in ND&WM as it is successfully organized by the JRC in the ND&WM Summer School. European experiences in ND&WM was reported and lectured in the present school.	The basic reference document is the Communication from EC to EP and Council on "EDUCATION AND TRAINING IN THE NUCLEAR ENERGY FIELD IN THE EU" and the associated working paper. A Summer School on Nuclear Decommissioning and Waste Management (ND&WM Summer School) is organized by JRC within the institutional programme and in the frame of the cooperation with IAEA, the International Association of Radioprotection Association. This association gathers the main European stakeholders in the field of nuclear decommissioning and waste management.

Table A15-3. Examples of impacts related to the work of the Institute for Transuranium Elements

Impact title	Category	Impact description	Mandate
Implementation of the EU legislation related to nuclear safety	Implementation, monitoring, evaluation of EU policy	<p>The activities have supported DG ENER for the supervision of the implementation of the directive 2009/71/EURATOM (Nuclear Safety Directive), more specifically concerning:</p> <ul style="list-style-type: none"> <li>- technical review of EU MS reports on the implementation of the directive</li> <li>- reviewing and commenting on the EC Communication to the Council and Parliament on the implementation of the directive, (COM(2015)573), and the accompanying Staff Working Document (SWD(2015)244), which were prepared by DG ENER using the above JRC technical reviews as an input.</li> <li>- participation in IAEA IRRS peer-reviews of EU nuclear regulatory authorities to be performed in each EU MS at least every 10 years in fulfilment of the directive.</li> </ul> <p>The Council's adoption of the Nuclear Safety Directive on 25 June 2009 was a major step towards achieving a common legal framework on nuclear safety in Europe. Until then, nuclear safety was governed by national legislation and international conventions. The existing system was supplemented by the Directive, which gave binding legal force to the main international nuclear safety principles.</p> <p>The objective of the Directive is to maintain and promote the continuous improvement of nuclear safety. It requires Member States to make appropriate national arrangements for a high level of nuclear safety to protect workers and the general public against the dangers of exposure to ionising radiation from nuclear installations.</p>	MoU between DG ENER and JRC. Under Article 9(2) of Directive 2009/71/EURATOM (Nuclear Safety Directive), the Commission is required to submit a progress report on the implementation of the Directive. The Directive is secondary legislation deriving from Articles 2(b) and 30 of the Euratom Treaty. JRC provides support to DG ENER to fulfil this requirement.
Super Grids and Electricity Transmission Projects of Common Interest	Implementation, monitoring, evaluation of EU policy	<p>The Energy Union's initiatives, with its strategic objectives of making energy more secure, affordable and sustainable, represent a top policy priority for the European Commission. Across 2015 we have been contributing to several dimensions of the Energy Union and particularly to the supply security, and internal energy market domains. All these computations and the derived information made possible the final construction of the list (including both electricity and gas projects) which was published by the Commission on 18 November 2015 (C(2015) 8052 final).</p> <p>The projects assessed through our techno-economic evaluation methodology are eligible for fast-track permitting procedures and access to privileged loans and grants for their speedier implementation by means of the EU Connecting Europe Facility instrument.</p>	Super Grids and Electricity Transmission Projects of Common Interest

Table A15-4. Examples of impacts related to the work of the Institute for Energy and Transport

Impact title	Category	Impact description	Mandate
SETIS in support of the implementation of the European Energy Technology Policy	Implementation, monitoring, evaluation of EU policy	The JRC work has underpinned the implementation of the European energy technology policy with data and analysis and has supported the decision-making process within the SET-Plan, updating the Steering Group on a regular basis, a valuable contribution recognised by DG ENER, DG RTD and the Member States. Following the adoption of the Integrated SET-Plan Communication C(2015)6317 the JRC has become an instrumental partner of the SET-Plan Governance for the implementation of the 10 SET-Plan Actions, by providing robust scientific evidence and building consensus across the member States, the Industry and the Commission. The website has gained a returning audience within the energy community, and acts as a dissemination and consultation platform for the SET-Plan. At the request of ENER and RTD the JRC has continued to host the Energy Research Knowledge Centre and managed the development of necessary online tools for the registration of stakeholders in the context of the Integrated Roadmap & Action Plan. It also offers a platform for the dissemination of information on EU energy R&I and supports knowledge sharing and the creation of networks by hosting contributions by relevant stakeholders. SETIS also actively participates and supports publicity and dissemination of the SET-Plan conferences and other relevant events.	MoU [MoU 30894 ENER/JRC on non-nuclear Energy: Annex on SETIS] with DG ENER on Management and Operation of the Strategic Energy Technology Information System (SETIS). The SETIS mandate stems from: (i) the Communication "European Strategic Energy Technology Plan (SET-Plan) - COM(2007)723" (ii) the "Energy Technologies and Innovation Communication"COM(2013)253 and (iii) the Communication "Towards an Integrated Strategic Energy Technology (SET) Plan: Accelerating the European Energy System Transformation" - C(2015) 6317 final [pp.9 section 3(e)]
Photovoltaics: support to the development of new and improved performance measurement standards	EU and global standardisation and international harmonisation	IEC TC 82, which is chaired by the JRC, released in January 2015 the "IEC 60904-2 Photovoltaic devices – Part 2: Requirements for photovoltaic reference devices". Cenelec WG1 released the following standards (developed in Cenelec as opposed to approval of IEC documents), on the basis of JRC's contribution (see attachments for more details): EN 62790:2015 Junction boxes for photovoltaic modules - Safety requirements and tests, 2015-03-13 EN 62817:2015 Photovoltaic systems - Design qualification of solar trackers 2015-03-13 EN 62852:2015 Connectors for DC-application in photovoltaic systems - Safety requirements and tests 2015-03-13.	The annual Union work programme for European standardisation for 2015 (COM(2014) 500) states that "the Commission's is keen to support faster market introduction of advanced concepts by harmonisation and development of standards for photovoltaic technology". the European Commission, DG Enterprise has a Type A Liaison with IEC TC 82 (this is the highest possible level of Liaison, and puts the European Commission (and the JRC) on the same level as National Committees, however without voting rights). The Commission mandate to CENELEC for PV is M/089 EN.
Analysis and reporting of Renewable Energy deployment in Europe	Implementation, monitoring, evaluation of EU policy	The actual deployment of renewable energies (RE) in Europe is monitored through the analysis of National Renewable Energy Action Plans, Renewable energy progress reports and other data sources. Analyses are published in the form of Science and Policy reports and data are provided to costumer DGs (in particular DG ENER) upon request. During 2015 the JRC provided support to DG ENER in assessing the progress achieved by the Member States in the frame of the Renewable Energy Directive 2009/28/CE.	The actual deployment of renewable energies (RE) in Europe is monitored, by means of the analysis of data coming from different sources producing series of "state-of-the-art" reference progress reports describing both the state of whole RE portfolio and its expected development in future years.

Table A15-4 (continued). Examples of impacts related to the work of the Institute for Energy and Transport

Impact title	Category	Impact description	Mandate
Contribution to negotiations of the Bank Structural Reform Regulation Proposal at the European Council	Anticipation, conception, adoption of EU policy	DG FISMA succeeded in the negotiations within the Council Working Party, that in June 2015 endorsed the Bank Structural Reform Proposal. Currently the proposal is under discussion at the European Parliament. JRC contributed to achieve the endorsement, by performing several types of quantitative analyses requested by the MS in the negotiations. The JRC analyses aimed at selecting the set of EU banks that should be separated, based on their contributions to systemic risk. The selection of the banks is politically very sensitive since the final set of banks will have to undergo a complete reshape of their business structure to separate trading activities from retail ones. MS requested a wide number of quantitative assessments to agree on the rules to select the banks. In particular JRC assessed the feasibility of isolating the riskier banks using a set of balance sheet indicators, implementing the selection by simple calibrated rules (based on cluster analysis and regression analysis), and evaluated the robustness of the proposed allocation. JRC analyses were presented by DG FISMA at the meetings of the Council and several EC non-papers distributed to the Working Party contained JRC analyses (attached the most relevant ones). DG FISMA expressed its acknowledgement to the JRC for the excellent support in the negotiations.	Memorandum of Understanding JRC.BXL.MOU.32825-2012, signed on 24/07/2013 covering a three years period. Annex 1 of the MoU describes the areas of cooperation and states: "Provide technical support for the quantitative impact assessment of legislative proposals with the aim to strengthen financial stability and help to prevent future crises."
The use of JRC Program GAP to monitor the fiscal position of EU MS in application of the Stability and Growth Pact	Implementation, monitoring, evaluation of EU policy	Program GAP is used by the EC and the MS for the estimation of the output gap which is an essential ingredient to assess the fiscal policy of a country and its compliance with the Stability and Growth Pact. The potential growth and output gap are used by DG ECFIN in the context of the Macroeconomic Imbalance Procedure and the European Semester to evaluate the effectiveness of the structural reform agenda.	Memorandum of Understanding JRC.BXL.MOU.32922-2012, signed on 03/10/2012 covering a three years period. Annex 1 of the MoU describes the areas of cooperation and states: "(1) Maintenance, development and update of the GAP platform; (2) development of methodologies put forward by the output gap working group" (Support to the surveillance of the fiscal policies of Member States in the context of the Stability and Growth Pact).
INFORM: Common evidence-based risk assessment across humanitarian actors, including ECHO	EU and global standardisation and international harmonisation	The INFORM Index for Risk Management is effectively used as a common evidence base for risk-aware actions. Organisations using INFORM in their funding decisions include: ECHO (European Consensus, 1 billion euro funding allocation through Integrated Assessment Framework), United Nations Office for Coordination of Humanitarian Affairs (internally, and to distribute the Central Emergency Response Funds, around 420m euro per year). INFORM is referenced in draft ECHO budget: Worldwide decision 2016 (p2).  Organisations using INFORM in their internal risk management include World Food Programme, UNICEF, IOM, WMO, WHO, OECD, UNDP, UNEP, UNFPA, UNHCR, UNISDR, UNWOMEN, FAO, UK DFID. INFORM was the basis for derived indexes, including HelpAge (age-dependent disaster risk) and risk in African-Caribbean-Pacific countries (ACP programme of DEVCO). The Global Sustainable Development Report features INFORM.	Contract with UK Department for International Development (DFID): maintain INFORM and foster adoption by international organisations. - Administrative Arrangement with DG ECHO: further develop INFORM and adapt it to the EU Neighborhood context and the Disaster Risk Reduction policies.
Support to the Kimberley Process - Implementation of EU policy	Implementation, monitoring, evaluation of EU policy	On behalf of the EC, who represents the EU in the UN Kimberley Process, the JRC is responsible for the collection of the EU's Kimberley Process Certification Scheme data from the competent EU authorities. To this end the JRC has developed and operates a system, ADAMAS, to collect, manage and analyse the EU KP data including certificates. In September 2015 ADAMAS is adopted as system by the competent EU KP authorities to exchange data with the EC.	Support to the KP in the implementation of Council Regulation (EC) No 2368/2002
The JRC provides support to implementation of the Common Fisheries Policy financial instrument, the European Fisheries Fund.	Implementation, monitoring, evaluation of EU policy	In line with Article 68 of the European Fisheries Fund (EFF) Regulation ((EC) No 1198/2006), each year the European Commission must forward to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions a report on how the EFF is being implemented. The report is based on an examination and assessment by the Commission of the Member States' annual reports and on any other available information, namely the Annual Economic Report on the EU Fishing Fleet (JRC Scientific and Policy Reports, JRC 97371). This activity is a major monitoring process to ensure accountability and the proper financial implementation of the EFF by the Member States. The JRC also assisted in the elaboration of the study for DG MARE: "Ex post evaluation on Union financial measures for the implementation of the Common Fisheries Policy and in the area of the Law of the Sea 2007-2013", by participating in the Steering Committee and supplying data and know-how (See supporting evidence. - The JRC is referred to in the report).	An administrative arrangement between the JRC and DG MARE (JRC CONTRACT No. 33664-2014 NFP) requires the JRC to execute tasks related to the provision and management of scientific advice to the Common Fisheries Policy. The mandate includes to a significant economic analysis which feeds also onto the evaluation, monitoring and implementation of the CFP financial instrument.

Table A15-5. Examples of impacts related to the work of the Institute for the Protection and Security of the Citizen

Impact title	Category	Impact description	Mandate
Revision of the European Drinking Water Annexes II and III	Anticipation, conception, adoption of EU policy	<p>The impact of JRC contribution has been successful translated into the approval and publication in the Official Journal of the reviewed Annexes II and III of the Directive ( EU 2015/1787 of 6 October 2015 ). Documents, such as provisional of the Annexes's drafts and Explanatory Note circulated in the Second round of Inter Service Consultation in January 2015, clearly mentioned that the JRC has technically prepared the documents.</p> <p>JRC contributions will have a tremendous impacts on concept , harmonisation and future implementation of the Directive. One contribution is the harmonisation between Drinking Water Directive and Water Framework Directive, indeed an amended topic aligns the same minimum performance criteria for the chemical monitoring analytical method in both Directives. This has been possible due to the unique scientific knowledge, technical and experimental expertise of JRC. The other contribution is a new concept for the chemical parameters' monitoring in the Drinking Water Directive which is now based on the risk assessment approach. The third key contribution is the amended Annex III for the alternative methods for microbiological parameters and the European Microbiology Expert (EMEG) group coordination.</p> <p>MS can use alternative methods if they show their equivalency respect to the one in the Directive. The data are assessed by EMEG and JRC. In the provisional document drafted by DG ENV for the Annex III, it is clearly mentioned that JRC should host a web site for the publication of alternative method used by MS and approved by EMEG and JRC. The web site is active. The other impact is the inclusion of a standard to show the equivalency for innovative methods. This was asked by some MS and JRC is working experimentally on these methods. The inclusion will open new opportunities for implementation of new method for water quality assessments.</p>	<p>DG ENV C2 Unit asked the JRC H.1 Unit to contribute to the revision of the Annexes II and III of the Drinking Water Directive by i) providing support on scientific and technical issues; ii) coordinating the sub-expert group on Microbiology and Sampling and Monitoring; iii) establish a work programme for 2013 - 2014 and beyond, including the contribution to the alternative microbiological methods and other subjects ; iv) enhancing synergies with issues relevant for other Directives e.g. microbiological (bathing) and chemical parameters (Water Framework Directive - Priority Substances).</p>
Adapting Cuban water management and food production systems to changing climate	Support to specific countries/regions and international bodies (other than standardisation or crisis support)	<p>Cuban stakeholders and decision-makers have been provided with tools to support informed decision-making regarding i) water resources use, particularly to guarantee sustainable long-term food production and suitable socio-economic development, and ii) adaptation of agricultural management of cropping systems to projected climate scenarios.</p>	<p>In the context of the BASAL project, the JRC has been requested by the EU Delegation and the Cuban stakeholders to provide support for:</p> <ul style="list-style-type: none"> <li>- The identification of climate change impacts likely to affect major national food production and agricultural systems in Cuba</li> <li>- The promotion of best practices and provision of information for agricultural production and water management to support Cuba's adaptation to climate change.</li> <li>- The delivery of scientific and experience-based tools and recommendations to enhance decision-making and planning capacities of Cuban stakeholders</li> </ul>

Table A15-6. Examples of impacts related to the work of the Institute for Environment and Sustainability

Impact title	Category	Impact description	Mandate
Implementation of the EU Copernicus Regulation as regards early warning and monitoring of forest fires	Implementation, monitoring, evaluation of EU policy	Continuous monitoring of forest fires in Europe, Middle East and North Africa, provision of daily and weekly reports on forest fire activity to the Emergency Response Coordinating Center of DG ECHO and provision of early warning (fire danger forecast) and impact (burnt area damage assessment) in the context of the Emergency Management Services of Copernicus.	EU Copernicus Regulation (2014) and Commission Implementing Decision Concerning the adoption of a financing decision for 2015 in the framework of the Copernicus Programme
Support to DG AGRI evaluation and response to a crisis situation	Ad-hoc support (including crisis management)	The information provided by AGRI4CAST was used by DG AGRI for market analysis and CAP-related decision making, as well as for briefings of the General Director and in response to requests from MEP (Spain) and MS (Poland). It comprised a special report on season development for Spain 2014/15, two special reports on Poland, one on the impact on summer crops, mainly grain maize, one on the development of pasture productivity, as well as maps and graphs for the situation in Portugal over summer 2015.	REGULATION (EU) No 1306/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 December 2013 on the financing, management and monitoring of the common agricultural policy, including Article 6 (c) on "the measures taken by the Commission through remote-sensing applications used for the monitoring of agricultural resources in accordance with Article 22". Article 22 further specifies that "the measures financed (...) concern (..) the carrying out of specific studies on climate conditions (..).
Support monitoring of CAP with indicators: soil erosion and organic matter	Implementation, monitoring, evaluation of EU policy	A set of 45 indicators has been identified to describe the general context in which policy measures are designed, planned and implemented. They form part of the monitoring and evaluation framework for the CAP 2014-2020 and are used in rural development programmes for a comprehensive overall description of the current situation of the programming area. The European Commission provides an annual update of data for these indicator The basis for this indicator is defined by COMMISSION IMPLEMENTING REGULATION (EU) No 834/2014 of 22 July 2014 laying down rules for the application of the common monitoring and evaluation framework of the common agricultural policy and COMMISSION IMPLEMENTING REGULATION (EU) No 808/2014 of 17 July 2014 laying down rules for the application of Regulation (EU) No 1305/2013 of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD).	Environmental indicator used in the commission implementing regulation/guidance documents. CAP Context Indicator 41: Soil organic matter in arable land CAP Context Indicator 42: Soil erosion  Both these themes are measures to be implemented in MS as GAEC measures.

Table A15-6 (continued). Examples of impacts related to the work of the Institute for Environment and Sustainability

Impact title	Category	Impact description	Mandate
New EU Directive on Common Noise Assessment Methods in Europe (EU 2015/996)	Anticipation, conception, adoption of EU policy	<p>New EC Directive (19 May 2015) on establishing common environmental noise assessment methods in Europe (EU) 2015/996) was Issued on 1 July 2015 with a traceable high policy impact for JRC as its work mainly performed the years before (i.e. JRC's Reference report on CNOSSOS-EU) is explicitly referenced into the legal act as the basis for the new regulation (point 7 of preamble, L 168/2) (<a href="http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L0996&amp;from=EN">http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L0996&amp;from=EN</a>).</p> <p>Among the key findings of the evaluation of the Environmental Noise Directive (2002/49/EC) (END) within the context of the ongoing Noise-REFIT process t are the following: (a) the development of the CNOSSOS-EU methodological framework and the subsequent adoption of the new Directive in July 2015 represent a major achievement towards a common approach to strategic noise mapping in EU for each of the main noise sources (i.e. roads, railways, aircrafts and industrial premises) (effectiveness criterion); The strong EU added value related to the END because it has put in place a common EU legal framework for the first time will only be maximised once CNOSSOS-EU has been fully implemented in EU MS and consequently comparable data will be made available to measure changes in population exposure between future rounds of strategic noise mapping in Europe (European Added Value criterion); (b) A quantitative indicator of the impact of JRC's work on CNOSSOS-EU is the number of the downloaded publications from the JRC's Publication Repository in the period January 2011 to September 2015 (JRC's 'top 10s' prepared by JRC Directorate A). Finally, the JRC report on CNOSSOS-EU (published in 2012 and downloaded 6691 times) is ranking 16th in the list of the 288 JRC most downloaded documents (more than 1000 downloads).</p>	Three AAs (2009-2012) with DG ENV & formal involvement in discussions/technical work under the DG ENV's Noise Regulatory Committee and associated Technical Experts group (2010-2015). Additionally JRC participates in the Inter-service Steering Group (established by DG ENV in 2014) and supports the evaluation of Directive 2002/49/EC within the EC's Regulatory Fitness and Performance Programme (REFIT) (2014-2016).
Ensuring long-term sustainability of the European network for surveillance of congenital anomalies (EUROCAT) as part of the EU Platform on Rare Diseases as per COM(2008)679	Implementation, monitoring, evaluation of EU policy	<p>The Commission Communication indicates as two main areas: i) improving the recognition and visibility of rare diseases and ii) developing cooperation, coordination and regulation for rare diseases at EU level. Alongside the Communication, the Council Recommendation emphasises the need for sustainability in the field of rare diseases.</p> <p>Implementing this policy, the JRC has been entrusted by DG SANTE to develop the EU Platform on Rare Diseases Registration with the main objectives: i) to provide a central access point for information on rare diseases patients' registries for all stakeholders (healthcare providers, researchers, patients, decision makers, etc.), ii) to support the 600+ registries in Europe in view of their interoperability thus addressing the enormous fragmentation of data sources and iii) to host activities of the European surveillance networks providing them with sustainability. The transfer to the JRC of the EUROCAT Central Registry together with the related EU-level coordinating activities, which are now fully operational at the JRC, is a milestone for the Platform. It ensures sustainability/continuity for the EUROCAT network, which consists of 39 individual registries for the surveillance of congenital anomalies (e.g. genetic diseases, malformations etc.) in 21 countries enabling all stakeholders to utilise the current knowledge for public health issues, primary and secondary prevention, decision making for health and social care.</p>	Administrative Arrangement "Development and maintenance of the European Platform on Rare Diseases Registration" 17.030600/13/669748 between DG SANCO and JRC for the period of 11/12/2013 - 11/12/2016. Commission Communication COM (2008) 679 final on Rare Diseases (Chapter 5.11) and Council Recommendation (2009/C 151/02) on action in the field of rare diseases. Council recommendation on an action in the field of rare diseases (2009/C 151/02)
Enabling authorisation of GM Food and Feed	Implementation, monitoring, evaluation of EU policy	The EURL GMFF plays a central role in the EU approval of GMOs ("No method – No authorisation"). It holds a legal responsibility to guarantee that the GMO control system in the EU has the right tools, validated methods and control samples, to function efficiently. This is achieved because the validation, as carried out by the EURL GMFF, is based on method performance criteria that have been established together with the ENGL (European Network of GMO Laboratories) and which include, inter alia, the requirement of practicability. The efficiency of this approach has led to the fact that today the EURL GMFF, together with the ENGL, is de-facto the world reference in the field of detection, identification and quantification of GMO in food and feed and also environmental samples. The driving role of the EURL GMFF is fully and stably recognized and appreciated by all stakeholders involved, including the biotech industry.	Authorisation of GM Food and Feed is regulated by Regulation (EC) No 1829/2003 and linked implementing legislation. The JRC, as EURL GMFF must declare methods proposed by applicants for the detection, identification and quantification of GMOs as being fit-for-purpose, i.e. for regulatory GMO testing. Only with a valid method a GMO can be authorised: "no method, no market". Regulation (EC) No 1829/2003 tasks the EURL GMFF also with other activities, including provision of control samples to official control laboratories and support to the Commission in case of disputes between Member States.

Table A15-7. Examples of impacts related to the work of the Institute for Health and Consumer Protection

Impact title	Category	Impact description	Mandate
Supporting global harmonisation of GMO analysis	Support to specific countries/regions and international bodies (other than standardisation or crisis support)	The Project "Towards Global Harmonisation of GMO Analysis by Creating and Supporting Regional Networks of Excellence" and related initiatives help fulfilling the aims of DG SANTE's "Better Training for Safer Food" Programme and the mandate of the EURL GMFF under Regulation (EC) 882/2004 on food controls. The activities organized in this context help consolidating the EU position and reputation as a pole of excellence, increasing awareness and avoiding trade conflicts. The expected outcome of the project include, in particular, the dissemination of EU control and safety requirements in the GMO field, the provision of up-to-date knowledge on GMO analysis, and the extended sharing of information on methods and other technical aspects among representatives of National enforcement bodies and researchers leading projects on GMO analysis in the different countries of the five regions concerned. The Project contributed to the consolidation of Regional GMO-laboratory Networks in Latin America, Africa, Asia, the MENA region and in Eastern European countries. It also strongly contributed to strengthening collaboration and harmonization within and among these regions and Europe. Training activities enabled the participants to understand technical requirements of the EU GMO legislation and to use GM methods at EU standard level and in line with international quality standards for official regulatory GMO testing. The 2nd International Workshop of GMO Analysis Networking constituted a key milestone for forthcoming collaboration among Networks towards further enhancement of global harmonisation in GMO analysis. The EURL/ENGL "Definition of minimum performance requirements for analytical methods of GMO testing" v.2 is de facto a global standard for methods performance and validation, representing a worldwide reference against which methods for detection, identification and quantification of GMO are developed in the EU and beyond (as recognised by international scientific literature).	The EU has an interest that trade partners know and accept the legal requirements that imports have to meet and are able to verify this prior to export, thus avoiding trade conflicts due to non-compliance of their goods. The Commission therefore runs a programme "Better Training for Safer Food" that offers trade partners the necessary training. For the area of GMO testing the JRC is entrusted since several years with the execution of the BTSF-project "Towards Global Harmonisation of GMO Analysis by Creating and Supporting Regional Networks of Excellence", AA SANCO/2013/G4/ SI2.663360-663419. This activity also responds to the legal mandate of the EURL GMFF as defined by Reg. (EC) No 882/2004 that includes third country experts into the training events offered by the EURL
Test methods for the Test Methods Regulation (Regulation 440/2008) (6th and 7th ATP)	Anticipation, conception, adoption of EU policy	The JRC (I.04) acts as the Commission's coordinator for the Test Methods Regulation (TMR, Regulation (EC) No 440/2008 laying down test methods pursuant to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)) by delegation of the chef-de-file DG ENV. The TMR is essential for the proper implementation of REACH and other regulations related to chemicals as it contains the Test Methods required for testing the hazardous properties of chemicals. The JRC prepares the draft test methods that have to be incorporated into the TMR and provides them to DG ENV for their formal adoption following the method called Adaptation to Technical Progress (ATP) under the comitology procedures. In 2015, the 6th ATP (20 methods) was adopted by the Commission and it is now in the process of publishing (expected within January 2016). Furthermore, the JRC prepared the 7th ATP, including 20 new or updated test methods and deletion of 6 obsolete ones, which underwent in 2015 a positive Inter-Service Consultation (CISNet A3 - Ares(2015)5488295 de la DG ENV - délai 16/12/2015). After this positive outcome, the proposal will now follow the further steps of adoption.	DG ENV is the Commission's Chef de file for the Test Method Regulation and has delegated the technical/scientific work to JRC (MoD between DG ENV and JRC).

Table A15-7 (continued). Examples of impacts related to the work of the Institute for Health and Consumer Protection



Impact title	Category	Impact description	Mandate
Energy Union Package: The Paris Protocol - a blueprint for tackling global climate change beyond 2020	Anticipation, conception, adoption of EU policy	The Staff Working Document is an official EC publication of which the main part consists of GEM-E3 and POLES modelling results produced by JRC.J1.	A multi-annual Administrative Arrangement to support DG Climate on international and EU levels with techno-economic analysis of GHG mitigation pathways.
Input to the Single Market Integration and Competitiveness in the EU and its MS 2015 (DG GROW)	Anticipation, conception, adoption of EU policy	The JRC analysis, based on data from the EU Industrial R&D Investment Scoreboard, provides evidence on the non-disminishing returns nature of labour inputs in the case of knowledge-intensive companies. This confirms the theories on knowledge and labour specialisation, where it is assumed that an increase in the knowledge investment embodies in the human capital of workers raises the marginal product of labour. This non-disminishing returns nature operates when companies have reached a certain size and can also be observed for very large firms in less knowledge intensive firms. Evidence also shows that knowledge intensive firms have an average profit growth three times larger than in the case of less knowledge intensive ones, placing them in a better position to grow faster and thus reach the threshold where labour starts to show non-disminishing results. This evidence is used by DG GROW to explain the trends observed in the shares of manufacturing employment and added-value observed along the economic cycle, showing that there is no contradiction in increasing output and reinforcing competitiveness and shrinking the contribution to the economy in terms of total added-value.	DG GROW has made reference to an analytical work carried-out in the context of the IRIMA project which is implemented on the basis of an Administrative Arrangement with DG RTD. Such reference has been suggested to DG GROW during the regular contacts undertaken between the IRIMA project and the economic analysis Unit of former DG ENTR which was in charge of the annual competitiveness reports. The JRC, via the IRIMA related activities and outputs, has contributed in the past to the elaboration of such reports.
JRC contribution to DG EAC's yearly flagship report: Education and Training monitor 2015 (E&T Monitor)	Implementation, monitoring, evaluation of EU policy	On page 2 of the report, the JRC IPTS contribution is clearly acknowledged: "This publication is based on document SWD(2015)199. The Education and Training Monitor 2015 was prepared by the Directorate-General for Education and Culture (DG EAC), with contributions from the Directorate-General for Employment, Social Affairs and Inclusion (DG EMPL). DG EAC was assisted by the Eurostat, the Eurydice Network and the JRC's Centre for Research on Education and Lifelong Learning (CRELL) and Institute of Prospective Technological Studies (IPTS). The Members of the Standing Group on Indicators and Benchmarks (SGIB) were consulted during the drafting phase." In addition to the overall acknowledgement, the report uses a graph and text from the survey that JRC IPTS undertook for the OpenEdu project (p76) and references were made to 6 different reports from ICT for Learning and Skills team (footnotes 90, 91, 96, 100, 157, 160).	JRC IPTS input to the E&T Monitor results from the long-term collaboration (10 years of research) of the "ICT for Learning and Skills" team with DG EAC on digitalisation of E&T. In 2015 two AA projects for DG EAC ran in parallel: AA 33409 OpenEdu (JBP1730) on Opening up Education and AA33817 InnovativeEdu (JPB 2277) on Innovating Education. Related research is also developed within AA 33818 on Competence Frameworks (JPB 2845) dealing with digital and entrepreneurship competence which was moved from EAC to EMPL with the launch of the new Juncker Commission.
Support to Regulation on Energy Labelling	Anticipation, conception, adoption of EU policy	JRC.J3 contributed to a substantial part of the evidence base for the Proposal for a Regulation of the European Parliament and of the Council Setting a Framework for Energy Efficiency Labelling and Repealing Directive 2010/30/EU, 15 July 2015, COM(2015) 341 final, {SWD(2015) 139 final}, {SWD(2015) 140 final}, through its involvement in this study. The work was cited both in the Proposal for a Regulation itself (footnote 6) and in the Impact Assessment study (footnotes 13, 18, 29, 69, 109, 195, and 196).	The Behavioural Studies for European Policy (AA 33456 BESTEP2) Administrative Arrangement with DG JUST, is the mechanism through which JRC provides required support to various EC services looking to conduct behavioural studies in their respective policy areas. This horizontal hands-on support activity is key for ensuring behavioural studies are undertaken at various stages of the policy process, which ultimately leads to better-designed, more effective and cost-efficient policies.
Approval by EU Member States of a Best Practice Document from the European Coexistence Bureau ECoB	Implementation, monitoring, evaluation of EU policy	The document deals with the practices that farmers need to implement to ensure the coexistence between GM and non-GM soybean crop production. The document was agreed with Member States representatives and later on approved by the respective Competent Authorities (Directive 2001/18/EC Regulatory Committee).	The European Coexistence Bureau (ECoB) was created in 2008 to implement the Council conclusions requesting the Commission to identify best practices for technical segregation of GM and non-GM crops. ECoB develops EU-wide, crop-specific guidelines for coexistence of GM and non-GM crops at farm level. The guidelines leave member states the necessary flexibility to adapt the recommendations to their specific agricultural conditions ( <a href="http://ecob.jrc.ec.europa.eu">http://ecob.jrc.ec.europa.eu</a> )

Table A15-8. Examples of impacts related to the work of the Institute for Prospective Technological Studies

## Annex 16. Indicators and outputs related to decommissioning

ACTIVITY 10 05			
<b>SPECIFIC OBJECTIVE 13:</b>  <b>Historical liabilities resulting from nuclear activities carried out by the JRC pursuant to the Euratom Treaty</b>  <b>➤ Implement the Decommissioning &amp; Waste Management Programme (see progress indicators)</b>  <u><b>Brief description:</b></u>  <p>The decommissioning activity aims to progressively dismantle the JRC's nuclear installations, either already obsolete (with no foreseen further use) or “future liabilities” (still in use). It also intends to treat “historical” waste (i.e. waste accumulated in the past) and waste arising from the dismantling operations. In 1999, the Commission decided to launch a programme to meet this objective. By this choice, the Commission shifted to the practice adopted by most EU Member States, preferring to start the decommissioning immediately after shutdown of the installations rather than deferring decommissioning in the hope that decreasing radiological activity would reduce the financial burden. The programme started in 1999 and is based on the assumption, made for budgetary planning reasons, that the decommissioning of the last nuclear installation and the final disposal of historical wastes will be achieved around 2030.</p> <p>Due to the status of their facilities and to their respective environment, the Ispra site (IT) is engaged in a wider range of activities than the three other sites Geel (BE), Karlsruhe (DE) and Petten (NL), where most facilities are still operational.</p>			
Main outputs in 2015, expenditure-related (Budget line 10 05)	Progress of the main on-going projects		
	Status end 2014	Status end 2015	Final target (result)
<b>1) Decommissioning and waste management activities at Ispra</b>  <ul style="list-style-type: none"> <li>▪ Management of Nuclear Material and High Level Waste (HLW) up to its Intermediate Storage</li> <li>▪ Construction of waste treatment facility (grouting facility, GF)</li> <li>▪ Qualification and supply of final waste package (FWP) containers</li> <li>▪ Radioactive waste characterisation and super-compaction</li> </ul>	<p>1<sup>st</sup> Feasibility study for Nuclear Material &amp; HLW storage completed</p> <p>Phase 2 of the main supply contract has started (completion of eng. executive design).</p> <p>FWP qualification tests completed</p> <p>Licensing File for characterisation and super-compaction approval pending comfort letter from Sogin</p>	<p>Tender for Contract for manufacture &amp; supply of Nuclear Material dry storage casks on hold, option of reprocessing in development</p> <p>Supplier contract resolved. Following resolution of supply contract contractual strategy concept reviewed and project resumed.</p> <p>Still waiting approval of qualification from Safety Authorities.</p> <p>Waiting for approval from Safety Authorities</p>	<p>HLW strategy under review (2 options dry storage vs reprocessing)</p> <p>GF in operation (end 2018)</p> <p>FWP 1<sup>st</sup> production batch ready for use (in 2018)</p> <p>Waste characterised and super-compacted prior to final conditioning for storage.</p>

<ul style="list-style-type: none"> <li>▪ Evacuation of high level waste from “LCSR”<sup>8</sup> facility (fuel remnants and activated material)</li> <li>▪ Temporary storage area for nuclear materials (TSA)</li> <li>▪ Decommissioning of obsolete “FARO”<sup>9</sup> nuclear facility and management of associated waste</li> <li>▪ Decommissioning of obsolete “STRRL”<sup>10</sup> nuclear facility (excluding the tank farm facility, TF)</li> </ul>	<p>100% low &amp; medium level waste managed</p> <p>Pending authorisation of nuclear tests of the TSA</p> <p>FARO facility dismantling 100% completed</p> <p>STRRL pre-decommissioning stopped at 36% pending approval of licence conversion by Ministry for Economic Development</p>	<p>Management of fuel remnants &amp; activated material (retrieval and packaging)</p> <p>Revision of authorisation file and update of internal emergency plan completed</p> <p>"Clearance" of waste issued from facility decommissioning started</p> <p>Update of technical documents supporting license conversion concluded, awaiting conversion.</p>	<p>Fuel remnants transferred to ESSOR hot cells (in 2017)</p> <p>TSA formally in operation (in 2017/2018)</p> <p>"Cleared" waste evacuated</p> <p>STRRL facility (Phase 1/2 excl. Tank Farm) 100% decommissioned</p>
<p>2) Pre-decommissioning - waste management activities <b>Karlsruhe</b></p> <ul style="list-style-type: none"> <li>▪ Dismantling obsolete equipment (glove boxes)</li> <li>▪ Residual contribution for the construction of the German waste repository (<i>residual budget need as estimated by German Authorities in 2012, and 2014, respectively</i>)<sup>4</sup></li> </ul>	<p>68% (+ 10) glove boxes dismantled</p> <p>47% (of budget committed based on cost forecast as of 2012)</p>	<p>70% (+ 5) glove boxes dismantled</p> <p>37% (of budget committed based on updated cost forecast as of 2014<sup>4</sup>)</p>	<p>100 % of legacy glove boxes dismantled (date not defined)</p> <p>100 % of the budget committed (in 2023)<sup>4</sup></p>
<p>3) Pre-decommissioning and waste management activities at <b>Geel</b></p> <ul style="list-style-type: none"> <li>▪ Evacuation of nuclear material</li> <li>▪ Dismantling/evacuation obsolete VDG equipment</li> </ul>	<p>- Contract for evacuation signed</p> <p>- Inventory obsolete equipment made</p>	<p>- Material under contract evacuated</p> <p>- Material dismantled and packed</p>	<p>- 100 % materials evacuated</p>
<p>4) Pre-decommissioning - waste management activities at <b>Petten</b></p> <ul style="list-style-type: none"> <li>▪ transport and decontamination of steel waste for recycling; recovery of concentrated radioactive slag and transport of excessively activated steel samples and slag to COVRA storage facility</li> <li>▪ optimization study, transport and disposal of JRC legacy waste (un-irradiated experimental fuel) to COVRA</li> </ul>	<p>- samples characterized, quotation expected</p> <p>- quotation expected</p>	<p>- transports postponed to 2016</p> <p>- waste transport optimisation ongoing</p>	<p>- steel decontaminated and recycled; activated steel and slag sent to COVRA</p> <p>- all material evacuated (2017)</p>

<sup>8</sup> **LCSR**: “Laboratorio Caldo Studi e Ricerche” (former nuclear laboratories)

<sup>9</sup> **FARO**: “Fuel melting And Release Oven” (former installation for the study of melting and release of nuclear fuel)

<sup>10</sup> **STRRL**: “Stazione Trattamento e Raccolta Rifiuti Liquidi” (former facility for the collection and treatment of liquid waste)

<sup>4</sup> Figures relating to the updated cost forecast of the German Authorities as communicated in 2014, with a residual budget significantly higher than that of the cost forecast 2012 used in the AA 2015. The cost increase is due to delays in the construction of the German waste repository. For comparison: Taking the residual budget of the cost forecast 2012 into account, the budget committed by end of 2015 would comprise 52%.

<ul style="list-style-type: none"> <li>▪ Workshop on HFR decommissioning options</li> </ul>		<ul style="list-style-type: none"> <li>- workshop cancelled</li> </ul>	<ul style="list-style-type: none"> <li>- clarity about options for JRC to best prepare for HFR decommis.</li> </ul>
<ul style="list-style-type: none"> <li>▪ Update of HFR decommissioning cost estimation (legal requirement, every 5 years) and decommissioning plan</li> </ul>	<ul style="list-style-type: none"> <li>- latest report from 2011</li> </ul>	<ul style="list-style-type: none"> <li>- tender for contract for review of cost estimate ongoing</li> </ul>	<ul style="list-style-type: none"> <li>- result available mid of 2017</li> </ul>