

EURAMET

Input to the EMPIR Interim Evaluation

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European Metrology Programme for Innovation and Research

Decision No 555/2014/EU

Delegation Agreement H2020 EMPIR

Input to the EMPIR Interim Evaluation

(Analysis on data available at the end of 2016)

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Executive Summary

The 600 M€ European Metrology Programme for Innovation and Research (EMPIR) was established in 2014 by twenty-eight participating countries and the European Union, utilising Article 185 of the European Treaty. It follows on from the European Metrology Research Programme (EMRP) that held its last call for Joint Research Projects in 2013. EURAMET - the European Association of National Metrology Institutes - is the body responsible for the implementation of EMPIR. The Decision of the European Parliament and of the Council of 15 May 2014 (No 555/2014/EU) established the Programme, Commission Decision of 13.11.2015 (C(2015) 7760) adopted a Financing Decision for 2015 and approved the associated Work Plan. A Delegation Agreement (H2020 EMPIR) was signed with EURAMET on 27 April 2015.

The core activity of EMPIR consists of funding multi-partner transnational joint research projects to advance metrology and its applications. In view of their concentrated capacities in metrology, the core part of EMPIR is executed by National Metrology Institutes (NMIs) and Designated Institutes (DIs) identified by the participating states.

The key differences between the EMRP and EMPIR are the replacement of the Researcher Grant schemes by the involvement of non-NMIs and non-DIs as directly funded partners in the Joint Research Projects and the development of new types of project. Both “Research Potential” and “Support for Impact” calls were piloted in 2014, the first being research projects aimed at developing research capacity in newer NMIs, the second being a support action aimed at new opportunities for exploiting the results of completed EMRP and iMERA-Plus projects. These calls were repeated in 2015 with improvements learnt from the first calls. In 2015 the third new type of call – that to support standardisation activities was piloted.

The specific objectives of EMPIR are:

- At least 400 M€ of European turnover from new or significantly improved products and services that can be attributed to the research activities of EMPIR and its predecessors
- At least 60 % of CEN/CENELEC /ISO/IEC Technical Committees and equivalent standardisation bodies with potential to benefit directly from EMPIR projects to engage with the programme
- Maintain a level of at least 50 % of dedicated national metrology research investments in Europe being coordinated or influenced via the programme
- All European NMIs and their designated institutes interact with the programme
- European leadership in at least 20 % of international metrology committees

The operational objectives are:

- Establish common agendas with strong integration of basic as well as challenge-oriented metrology research via common priorities and joint calls with excellence based projects selection
- Support innovation related activities through the development of new technologies, industry-driven joint research projects and industrial uptake. This requires a systematic technology screening of projects and at least 20 % industry driven research.
- Increase immediate relevance for policy makers and standardisation bodies. At least 10 % is dedicated to normative research.
- Open the programme to the relevant scientific communities and raise awareness and involvement of European technology and research organisations. This means to at least double the participation of non NMI/DI scientists in the programme compared to EMRP
- Support capacity building in developing NMIs, in particular by assisting national authorities to fully exploit the use of structural funds and other relevant programmes. The expectation is to increase the leverage of EU structural funds and other programmes, from 0 % under EMRP to 10 % of the co-investment in EMPIR.
- Strengthen European leadership through EURAMET and foster global cooperation. It should lead to at least two structured cooperations with major metrology actors outside Europe (e.g. US, Canada).

Our current progress towards achieving the high level objectives is:

- 319 M€ of European turnover from new or significantly improved products and services that can be attributed to the research activities of EMPIR and its predecessors has been identified.
- The value of the total EMPIR budget is about half the total European national metrology research budgets over the same period.
- Of the 70 chairs and vice chairs of the working groups of the CIPM Consultative Committees, 36 come from European NMIs and DIs.
- Of the contracts issued so far, 28 % of the legal entities involved are industrial.
- Of the contracts issued so far, 17 % of the contracted effort is directed at normative research.

- Of the EMPIR contracts issued so far, the external funded participants estimate the funded effort to be 1.92 times the equivalent effort in EMRP.

The EMRP and EMPIR are good examples of European Joint Programming - pooling national research efforts in order to make better use of Europe's precious public R&D resources to tackle common European challenges more effectively. The first stage of the call selects research areas where the stakeholder need is clear and the metrology community have the appropriate resources to make a significant impact. The second stage is a competition where the best proposals (in terms of scientific excellence and potential impact) are chosen by independent referees. The result is collaborative European projects where critical mass is brought to bear on clear objectives, with agreed project plans and enhanced stakeholder engagement. All the participants abide by the European level independent evaluation, clearly demonstrating the true "European Research Area" nature of the programmes.

Details of the running and completed EMRP and EMPIR projects are available from the EURAMET website www.euramet.org.

1 Implementation of the annual work plans and the resulting activities

1.1 Definition of the area of the programme to be opened

The areas of the programme in broad terms (Targeted Programmes) to be opened in each year were decided by the EMPIR Committee at the beginning of the programme, along with an indicative budget for each Targeted Programme¹. While budget may be rebalanced between Targeted Programmes in any year it is not expected that the sequence of calls be changed.

The process for defining the individual areas starts with the appointment of a "Guardian" from the EMPIR Committee for each TP within the call. The "guardian" oversees the implementation of the call from pre-announcement phases to the end of the projects. The guardian consults widely with stakeholders and refines their input into a "scope" that defines each call. Draft scopes are included in the annual work plan a year before the call, refined over the following year, and become fixed when the EMPIR Committee and the Commission agree the work plan for the current year.

In 2015 and 2016, to encourage input from the European Standardisation Organisations, a process was arranged with CEN and CENELEC to gather their priorities for the NRM calls. The STAIR EMPIR working group created in July 2014 by CEN-CENELEC STAIR (STandardisation, Innovation and Research) and EURAMET ran formal consultations in both years. The results of these consultations were published with the Stage 1 calls.

1.2 Call budget, national funding and Union contribution

The total budget for the first three years was 213.75 M€ in a project full costs view – 112.5 M€ EU contribution, 101.25 M€ as "in kind" funding provided by the participating National Metrology Institutes and Designated Institutes from the national programmes/funding. In addition, 10.125 M€ of the participating states' cash contribution for the administration of the programme can be associated with the calls. The initial breakdown of the budget between the TPs, in terms of EU Contribution, was:

- 2014 TP Industry – 23 M€
- 2014 TP Research Potential – 1.5 M€
- 2014 Support for Impact – 0.5 M€
- 2015 TP Health – 20.4 M€
- 2015 TP SI – 12 M€
- 2015 TP Pre- and co-normative research – 4.8 M€
- 2015 TP Research Potential – 2.3 M€
- 2015 Support for Impact – 0.5 M€
- 2016 TP Energy – 20 M€
- 2016 TP Environment – 20 M€
- 2016 TP Pre- and co-normative research – 4.7 M€
- 2016 TP Research Potential – 2.3 M€
- 2016 Support for Impact – 0.5 M€

1.3 Call announcement

EURAMET e.V. launched the calls within the European Metrology Programme for Innovation and Research (EMPIR) addressing the topic areas in January or early February each year.

The announcements were made through at least one international journal, as well as on the EURAMET website and through various other electronic media.

¹ C(2014) 7958 final, COMMISSION DECISION of 31.10.2014 concerning the adoption of a Financing Decision 2014 and the approval of the associated Work Plan of the Art. 185 initiative 'European Metrology Programme for Innovation and Research (EMPIR)'

1.4 Call Stage 1 – Potential Research Topics (PRTs)

JRP calls were implemented in two stages.

The aim of Stage 1 is to identify challenges and problems and provide ideas to help the EMPIR Committee best prioritise the most important topics to address and make best use of the resources available in the NMI and DI community.

The following detailed EURAMET documentation supports the Stage 1 calls

- “Guide 2: Submitting a Potential Research Topic”²
- “Guide 3: Prioritising Potential Research Topics”³

1.4.1 Stage 1 submissions received

There were a total of 163 Stage 1 submissions received in 2014, 189 in 2015 and 177 in 2016. All were subject to a very simple but defined eligibility check in agreement with “Guide 1: Admissibility and Eligibility for EMPIR Calls”⁴, mainly to simply weed out any repeat submissions or inadequate submissions, or submissions entirely out of scope. The online web page required proposers to identify the most appropriate classification against a list, with the option of “other” for cross cutting topics or topics which the proposers felt did not fall easily into one of the predefined classifications. The classification was only used to make it more likely that similar topics were reviewed together.

1.4.2 Stage 1 admissibility, eligibility and prioritisation

Having completed the admissibility and eligibility checks, EURAMET revisited the classification. A check was made to ensure that the proposers had allocated their proposal to the appropriate classification.

The PRTs that passed the eligibility sift were forwarded to the EMPIR subcommittees and in a next stage to the EMPIR committee.

The prioritisation process culminated in two meetings each year, one for the Sub-Committee Capacity Building to review the Research Potential TP and one for the Sub-Committee Research to review the other TPs. The results from the meetings were a consensus view on which topics to publish at stage 2.

The first drafts of the “Supporting Documents” were prepared by the MSU, a short document for each topic to be published at Stage 2 describing the background, objectives and potential impact. These drafts were then reviewed by the EMPIR sub-committee, iterated until deemed acceptable and agreed with the full EMPIR Committee

1.5 Call Stage 2 – Joint Research Projects (JRPs)

The call stage 2 for JRPs opens with the SRT topics being published, each with a supporting document identifying the need or opportunity, the scientific objectives and likely impact.

The following detailed EURAMET documentation⁵ supports the Stage 2 call:

- “Guide 1: Admissibility and Eligibility EMPIR Calls”
- “List 1a: NMIs and DIs and, where known to EURAMET, the associated legal entities that can participate in EMPIR projects”
- “List 1b: Country information”
- “Guide 4: Writing Joint Research Projects (JRPs)”
- “Template 4: JRP protocol”
- “List 4: Checklist for Template 4”
- “List 5: Checklist for Template 5”
- “Guide 5: Submitting administrative data for EMPIR projects”
- “Template 5: Project Administrative Data”

² https://msu.euramet.org/downloads/documents/Guide_2_Submitting_PRT.pdf

³ https://msu.euramet.org/downloads/documents/Guide_3_Prioritising_PRTs.pdf

⁴ <https://msu.euramet.org/downloads/documents/Guide1.pdf>

⁵ <https://msu.euramet.org/downloads/#guides>

- “Guide 6: Evaluating EMPIR Projects”
- “Form 6a: Code of Conduct and Declaration”
- “Form 6b: Payment to Referees”
- “Form 6c: JRP Evaluation”
- “Form 6e: Ethics Screening Report”

1.6 Call - Support for Impact Projects (SIPs)

This call scope identifies the need or opportunity and expected project outputs and / or impact for SIPs. SIPs were introduced in order to better exploit the scientific and technological achievements of the JRPs, and facilitate stakeholder uptake of the results. The clear focus of SIPs is on dissemination and exploitation activities.

A key requirement for SIPs is that there will be an external request for the work from an organisation ready to take up the outputs of the project and move them on to impact outside the metrology community, e.g. a Standards Developing Organisation requesting something to be incorporated in a draft standard, or an industrial organisation ready to pilot a new measurement technique if the right technology transfer activities occur. Without such a willing recipient expressing support for the proposal and identifying the actions they will take with the outputs of the project, the proposal would have no evidence of the route to impact.

The following detailed EURAMET documentation⁶ supports the SIP call:

- “Form 6d: SIP Evaluation”
- “Guide 7: Writing Support for Impact Projects (SIPs)”
- “Template 7: SIP protocol”

1.7 Evaluation of proposals

The following detailed EURAMET documentation published with the call documents⁷ is sent to referees:

- “Guide 4: Writing Joint Research Projects (JRPs)”
- “Guide 6: Evaluating EMPIR Projects”
- “Form 6a: Code of Conduct and Declaration”
- “Form 6b: Payment to Referees”
- “Form 6c: JRP Evaluation”
- “Form 6d: SIP Evaluation”
- “Guide 7: Writing Support for Impact Projects (SIPs)”

Referees were asked to confirm by e-mail that they were able to agree to both the “Code of Conduct for Referees” and the “Declaration of Confidentiality and Any Conflict of Interest” which are referenced in Guide 6. Actual signature of these documents by each referee takes place prior to the evaluation of proposals as a prerequisite for participation.

The forms used for evaluation (Forms 6c and 6d) followed the evaluation criteria in the EMPIR work plans. The evaluation criteria are:

- Excellence.
- Impact

Quality and efficiency of the implementation In the forms 6c and 6d, referees are also asked to evaluate the operational capacity of the individual participant(s) in a proposal. Detailed information on the evaluation of EMPIR projects is available in Guide 6.

⁶ <https://msu.euramet.org/downloads/#guides>

⁷ <https://msu.euramet.org/downloads/>

1.7.1 Review conference

JRP proposals are each evaluated at a review conference⁸. For each TP, the referees met a representative of the proposing consortia, enabling them to clarify their understanding of the proposed project and to test the various claims made, prior to marking the JRPs.

The referees are split into pre-defined groups to allow efficient and effective discussion of the proposals. Each of the proposals in the group is marked within the group by consensus, in agreement with the scoring guidance provided in Guide 6.

The final discussions, where referees from all groups come together to review and approve the single ranked list, demonstrates that scoring has been consistent across the groups.

1.7.2 Consensus group meeting

The Support for Impact proposals are evaluated at a consensus group meeting which takes place in the hotel used for the Review Conference. . At the consensus group meeting the referees met and discuss their preliminary evaluation of the proposals, before marking each proposal by consensus.

To ensure consistency between the scores from referees, the training of the EURAMET facilitators concentrates on leading their referees to consensus opinions based on the scoring guidance provided in Guide 6. As marks are agreed between the referees, the facilitator will keep referring to these definitions.

1.7.3 Independent observation of the evaluation process

The review conferences and consensus group meetings are attended by an independent observer proposed to EURAMET by the European Commission. The independent observer has access to all documentation, all communications with the referees, and attends the review conferences with full access to all areas. They also have, and use, the freedom to interview proposers, referees and EURAMET staff. They are asked to provide a report in two parts – the first part to report on the correctness of the process as implemented and the second part to offer any suggestions for improvement for the EMPIR Committee.⁹

1.7.4 The EMPIR Committee Decision

It should be noted that the EMPIR Committee is the body within EURAMET charged with the overall responsibility for the EMPIR.

Immediately following the review conferences/consensus group meetings, the full EMPIR Committee meet and formally endorse the recommendations of the independent referees without change. Although the referees provide the ranked lists, budget restrictions are such that a funding line has to be drawn in each list.

1.8 **Announcement and Grant Agreement preparation**

Announcement and Grant Agreement preparation for the projects selected takes place in the first few months of the following year.

All projects begin a period of contract negotiations aiming is to convert the proposals as submitted at Call close in to the Annexes 1 and 2 of the Grant Agreement by

- Addressing the referees' and ethics reviewers' comments
- Ensuring they describe clearly what is to be achieved
- Ensuring they contain enough detail to enable progress to be reported and monitored
- Including best practice in the impact and management sections
- A review of the financial information to ensure budgets are consistent across the portfolio (e.g. where EURAMET knows that an organisation uses actual rather than unit costs for direct personnel this was checked).

⁸ In 2014 the research potential JRPs were evaluated at a Consensus Group, but after that call the EMPIR Committee decided that Research Potential should also use the Review Conference process.

⁹ Reports from the independent observers can be found at http://msu.euramet.org/previous_calls/index.html

During the grant preparation process the claims of the proposers on the amount of effort directed towards standardisation was moderated. The final figure for the 2014 and 2015 calls was that 17 % of the effort in the funded projects was directed towards standardisation activities.

2 Financial Management

EURAMET received EU funds for EMPIR in 2015 and 2016 in accordance with the Transfer of Funds Agreements. 40.5 M€ in total. These funds are held by EURAMET and then paid to the Grant Beneficiaries in accordance with the Grant Agreements. None of the funds are used for implementation activities which are all paid for by the National Cash contributions.

2.1 Allocation of EU Contribution to recipients

The funds allocated by the EU to the calls were allocated to the recipients in accordance with the requirements of the Decision, the Delegation Agreement, the work plan and the Model Grant Agreement, and according to their estimated costs in the budget. The total EU funds allocated for contracted projects in 2014 and 2015 is 64 956 899 € compared with the maximum available of 65 M€. .

2.2 Payments to recipients

At present EURAMET has only paid prefinancing to the beneficiaries. Before payments are made against financial statements EURAMET obtains reasonable assurance that the costs claimed by the beneficiaries are correct and represent eligible costs in accordance with the processes outlined in the model grant agreements.

2.3 Discretionary activities

Each year the EMPIR Committee decides to fund, from the implementation budget, a number of discretionary activities. Examples of these activities are:

Activities supporting links to standardisation:

1. Continuation of engagement with CEN/CENELEC and STAIR-EMPIR enabling them to define their priorities for pre- and co-normative calls.
2. The development of a link with ETSI to enable the same purpose.
3. Continuation of the advice service, through the helpdesk, which puts researchers in touch with relevant standardisation activities.
4. Provision of the facilitator role for the pre and co-normative research call, assisting potential proposers, both before and after call launch, in understanding the call scope and the type of activities that EURAMET expects to see in successful proposals.

Activities supporting capacity building:

1. Support for the annual cycle of Human and Institutional Capacity Building (HI-CB) activities. This includes identification of training needs between EURAMET members, finding hosting institutes and trainers, preparation of the HI-CB draft workplan for approval by EMPIR Committee and implementation of approved activities during the year.
2. A collation of investments in metrological capacity from EU Structural Funds.
3. Provision of the facilitator role for the Research Potential Call, assisting potential proposers, both before and after call launch, in understanding the call scope and the type of activities that EURAMET expects to see in successful proposals.
4. Development of a scheme for Researcher Mobility Grants funded from the EMPIR implementation budget and subsequent funding of those grants.
5. Provision of the facilitator role for Researcher Mobility Grants (RMGs). Identifying JRPs willing to host a researcher, identifying Employing Organisations willing to provide a researcher, negotiating a set of adverts that EURAMET could use to launch an RMG Call each summer.
6. Holding “information days” on the Capacity Building aspects of EMPIR in specific regions.
7. Development of a proposal for funding the development of knowledge transfer tools from the EMPIR implementation budget.

Activities supporting innovation:

1. A workshop for the impact workpackage leaders in running JRPs, to outline how their projects are expected to contribute to the programme level impacts and to share best practice between JRPs in describing and promoting impact.
2. A workshop for sharing best practice between EURAMET NMIs and DIs with experience in knowledge transfer and innovation support and those seeking to learn and improve their skills in this area.
3. Provision of the facilitator role for the SIP Call, assisting potential proposers, both before and after call launch, in understanding the call scope and the type of activities that EURAMET expects to see in successful proposals.

3 Data on the programme implementation and impact

3.1 Call dates and timescales

Table 1: Dates and timescales

Stage	2014					2015			2016		
	Stage 1 - IND PRT	Stage 1 - RPT PRT	Stage 2 - IND JRP	Stage 2 - RPT JRP	SIP	Stage 1 PRT	Stage 2 JRP	SIP	Stage 1 PRT	Stage 2 JRP	SIP
	Call Opened:	03-Feb-14	10-Feb-14	24-Jun-14	24-Jun-14	25-Aug-14	02-Feb-15	23-Jun-15	05-Aug-15	18-Jan-16	16-Jun-16
Call Closed:	18-Mar-14	25-Mar-14	09-Oct-14	09-Oct-14	30-Sep-14	17-Mar-15	08-Oct-15	29-Sep-15	29-Feb-16	30-Sep-16	26-Sep-16
Selection decision made by EMPIR Committee:	06-Jun-14	06-Jun-14	25-Nov-14	25-Nov-14	25-Nov-14	05-Jun-15	01-Dec-15	01-Dec-15	27-May-16	28-Nov-16	28-Nov-16
Announcement	-	-	14-Jan-15	11-Feb-15	25-Feb-15	-	13-Jan-16	13-Jan-16	-	11-Jan-17	11-Jan-17
Expected Grant Agreement signature	-	-	14-Apr-15	11-May-15	25-May-15	-	31-May-16	29-May-16	-	31-May-17	31-May-17
Days between Call closure and Announcement:	-	-	97	125	148	-	97	106	-	103	107
Days between Call closure and expected signature of Grant Agreement:	-	-	187	214	237	-	236	243	-	243	247

3.2 Detailed statistics from Stage 1 in 2014, 2015 and 2016

Table 2: Type of organisation submitting PRTs by country

Country	NMI/DI	Other	Total
Austria	2	0	2
Belgium	1	0	1
Bosnia and Herzegovina	9	0	9
Bulgaria	2	0	2
Croatia	3	2	5
Czech Republic	12	1	13
Denmark	5	0	5
Estonia	3	0	3
Finland	11	0	11
France	31	7	38
Germany	78	11	89
Greece	0	0	0
Ireland	1	0	1
Italy	16	13	29
Netherlands	16	3	19
Norway	1	0	1
Poland	1	1	2
Portugal	3	2	5
Romania	1	0	1
Serbia	1	2	3
Slovenia	1	2	3
Spain	4	6	10
Sweden	7	0	7
Switzerland	3	0	3
Turkey	12	0	12
Ukraine	2	0	2
United Kingdom	84	8	92
Total	310	58	368

3.3 Detailed statistics from Stage 2 – submitted proposals in 2014, 2015 and 2016

Table 3: Resource details for all submitted proposals

	JRP	SIP	Total
Total Proposal value	243,702,801 €	2,569,805 €	246,272,606 €
- <i>Internal funding requested</i>	149,670,308 €	2,198,457 €	151,868,765 €
- <i>External funding requested</i>	66,332,612 €	140,938 €	66,473,549 €
Total requested EU funding	218,342,314 €	2,339,394 €	220,681,708 €
Total available EU funding	111,000,000 €	1,500,000 €	112,500,000 €
Total person months efforts	30,220	246	30,465
- <i>Person months efforts -internal funded</i>	19,652	217	19,869
- <i>Person months efforts -external funded</i>	8,296	13	8,309
- <i>Person months efforts - unfunded</i>	1,999	16	2,014
Number of proposals	149	25	174
Number of eligible proposals	146	25	171
Total number of partners	1,761	64	1,825
Average partners per proposal	12	3	11
Average total value per proposal	1,669,197 €	102,792 €	1,440,191 €
Average funding request per proposal	1,495,495.30 €	93,575.77 €	1,290,536.30 €

Figure 1: Value of submitted proposals by country and type

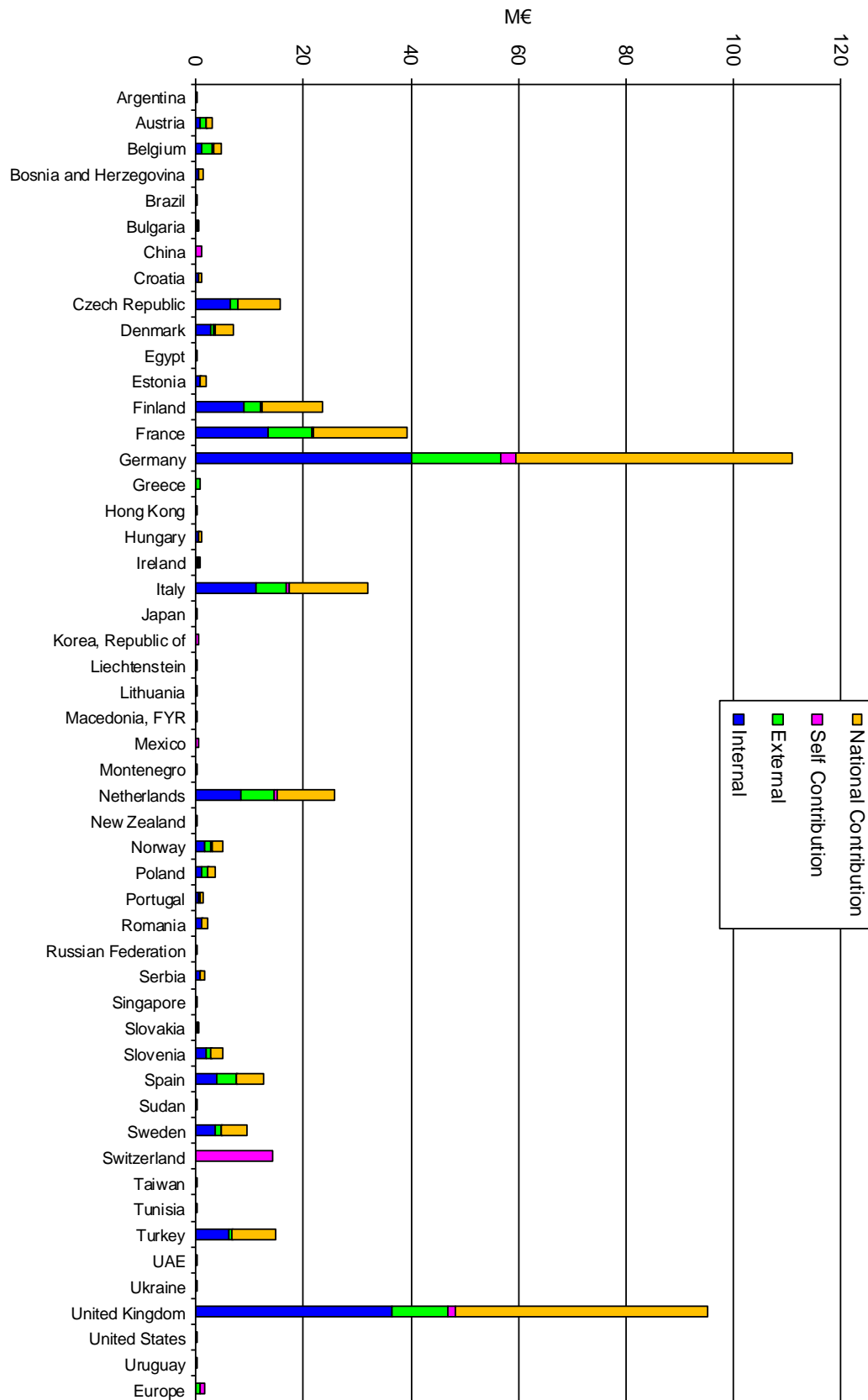
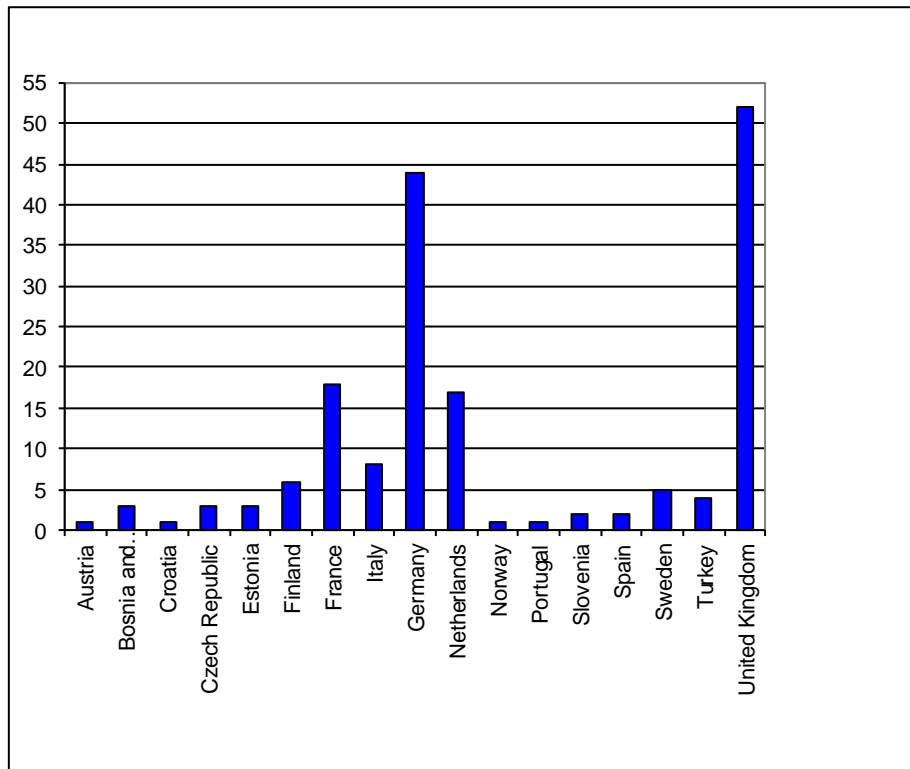


Figure 2: Nationality of coordinating organisation in the submitted proposals



3.4 Detailed statistics from Stage 2 – selected proposals in 2014, 2015 and 2016

Table 4: Resource details for all selected proposals

	JRP	SIP	Total
Total Proposal value	125,597,849 €	1,504,565 €	127,102,414 €
- Internal funding requested	77,075,043 €	1,327,842 €	78,402,885 €
- External funding requested	33,936,335 €	72,188 €	34,008,523 €
Total requested EU funding	111,011,378 €	1,400,030 €	112,411,408 €
Total available EU funding	111,000,000 €	1,500,000 €	112,500,000 €
Total person months efforts	15,192	147	15,339
- Person months efforts -internal funded	9,892	130	10,022
- Person months efforts -external funded	4,084	9	4,094
- Person months efforts - unfunded	1,197	7	1,205
Number of projects selected	76	15	91
Total number of partners	939	37	976
Average partners per selected project	12	2	11
Average total value per selected project	1,652,603 €	100,304 €	1,396,730 €
Average funding request per selected project	1,460,676.03 €	93,335.31 €	1,235,290.20 €

Figure 3: Value of selected proposals by country and type

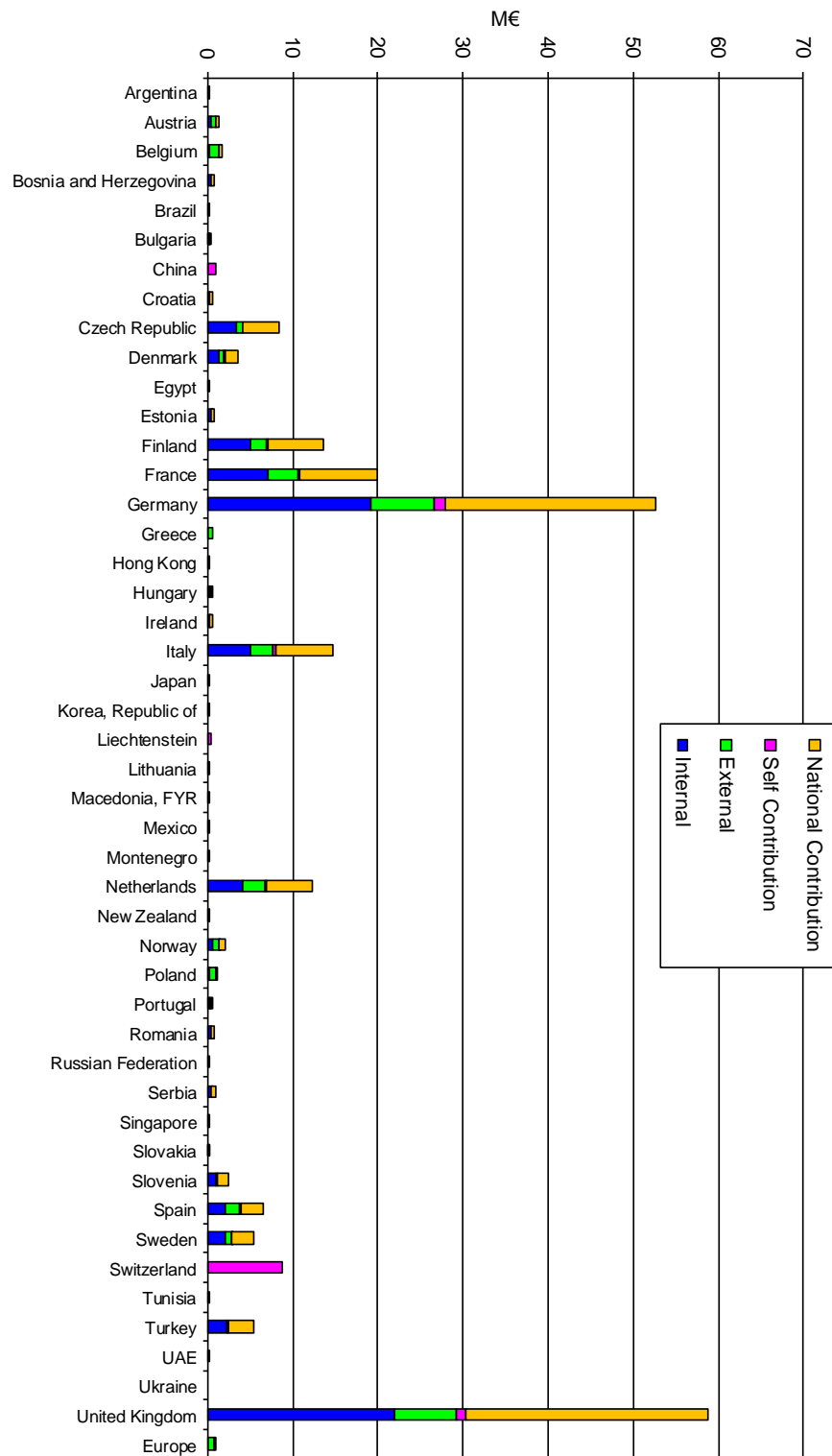
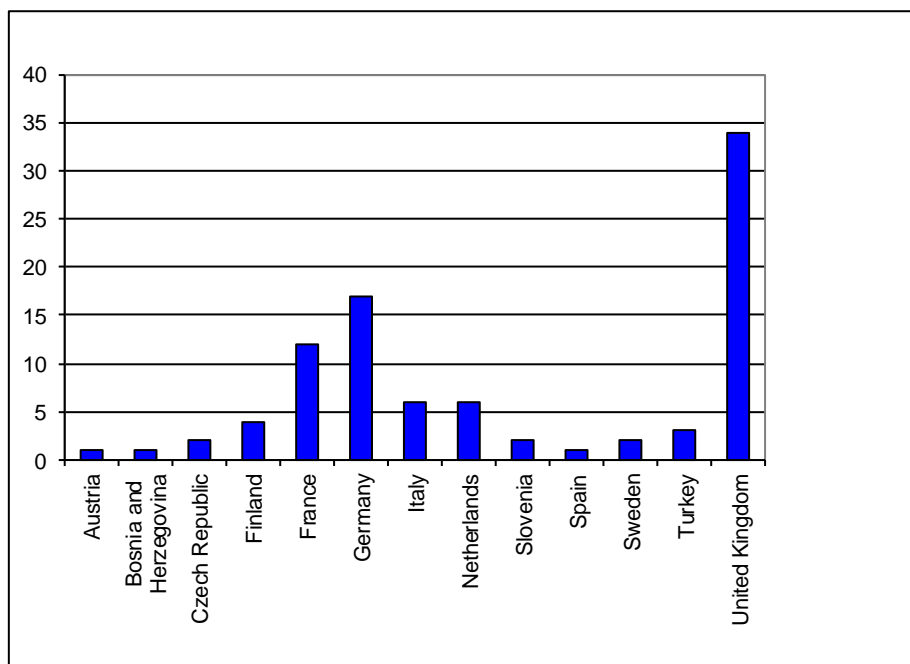


Figure 4: Nationality of coordinating organisation in selected proposals



3.5 Detailed statistics on funded projects

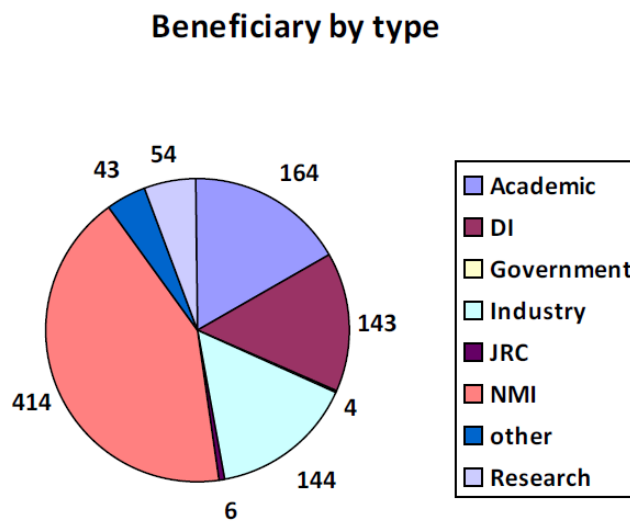
Table 5: Funding by TP

TP	Projects Selected	Total Value	Average EU Contribution	Average National contribution	Average Self contribution	Years effort per proie	Participations per project
14IND	14	€44 323 304	€1 562 089	€1 372 500	€231 361	18.7	13.1
14RPT	5	€5 292 630	€480 599	€577 927	€0	8.0	10.6
14SIP	8	€1 640 075	€85 626	€110 090	€9 293	0.8	2.5
15HLT	9	€34 371 353	€1 992 070	€1 655 814	€171 155	21.5	12.2
15NRM	4	€3 707 170	€467 387	€459 406	€0	4.0	7.5
15RPT	4	€3 952 082	€448 501	€515 603	€23 917	6.9	9.8
15SIB	10	€38 495 091	€1 783 814	€1 796 243	€269 453	21.1	13.3
15SIP	6	€1 220 499	€94 889	€106 486	€2 042	0.8	2.3
16ENG	9	€38 815 899	€2 174 393	€1 809 938	€328 547	21.4	15.6
16ENV	10	€42 589 202	€2 136 592	€1 781 069	€341 259	23.9	15.1
16NRM	8	€10 071 434	€623 128	€554 874	€80 928	6.6	9.3
16RPT	3	€3 059 197	€473 965	€545 767	€0	9.7	8.3
16SIP	1	€333 002	€145 689	€187 314	€0	0.8	2.0

Table 6: Funding by Country

Country Projects	Projects	Years effort	Total Value	EU Contribution	National Contribution	Self contribution
Argentina	1	1.7	€72 500	€72 500	€0	€0
Austria	12	10.0	€1 351 131	€895 693	€455 439	€0
Belgium	11	9.2	€1 347 808	€1 099 096	€193 482	€55 230
Bosnia and Herzegovina	8	10.8	€771 504	€337 533	€433 971	€0
Brazil	1	0.1	€22 500	€0	€0	€22 500
Bulgaria	3	5.9	€354 432	€239 439	€114 993	€0
China	3	14.1	€966 893	€0	€0	€966 893
Croatia	6	4.9	€501 960	€219 608	€282 353	€0
Czech Republic	50	80.2	€8 602 032	€4 117 443	€4 484 589	€0
Denmark	30	16.0	€3 506 277	€1 877 546	€1 500 605	€128 125
Egypt	1	0.1	€12 250	€12 250	€0	€0
Estonia	8	4.4	€626 873	€343 923	€282 950	€0
Europe	1	0.7	€40 000	€40 000	€0	€0
European Commission	6	4.9	€708 576	€655 621	€0	€52 955
Finland	61	59.7	€13 754 285	€6 855 305	€6 810 105	€88 875
France	93	99.2	€19 940 693	€10 680 325	€9 087 970	€172 399
Germany	157	297.4	€53 608 170	€26 926 888	€25 169 946	€1 511 336
Greece	11	8.4	€649 947	€616 947	€0	€33 000
Hong Kong	1	0.1	€16 250	€0	€0	€16 250
Hungary	4	5.1	€621 520	€311 290	€310 230	€0
Ireland	5	3.6	€489 485	€270 048	€219 437	€0
Italy	65	94.5	€14 476 986	€7 668 441	€6 540 399	€268 146
Japan	1	0.1	€16 250	€0	€0	€16 250
Korea, Republic of	2	1.8	€131 250	€0	€0	€131 250
Liechtenstein	2	1.4	€306 425	€0	€0	€306 425
Lithuania	1	0.7	€17 500	€17 500	€0	€0
Macedonia, The Former Yugoslav	1	1.2	€19 275	€19 275	€0	€0
Mexico	1	0.8	€108 775	€0	€0	€108 775
Montenegro	1	0.9	€19 350	€19 350	€0	€0
Netherlands	49	51.1	€12 347 181	€6 770 719	€5 361 837	€214 625
New Zealand	1	0.3	€35 500	€0	€0	€35 500
Norway	16	7.1	€2 056 787	€1 235 706	€821 081	€0
Poland	15	20.1	€1 133 360	€846 107	€287 253	€0
Portugal	9	5.0	€523 524	€363 163	€160 361	€0
Romania	5	9.3	€734 614	€321 393	€413 220	€0
Russian Federation	2	2.3	€115 000	€0	€0	€115 000
Serbia	9	13.2	€1 012 376	€468 508	€543 868	€0
Singapore	1	0.3	€75 000	€0	€0	€75 000
Slovakia	3	2.5	€180 082	€93 376	€86 706	€0
Slovenia	18	16.9	€2 431 996	€1 167 569	€1 264 428	€0
Spain	43	47.9	€6 527 970	€3 703 284	€2 663 437	€161 250
Sweden	29	22.0	€5 466 406	€2 852 701	€2 593 705	€20 000
Switzerland	43	52.9	€9 021 730	€0	€0	€9 021 730
Tunisia	1	0.6	€37 500	€37 500	€0	€0
Turkey	29	28.0	€5 387 792	€2 402 159	€2 985 633	€0
United Arab Emirates	1	0.2	€60 000	€0	€0	€60 000
United Kingdom	151	257.3	€57 363 705	€28 755 710	€27 516 330	€1 091 665

Figure 5: Type of beneficiary in funded projects



3.6 Outputs of all actions that ended in the reporting year

No projects have yet ended and reported so it is too soon to report any outputs and impacts of the projects funded to date. A reporting process is in place to collect and collate this data. The Output and Impact Report and guidance on its use is available from the EMPiR downloads page. Each project is required to complete this report at each reporting period.

3.7 Data on use and uptake of results and their impact

Data in this section will be compiled from surveys conducted after the projects are complete.

4 Progress made towards integration at scientific, management and financial levels

4.1 Scientific

The greatest integration of the national metrology programmes comes through the construction of the Selected Research Topics (SRT) and the proposals in response to those. The plan for EMRP was for a significant part of the metrology research in the EMRP member organisations to be funded through the Programme. This continues as an objective in EMPIR. This provides a great focus for the scientists working in the National Metrology Institutes, as to see their work funded they need to engage in collaboration across Europe.

The process starts long before a call is announced. Each Technical Committee (TC) in EURAMET meets at least annually to discuss plans for future calls. Contact Persons from each member will discuss their future plans, stakeholder needs that they have identified in their countries, and outline work they would like to do to address those needs. Where a consensus emerges in a TC that a need is significant enough to be best addressed collaboratively then interested parties will refine the idea and submit a Potential Research Topic (PRT) when the call is announced. Where the need is best addressed nationally then it will be left for individual national responses.

When the PRTs are formed into SRTs by the EMPIR Committee then a higher level of integration occurs. The Committee members bring their knowledge of national capabilities and national priorities, they think at a strategic level above the individual technical areas and prioritise topics where the stakeholder need is clearly demonstrated and the benefits to be gained from the involvement of the metrology community are greatest. They will construct SRTs designed to bring about change in the community, requiring different technical areas to cooperate to achieve an objective where this would not happen naturally due to organisational boundaries, or requiring the active engagement of industry, regulators or standards bodies throughout a project where the technical community would prefer merely to present the final results. In setting the indicative budgets by TP, the Committee take a joint strategic view on priorities for metrology research across Europe. At the start of the year (at Stage 1) the budgets reflect a top level view of priorities, but once the individual PRTs are received and turned into the SRTs, funds move between the TPs based on the needs identified and the relative importance of the SRTs selected. These decisions are not about individual projects but strategic direction and feed through to national programmes and resource allocations within the NMIs.

Above the Committee the national programme owners have aided integration by relinquishing control over a large proportion of their national programmes. As proposals are developed in response to the SRTs they can control that bid process, they can choose how to spread their resources across the proposals being prepared. In theory they could withdraw from a bid at the end of that process, although that is unlikely as it would cause some damage to the relationship with the partners and could affect other proposals. But, once the bid is submitted they relinquish control, the result is in the hands of the independent referees. Only half the proposals are funded, the competition between the SRTs being based on scientific excellence, potential impact, and quality. This can result in national priorities being frustrated if they have failed to convince the referees that their proposals are the best. The size of the funded JRP (typically 3 M€ at full cost) reduces fragmentation and duplication. Critical mass is brought to bear on clear objectives, with agreed project plans and enhanced stakeholder engagement. What could have been 20 independent research teams tinkering around a common area becomes a focused activity driven by the stakeholders.

A joint strategic direction between the EURAMET members is developed around the programme themes. For EMRP, the existence of the programme outline and the process for developing the scope for the calls were the embodiment of that joint strategy. For EMPIR the process continued in both the 2020 Strategy development¹⁰ and the Strategic Research Agenda¹¹. A current study is consulting members on their views of where closer integration is possible, but there are very significant differences between the members in their size, responsibilities and organisational structure which limit where they prefer to cooperate and where they choose to compete with each other.

The 'Grand Challenge' approach that is central to the programmes has also encouraged more interdisciplinary cooperation between the members and significant involvement of other research institutions. At the start of the EMRP the involvement of external partners was limited. The funding mechanism was through Researcher Excellence Grants (REGs) which were a personal award and required a new employment contract with the hosting organisation. This was not an attractive arrangement and take-up was low. The rules were changed in the 2012 Call to allow REGs to be awarded to organisations rather than individuals, allowing them to use a

¹⁰ EURAMET 2020 Strategy - <http://www.euramet.org/publications-media-centre/documents/>

¹¹ EURAMET Strategic Research Agenda - <http://www.euramet.org/publications-media-centre/documents/>

team of existing staff for the work rather than recruit a new individual. This greatly improved the attractiveness of the scheme and resulted in 494 person years of effort being funded, committing 39.5 M€ from the 40 M€ available. In EMPIR there is no REG scheme and the external partners join the projects under the same terms as they would join a Horizon 2020 project. Of the 300 M€ of EU funding in EMPIR, 90 M€ was reserved for external partners. Targets for the percentage funding going to external partners in each TP were set at the start of the programme¹² and have been met.

4.2 Management

There is great diversity between the EURAMET members in size, ambition, and freedom to operate. The German NMI has over 1900 employees and focuses on research, the Maltese NMI has 4 employees and focuses on services and knowledge transfer. France has a network of 10 organisations (one NMI and 9 Designated Institutes (DIs)) while the Netherlands has a single NMI to cover everything. Some members operate at "arm's length" from government with structures similar to commercial companies with freedom to recruit and allocate resources, while others operate as strictly controlled parts of government with their staff numbers fixed and limited ability to pay expenses to their staff based on funds received from EURAMET.

Enabling this diverse community to operate together within the programme requires careful consideration. Countries with the largest commitments to the programme can bid into most SRTs that they want to, those with smaller commitments must choose strategically, those with the smallest commitments may struggle to get accepted into a consortium, so the EMPIR Committee has a process where countries can declare up to 2 "strategic priorities" in a call and the members will work together to ensure that those countries do find a place in those consortia. In the EMRP, EURAMET had the freedom to write, and modify, its own contracts. So, individual difficulties around the ability to handle expenses could be circumvented - often the guestworking organisation would offer to pay the funds to a mobility researcher if the employing organisation was unable to. In EMPIR this freedom has been lost.

Management culture is also diverse between countries, between organisations in the same country, and even in some individual organisations. Some members have a long history of their governments having a contract with them for the research they do, in extreme cases they have had to report monthly on many thousands of individual tasks and receive payment on the progress they declare. Others receive an annual cash allocation and are only subject to a high level review every few years. Scientists and managers in the former types of organisations expect a clear project plan with regular reviews of progress and finances, some scientists in the latter types of organisation see such things as unnecessary bureaucracy or even an attack on their academic freedom.

The programmes have developed a common understanding of suitable project management practices over the years. At first the EMRP templates for the project plans and reporting were very prescriptive. They were designed to ensure that every partner had a clear understanding of what they had to do and by when. "Deliverables" were not project outputs delivered to EURAMET but documented the handover of knowledge or artefacts between partners for the next stage in the plan. EURAMET had a poor history of delivering collaborative (self-funded) projects to time and this needed to change with projects where the external funding was limited in duration. As the programmes progressed, the level of detail required in the project plans and reports has been continuously reduced as the community needs less supervision from EURAMET. Under EMPIR, the guidance to project coordinators now advises them to plan at a level of detail appropriate to the size of the project and only maintain some documentation within the consortium where it is helpful rather than require it to be submitted to EURAMET. This progress has only been possible because of systematic training of potential coordinators over the years both from EURAMET and in individual organisations. Currently EURAMET holds training events for those considering PRT submissions at Stage 1 (mostly focused on those considering Capacity Building proposals), potential coordinators at stage 2 (associated with the partnering meetings), project support providers (concentrating on technical reporting) and financial support staff (concentrating on financial reporting and the financial rules).

The final step of management integration occurs in the EURAMET ex-post audit process. This consists of both a financial audit based on EC practices from FP7 and a technical audit assessing "the scientific/technical management and control systems relating to the proper execution of the JRP and the JRP-Contract". This later part includes:

- the degree of fulfilment of the JRP-Protocol;
- the resources planned and utilised in relation to the achieved progress, particularly regarding the principles of economy, efficiency and effectiveness;

¹² https://msu.euramet.org/downloads/documents/EMPIR_Call_plan.pdf

- the management procedures and methods of the project;
- the plan for the use and dissemination of Foreground IP;
- the auditee's contribution and integration within the project;
- the claimed potential impact in scientific, technological, economic, competitive and social terms.

EURAMET members are required to maintain a Quality Management System (QMS), and submit to reviews of that system by EURAMET, so that EURAMET can approve their declared Calibration and Measurement Capabilities (CMCs) under the Mutual Recognition Arrangement of the CIPM¹³ (CIPM MRA). So these audits can be based on the extent to which the organisation's QMS has ensured efficient and effective delivery.

4.3 Financial

At the start of the EMRP, and through FP7, the EC were encouraging all research providers to adopt a Full Economic Cost (FEC) model of their costs involving a careful analysis of the overheads associated with doing the work. The encouragement was both the incentive of higher funding levels by this method and the expectation that earlier costing methods would become less attractive with time (e.g. that only those that had already established a fixed overhead model of 60 % could continue to use it while all new entrants would be limited to 20 %). The purpose of adopting this model was to give researchers and stakeholders a common understanding of the real costs of their work so that intelligent choices could be made of what should be done based on costs and benefits.

Previous costing methods varied greatly across the research community with individual organisations and countries having different perceptions of "additional cost" type models. One organisation may only have considered the costs of extra people employed specifically for the work, regarding the costs of buildings, equipment, even consumables and permanent university staff as already paid for from other funding sources. At the other extreme, an organisation may have the rent for its infrastructure based on an "opportunity lost" model - if the building was demolished, and houses built instead, what would the income to the land-owner be? These variations gave no common understanding of real costs on which to make decisions.

The FEC model, as implemented in FP7 and EMRP, held out the hope of a common understanding and a key advantage - because the full costs of the project were assessed, it was simple to demonstrate the co-funding of Joint Programmes. In EMRP a typical JRP received 45 % of its full costs from EU funds and 55 % from national sources (often in-kind). However, the model had two serious flaws. First, many organisations were unwilling or unable to put the systems in place to determine their real overhead. The process may have conflicted with other accounting requirements on their organisation or perhaps they feared the consequences of exposing real cost information. Second, and more importantly, the FEC model is essentially a management tool. It is designed for organisations that want to understand their costs and make management decisions based on that understanding. Those organisations are driven to build an accurate model for those purposes. It is not designed for commercial transactions where one organisation pays another. In circumstances where real income is based on an FEC analysis, the system can be driven to maximise income rather than determine true costs and then it breaks down. This is demonstrated by the disagreements between various auditors at different levels on whether costs have been assessed correctly or not.

The EC abandoned FEC for Horizon 2020 and EMPIR, introducing a costing model based on direct costs with a fixed contribution to overheads. The contribution to overheads is 25 % in H2020. This presented EMPIR with a serious problem - how to demonstrate the cofunded nature of the Joint Programme? The compromise reached included i) maintaining a link to the full costs still being determined in the EMRP, and ii) the Decision (see footnote 1) that EMPIR should include a provision that the average overhead rate of the EURAMET NMIs and DIs was taken to be 140 % at the start of the programme and had to be reviewed at the mid-term based on the latest FEC data from the EMRP. The 140 % overhead assumption led to the contribution to overheads in EMPIR for the NMIs and DIs being 5 % rather than the standard 25 %, to justify a 50:50 cofunding of the programme.

The main argument for this new method was "simplification". Organisations and auditors would no longer be required to assess the overheads, and organisations that never adopted FEC would remain in ignorance of their real costs, but those that do have an understanding of their real costs would see a reduction in the value of the EU funding. The Belgian NMI had a fixed overhead rate of 20 % in EMRP, it received EU funds of some $0.45 \times (\text{direct costs}) \times 1.2$ i.e. 54 % of direct costs. The Dutch NMI, at one point, had an overhead rate of 199 % and it received EU funds of some $0.45 \times (\text{direct costs}) \times 2.99$ i.e. 135 % of direct costs. Under EMPIR, both receive

¹³ <http://www.bipm.org/en/cipm-mra/>

105 % of direct costs. The Belgian NMI has seen its income double for the same effort while the Dutch NMI has seen a reduction of a third.

The interpretation of the co-funding has become even more confused. Under EMRP it was clear. Full costs were calculated and audited, 45 % came from EU funds, the other 55 % either came in a specific contract from the national source or was in-kind funding from the national infrastructure funding. Under EMPIR the co-funding is effectively crossing national boundaries, those with overhead rates above 140 % are subsidising those with overhead rates below 140 %. Those still thinking in some form of "additional costs" model, without an understanding of their true cost, can see the "national commitment" as purely academic as they receive 105 % of their direct costs from EU funds and the national funding is not visible in their own accounts and not proportional to their participation in the programme.

An additional feature of the Horizon 2020 finance rules has been around "Large Research Infrastructure costs". At first sight this appears to be an alternative way of recovering overhead type costs, but it is quite complex, requiring restructuring of the organisations accounting practices and approval of the detailed methodology by the EC. Only one EURAMET member has received approval to charge these types of costs in EMPIR projects.

As the full cost information from the EMRP becomes out of date, it is difficult to see how the co-funding of a future Joint Programme will be justified.

In summary, various methods of helping the research community understand its true costs, and make sensible joint decisions, have been tried in both programmes. None have been successful. This is not just applicable to EURAMET members, the same applies to the wider research community. One could be tempted to conclude that the research community prefers it this way.

5 Progress made towards achievement of the specific objectives

5.1 At least 400 M€ of European turnover from new or significantly improved products and services that can be attributed to the research activities of EMPIR and its predecessors

EURAMET conducted surveys of industrial participants in EMRP projects and developed impact case studies. These have demonstrated an economic impact in terms of actual and projected sales of innovative products (as quoted and/or estimated by the early adopters) influenced by the programme of 1,627 M€. Of this figure, the early adopters estimate that 319 M€ is directly attributable to the programme. This figure covers the industrial participants who participated in projects in the first two EMRP calls (covering the Energy, Environment and Industry themes) and therefore can be expected to increase as additional surveys are conducted and case studies developed. In addition, the new products sold will contribute to economic benefits for many of the end-users.

5.2 At least 60 % of CEN/CENELEC /ISO/IEC Technical Committees and equivalent standardisation bodies with potential to benefit directly from EMPIR projects to engage with the programme

All EMPIR proposals are required to specify which documentary standards and standards developing committees and working groups they will engage with. This engagement is tracked and reported by the EMPIR reporting processes. For example, the first group of 22 projects supported (under the 2014 call) intend to engage with and make contributions to 34 different technical committees. It is too soon to report the extent of this engagement to date as the first projects supported have only just reached their first reporting period. Using EMRP to illustrate the extent of engagement with standards organisations, to the end of 2015, EMRP projects had made 739 contributions to 379 unique standards committees, resulting in contributions to 17 published and 103 draft standards.

5.3 Maintain a level of at least 50 % of dedicated national metrology research investments in Europe being coordinated or influenced via the programme

This objective is harder to evaluate than it should be, mostly due to the lack of a common understanding of how to assess costs (see section 4.3).

In 2005, the 14 states proposing the iMERA project (a predecessor of the programmes) assessed their joint national research budget as 165 M€ per year and that up to half of that value could be subject to a joint prioritisation process. This appears to be the origin of the 50 % concept.

For 2015, 18 states participating in EMPIR have assessed their joint national research budget as 166 M€. This includes most of the largest participants and is unlikely to increase significantly when further data is received.

The annual value (to the NMIs and DIs) of the research projects commissioned by EMPIR is 68.571 M€ (30 M€ from the EU and 38.571 M€ as in-kind funding from the national budgets). This is similar to the long term annual rate across the programmes (iMERA-Plus, EMRP, EMPIR).

If the objective is to *maintain* then this is clearly achieved – the average national budgets for metrology research have stayed stable (in cash terms) over the decade, the programme funding has also been consistent.

However, demonstrating a figure of 50 % is more difficult; we need to be very careful which ratio we are talking about:

1. The percentage of the national budgets that is coordinated by the programmes (in the sense that the national budget is diverted to the in-kind funding) is 23 % (38.571/166).
2. The value of the total EMPIR budget compared to the national metrology research budgets over the same period (7 years) is 52 % (600/(7*166)).

Analysing the information on a country basis only adds confusion. Where countries don't use FEC to assess their national budget they can appear to use a significant part of their total national funding in the in-kind commitment (Turkey 75 %, Slovenia 116 %, Poland 73 %). For those with reliable FEC figures, Sweden commits the smallest at 12 %, Germany 16 %, France 18 %, The Netherlands commits the largest at 68 %.

Further numerical analysis is unlikely to give greater insight. Simple messages to take forward are:

- About a quarter of the national metrology research budgets is used as in-kind funding to EMPIR.
- The metrology research funded through EMPIR is about half the value of the metrology research funded by the combined national metrology research budgets.

Understanding the differences between these two statements is important when considering other indicators e.g. information from the EMRP on number of publications from NMIs supported by the programmes.

For the final evaluation, a survey should be done on which nationally funded projects are *influenced* by the programme, i.e. either done as preparation for an anticipated EMPIR project or further national work exploiting the outputs of an EMRP/EMPIR project. This will enable a more comprehensive evaluation of this objective.

5.4 All European NMIs and their designated institutes interact with the programme

All Euramet members have a place in a funded JRP except:

5.4.1 Albania

Albania had an ESRMG in EMRP and were co-authors on two PRTs in 2016. An RMG was unsuccessful in 2016.

5.4.2 Cyprus

Cyprus has not yet engaged with the programme. It has appointed a delegate to the General assembly but does not take part in any other parts of EURAMET.

5.4.3 Iceland

Iceland has expressed interest in HI-CB training for the dissemination of Time and Frequency.

5.4.4 Latvia

Latvia was a co-author in one PRT in 2016.

5.4.5 Lithuania

Lithuania have been involved with two RPT proposals that were not selected.

5.4.6 Luxembourg

The Luxembourg NMI consists of one person who claims to have no time to engage with us – not even to attend HI-CB training.

5.4.7 Malta

The past head of the Malta NMI was heavily engaged with EURAMET – a member of the Board of Directors. But with just 3 staff, concentrating on providing commercial services, engagement with the programme was not their priority.

5.4.8 Slovakia

Slovakia bid into two SIB proposals in 2015, but neither were selected.

In general, the thing limiting engagement from these countries is lack of staff and particularly money to fund the travel to attend training events.

The objective also talks about all DIs being engaged but, at this early stage in the programme, the appropriate TP for their area of designation may not have yet opened. This analysis can only be done later.

5.5 European leadership in at least 20 % of international metrology committees

Of the 70 chairs and vice chairs of the working groups of the CIPM Consultative Committees, 36 come from European NMIs and DIs.

6 Progress made towards achievement of the operational objectives

6.1 Establish common agendas with strong integration of basic as well as challenge-oriented metrology research via common priorities and joint calls with excellence based projects selection

EMPIR and its precursor joint programming activities (EMRP, iMERA-Plus and iMERA and MERA) have been on a journey towards closer integration of metrology research in Europe based on a common research agenda that drives and guides the collaborative pan-European research. EMRP research was guided by the research priorities identified during iMERA and similarly, during EMRP, EURAMET and its members developed a European Strategic Research Agenda (SRA) for the EMPIR period (<http://www.euramet.org/research-innovation/sra-survey/>).

A key element of the common research agenda for both EMRP and EMPIR is a thematic structure with a strong and direct focus on metrology to address the grand challenges rather than the traditional approach to metrology research focused on technical areas and/ or SI units. EMPIR calls are designed around the themes (referred to as TPs (Targeted Programme) in EMPIR) and the call scopes are based on the content of the SRA. The first stage of a two-stage proposal selection process ensures that proposed research topics align with the SRA and the call scopes.

The challenged based themes: Energy, Environment, Health and Industry are targeted at the needs of measurement uses in these areas be they public agencies seeking solutions, policy-makers and regulators seeking to design and implement solutions, businesses seeking to provide solutions or the research base. A key route to impact for the better measurements enabled by metrology research is to embed new accurate measurement methods in documentary standards and to improve the impact of metrology research. A new TP has been implemented in EMPIR to specifically to address the needs of standards organisations (CEN, Cenelec, ISO, etc.).

In addition to the challenge-oriented research EMPIR has two themes focused on longer-term more basic research to ensure the underpinning metrology system will meet society's future measurement needs. This research supports the development of the underpinning SI system of units (SI Broader Scope theme) as well as more exploratory research in the Fundamental theme.

Under EMRP 78 % of the research funding was directed to challenge-oriented themes and in EMPIR the expectation is for 61 % of the research to be in these themes.

6.2 Support innovation related activities through the development of new technologies, industry-driven joint research projects and industrial uptake. This requires a systematic technology screening of projects and at least 20 % industry driven research.

- The Industry calls (in 2014, 2017 and 2020) have a total budget (EU contribution) of 62.1 M€. This is 20.7 % of the 300 M€ total.
- Of the contracts issued so far, 35 % by value have been for the industry theme.
- Of the contracts issued so far, 7 % of the estimated costs belong to industrial beneficiaries, 40 % of these are funded and 60 % are unfunded.
- Of the contracts issued so far, 28 % of the legal entities involved are industrial.

6.3 Increase immediate relevance for policy makers and standardisation bodies. At least 10 % is dedicated to normative research.

Proposers are asked to estimate the percentage of effort in their proposals directed towards normative activities. This is then moderated by the MSU during negotiation to ensure the data is consistent with the activity descriptions. For the contracts issued so far, the estimate is that 17 % of the effort is dedicated to normative research.

6.4 Open the programme to the relevant scientific communities and raise awareness and involvement of European technology and research organisations. This means to at least double the participation of non NMI/DI scientists in the programme compared to EMRP

Headcount information will not be available for EMPIR projects until the consortia submit the "H2020 Questionnaire" at first periodic reporting. However, we do have estimates of person-months that can be compared between the programmes.

The REG contracts in EMRP (the route for funding non NMI/DI scientists in that programme) funded a total of 5740 months.

Of the EMPIR contracts issued so far, the external funded participants estimate the funded effort to be 2387 months. If we scale this up to the full value of EMPIR (x 300/65) we can estimate 11017 months. This represents an increase of 1.92 times the months in EMPIR compared to EMRP.

The external participation in EMRP was concentrated in long REG contracts – typically one person providing 36 months. The external participation in EMPIR is more likely to be more people providing less months each, so it is highly likely that the objective will be met.

6.5 Support capacity building in developing NMIs, in particular by assisting national authorities to fully exploit the use of structural funds and other relevant programmes. The expectation is to increase the leverage of EU structural funds and other programmes, from 0 % under EMRP to 10 % of the co-investment in EMPIR.

Capacity Building is supported through a range of training activities and a Mobility Grant scheme, all funded from the cash contributions. Despite much work on seeking routes to influence the direction of structural funds, no common systematic approach has been discovered.

From an initial survey we have identified some 17 M€ of structural funds directed to metrology infrastructure of which 4 M€ has been used in EMRP and EMPIR research projects.

6.6 Strengthen European leadership through EURAMET and foster global cooperation. It should lead to at least two structured cooperations with major metrology actors outside Europe (e.g. US, Canada).

No progress has been made on this objective yet.

Annex 1 Publishable summaries of all funded projects

The latest publishable Summaries of EMPIR projects are available on the EURAMET website.

- Projects funded from the EMPIR Call 2014 – Industry, Research Potential and Support for Impact:
<https://www.euramet.org/empir-call-2014>
- Projects funded from the EMPIR Call 2015 – Health, SI Broader Scope, Normative, Research Potential and Support for Impact:
<https://www.euramet.org/empir-call-2015>
- Projects funded from the EMPIR Call 2016 – Energy, Environment, Normative, Research Potential and Support for Impact:
<https://www.euramet.org/empir-call-2016>