



R&I Opportunities for the Coal and Steel in 2017

**24 May 2017
Lisbon / Portugal**

**Tiago PEREIRA
European Commission
DG Research and Innovation
Research Fund for Coal and Steel**

The RFCS



Research Fund for Coal & Steel

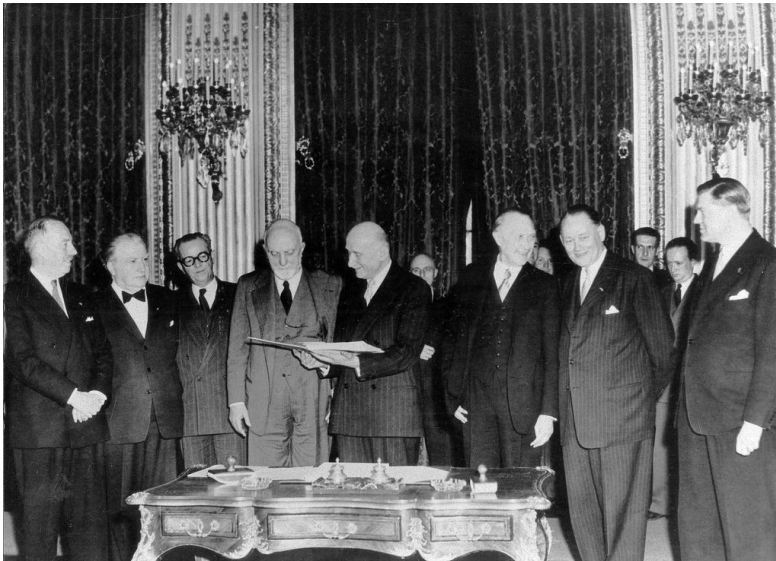
From the ECSC to RFCS

1952: Treaty of Paris – European Coal and Steel Community (ECSC)

2001: Treaty of Nice

2002: Treaty of Paris expired

2003: Council Decision - creation of RFCS



RFCS Background Information

Legal Basis

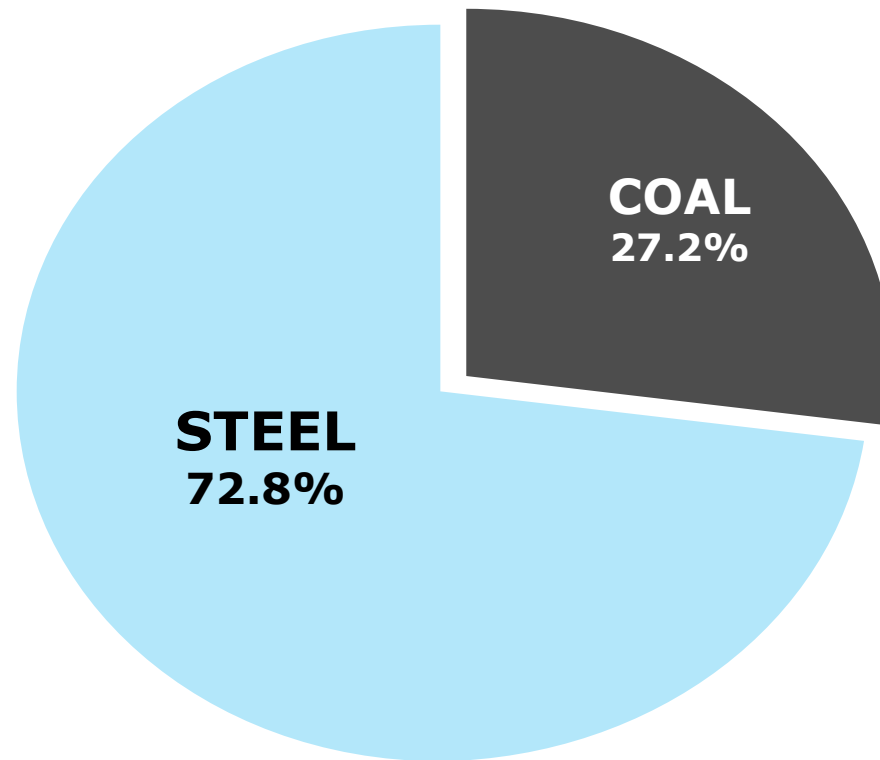
COUNCIL DECISION of 1 February 2003 establishing measures on the financial consequences of the expiry of the ESCS Treaty and on the Research Fund for Coal and Steel ***(2003/76/EC)***

COUNCIL DECISION of 29 April 2008 on the adoption of the Research Programme of the Research Fund for Coal and Steel and on the multiannual technical guidelines for this programme ***(2008/376/EC)***

The RFCS Programme

- Transference of the assets of the ECSC to the EU in 2002 and use their revenues to support the RFCS research programme.
- Levy/Reserves from Coal and Steel production = \sim 1.6 billion €
- Every year around € 52 million (average) is made available to universities, research centres and industry to fund projects (NO taxpayer).
- Currently, the legal basis of the RFCS Research Programme is outlined in the Council Decision 2008/376/EC of 29 April 2008.
- Complementary to other European financial instruments for research and innovation, such as Horizon 2020

RFCS funding allocation



RFCS Overview: Facts & Figures

- **Approx. 300 Grant Agreements running at any one time**
- **>700 M€ funding in Coal and Steel research since 2003 \approx 1 B€ total spending**
- **Mixture of industry, academia and research centres**
- **Technical, innovative projects, well defined objectives**
- **Can be complimentary to other funding (H2020, national funds, etc.)**

HOW does the RFCS Programme work?

Managed by Unit D4 – DG RTD, with the assistance of:

- **The Coal and Steel Committee (COSCO)**
- **The Coal and Steel Advisory Groups (CAG and SAG)**
- **The Coal and Steel Technical Groups (12 in total)**

COSCO - Composed of representatives of Member States. Its role is to assist the Commission in the overall programme management.

CAG/SAG - Composed of technical advisers, active in the field concerned and aware of the industrial priorities. Members are appointed by the Commission. The CAG and the SAG shall assist the Commission in the programme management.

Coal Technical Groups

- TGC 1** Coal mining operation, mine infrastructure and management, unconventional use of coal deposits
- TGC 2** Coal preparation, conversion and upgrading
- TGC 3** Coal combustion, clean and efficient coal technologies, CO₂ capture

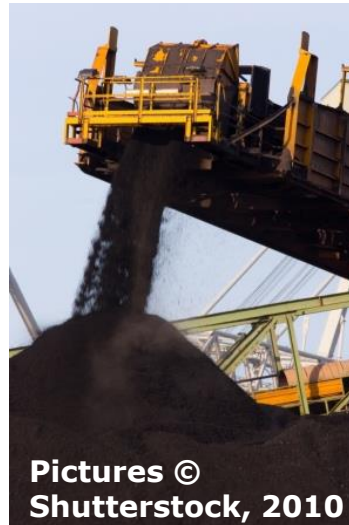
STEEL Technical Groups

- TGS 1 Ore agglomeration and iron making**
- TGS 2 Steelmaking processes**
- TGS 3 Casting**
- TGS 4 Hot and cold rolling processes**
- TGS 5 Finishing and coating**
- TGS 6 Physical metallurgy and design of new generic steel grades**
- TGS 7 Steel products and applications for automobiles, packaging home appliances**
- TGS 8 Steel products and applications for building, construction and industry**
- TGS 9 Factory-wide control, social and environmental issues**

COAL: Programme Research Objectives

**Management of
external dependence
on energy supply**

**Health and Safety
in Mines**

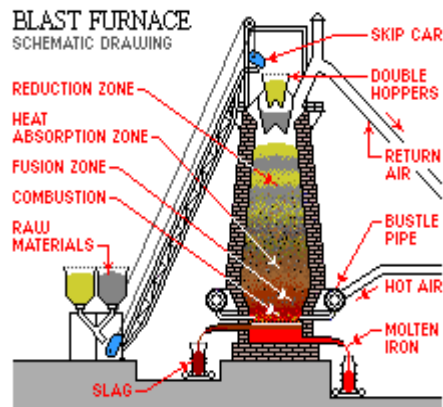


**Improving the
competitive
position
of European Union Coal**

**Efficient protection of
the environment
& improvement
of the use of coal
as clean energy source**



STEEL: Programme Research Objectives



Conservation of resources
and improvement of
working conditions



New and improved
steelmaking
and finishing
techniques



Research on
the utilisation
of steel



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| Type of Activity | Description | RFCS co-funding | Duration | Consortium |
|---|--|-----------------|--|---|
| Research projects | Investigative or experimental work | ≤60% | No specific requirement (indicative duration is 36 or 42 months) | Minimum three independent legal entities established in at least two different EU Member States |
| Pilot & Demonstration projects | Construction and/or operation of an installation at pilot or demonstration scale | ≤50% | No specific requirement (indicative duration is 36 or 42 months) | Minimum two independent legal entities established in at least two different EU Member States |
| Accompanying measures | Dissemination or promotion of knowledge gained | ≤ 100 % | No specific requirement (indicative duration is 18 months) | Minimum two independent legal entities established in at least two different EU Member States |

Research Projects

Proposals should demonstrate the ability to solve specific scientific or technical problems, as well as the economic and/or scientific technological impact of the results

- **Preliminary investigation on the state-of-art and literature review should not be part of the project, but should be completed prior to submission and described in the proposal**

Pilot & Demonstrations Projects

Bridge the gap between Research and Innovation (innovation is considered as the technological implementation of new products or processes within the relevant industrial sector)

- **Projects will also be evaluated for their potential to provide a step forward in the TRL.**
- **No significant research efforts should be included in Pilot and Demonstration projects, as they should focus on the construction and validation of a ready-designed unit.**

Accompanying Measures

Contribution to the assessment and enhancement of European or international technical regulations and standards

Valorisation of results that have a direct and immediate potential application at industrial level

Exploitation of new or alternative market possibilities of products and processes

Who can participate?

- Any legal entity established in the EU28 Member States
- Partners outside EU28 (either candidate or third countries) are entitled to participate but without receiving financial contribution



Typical Project

Industry-driven participation

- ✓ Dedicated and manageable consortium (5/8 partners)
- ✓ Average funding 1 – 2 M€ per project
- ✓ Duration typically 3 – 4 years (shorter for accompanying measures)

Submitting a Proposal

Starting date: **13 June 2017**

Deadline: **15 September 2017**
(17h00 Brussels local time)

How to submit a proposal ?

- Since 2011, RFCS proposals are to be **submitted electronically**.
- To be able to apply to the RFCS, each beneficiary needs a user ID and a **Participant Identification Code (PIC)**.
- Unless you have already one (through prior participation in the RFCS, FP, H2020) → request and validate your PIC as soon as possible through the **Unique Registration Facility (URF)**.

Submission Process

| | | Description | Responsible |
|---------------|----------------|---|---------------------|
| Step 1 | LOGIN | Access to the Participant Portal | Project Coordinator |
| Step 2 | FUNDING SCHEME | Selection of Funding Programme, Topic, Type of Activity and Technical group | Project Coordinator |
| Step 3 | CREATE DRAFT | Creation of a new draft proposal | Project Coordinator |
| Step 4 | PARTIES | Selection of partners | Project Coordinator |
| Step 5 | EDIT PROPOSAL | Preparation of the technical content, of the administrative information and of the budgetary aspects of the proposal. | All partners |
| Step 6 | SUBMIT | Final submission of the proposal | Project Coordinator |



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RESEARCH & INNOVATION

Participant Portal

European Commission > Research & Innovation > Participant Portal > Reference Documents

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FUNDING OPPORTUNITIES

HOW TO PARTICIPATE

EXPERTS

SUPPORT



LOGIN



REGISTER

H2020 Online Manual

Reference Documents

Beneficiary Register

Financial Viability Self-Check

SME Participation

Reference Documents

This page includes all the H2020 & FP7 reference documents starting with legal documents and the Commission work programmes for research and innovation up to model grant agreements and guides for specific actions and horizontal issues. The documents are grouped by categories. It also includes reference documents of other EU programmes, as 3rd Health, Consumer, COSME and Research Fund for Coal and Steel programmes. To access a document:

- Click on a folder
- Click on ARROW to have more information about the document and its available translations

You can search a specific H2020 or FP7 document on the [Europa Search](#) service.

H2020

Other EU programmes

FP7

- 3rd Health Programme
- Consumer Programme
- Cosme
- Research Fund for Coal and Steel
 - RFCS legislation
 - Work Programme
 - Grant agreements and contracts
 - Guidance
 - Templates & forms

HORIZON 2020 RESEARCH ON EUROPA CORDIS OLAF

Evaluation Criteria (1/2)

For Research projects:

- 1. Scientific and technical approach**
- 2. Innovative content**
- 3. Quality of the implementation**
- 4. Benefits for the European coal and steel sectors**

For Pilot and Demonstration projects:

- 1. Technical approach**
- 2. Contribution to innovation**
- 3. Quality of the implementation**
- 4. Benefits for the European coal and steel sectors**

Evaluation Criteria (2/2)

For Accompanying Measures:

- 1. Overall approach**
- 2. Dissemination value**
- 3. Quality of the implementation**
- 4. Benefits for the European coal and steel sectors**

Most common weak points (1/4)

Criterion 1 (Scientific & technical approach)

• State-of-the-art

- Poorly described – position at European & worldwide level
- Existing patents not taken into account or referenced
- No prioritisation of reference list (Form A1)

• Feasibility

- Poor description/lack of vision on development & validation stages

• Methods & Techniques, Approach

- Experimental activities: link/integration & global objectives unclear
- Excessive modelisation & simulation on unvalidated concepts
- Metrics of success missing (preferably with quantitative criteria) for Go / No Go
- Publication strategy poor (communication, seminars/workshops, website,...)

Most common weak points (2/4)

Criterion 2 (Innovative content)

- Often not so innovative – new ideas necessary
- Real innovative aspects remain unclear
- Incremental research & added value unclear
- Perspective of a wider & general use of expected results: poorly described

Most common weak points (3/4)

Criterion 3 (Quality of implementation)

- **Project Scheduling**
 - Coherence of flow of tasks
 - Timing: either lax, either too ambitious
- **Partnerships**
 - Industrial partners: often only pointed/specific contributions
 - (Real) Participation of industrial partners
 - Universities: implication in industrial & economic project parts
 - Plethoric & redundant partnerships
 - « Sleeping » partners without real contribution
- **Workplan**
 - Deliverables
 - Who is responsible for what?
 - Definition
 - (Clear) Overall WP flow diagram is helpful

Most common weak points (4/4)

Criteria 4 (Benefits for the European Coal and Steel sectors)

- Lack of knowledge of market deployment
- Evaluation of impact on competitiveness: poor or inexistant
- Quantitative assessment of economic impact: poor or inexistant

Scoring

0 = Fails or missing/incomplete information

1 = Poor

2 = Fair

3 = Good

4 = Very good

5 = Excellent

Additional priority bonus

Granted to research, pilot and demonstration projects if they address **at least 1** annual priority

Threshold of minimum **3** points **on all criteria** to avoid proposals with important weaknesses being funded.

In case of proposals with equal total score

Cascade mechanism

| Rank | Criterion | Name of the criterion for the different types of activity | | |
|-----------------|-------------|---|--|--|
| | | Research projects | Pilot and Demonstration projects | Accompanying Measures |
| 1 st | Criterion 4 | Benefits for the European coal and steel sectors | Benefits for the European coal and steel sectors | Benefits for the European coal and steel sectors |
| 2 nd | Criterion 1 | Scientific and technical approach | Technical approach | Overall approach |
| 3 rd | Criterion 2 | Innovative content | Contribution to Innovation | Dissemination value |
| 4 th | Criterion 3 | Quality of the implementation | Quality of the implementation | Quality of the implementation |

- *Priority given to the impact for relevant industrial sector*
- *Any possible ex-aequo cases solved (last criterion budget)*

Evaluation Process

Phase 1: Remote evaluation

Each proposal is evaluated individually by 3 evaluators on the dedicated SEP system (Submission & Evaluation of Proposals)

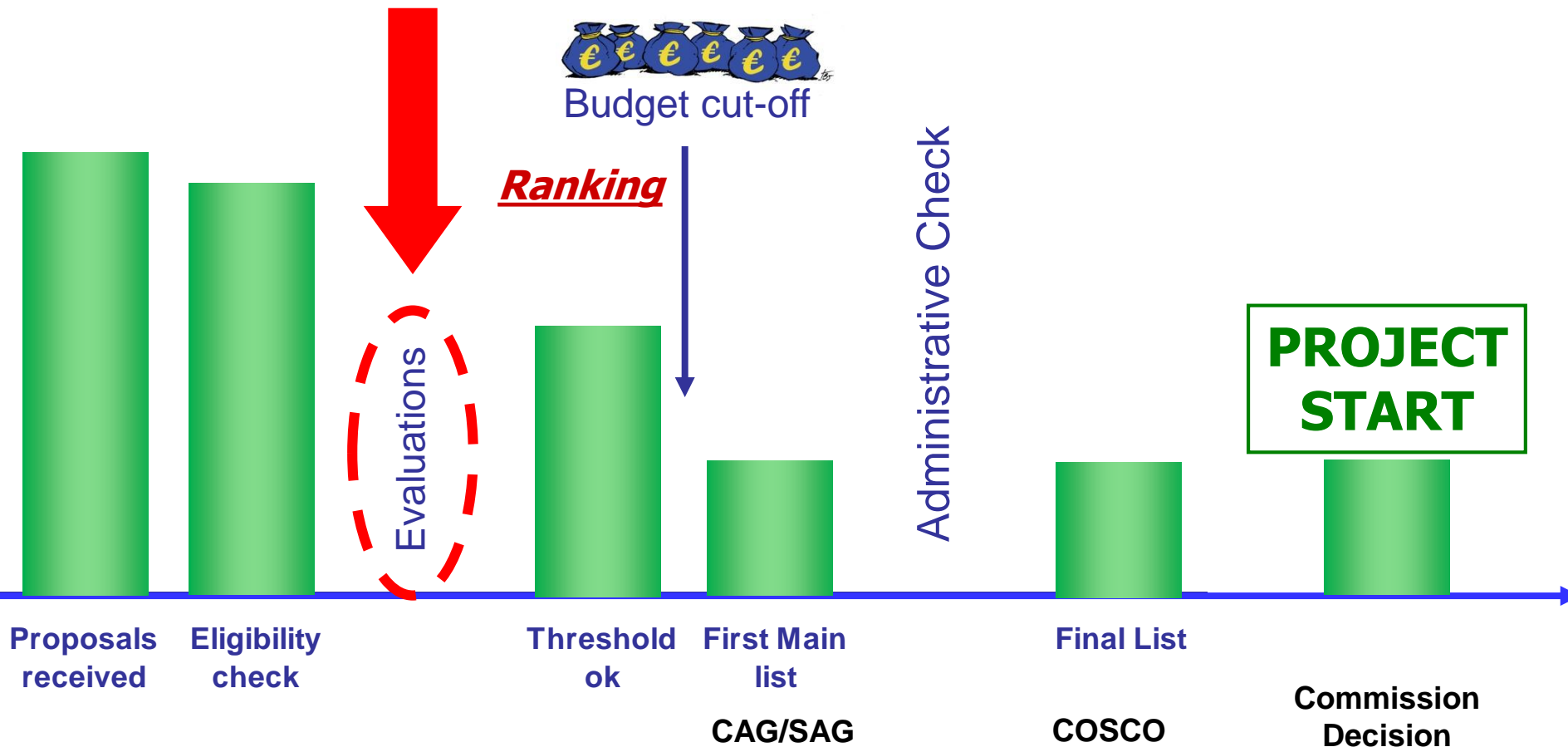
Phase 2: Preparation of draft Consensus Report

For each proposal a draft CR is prepared on the SEP system by a rapporteur (one of the evaluators) on the basis of the individual evaluations

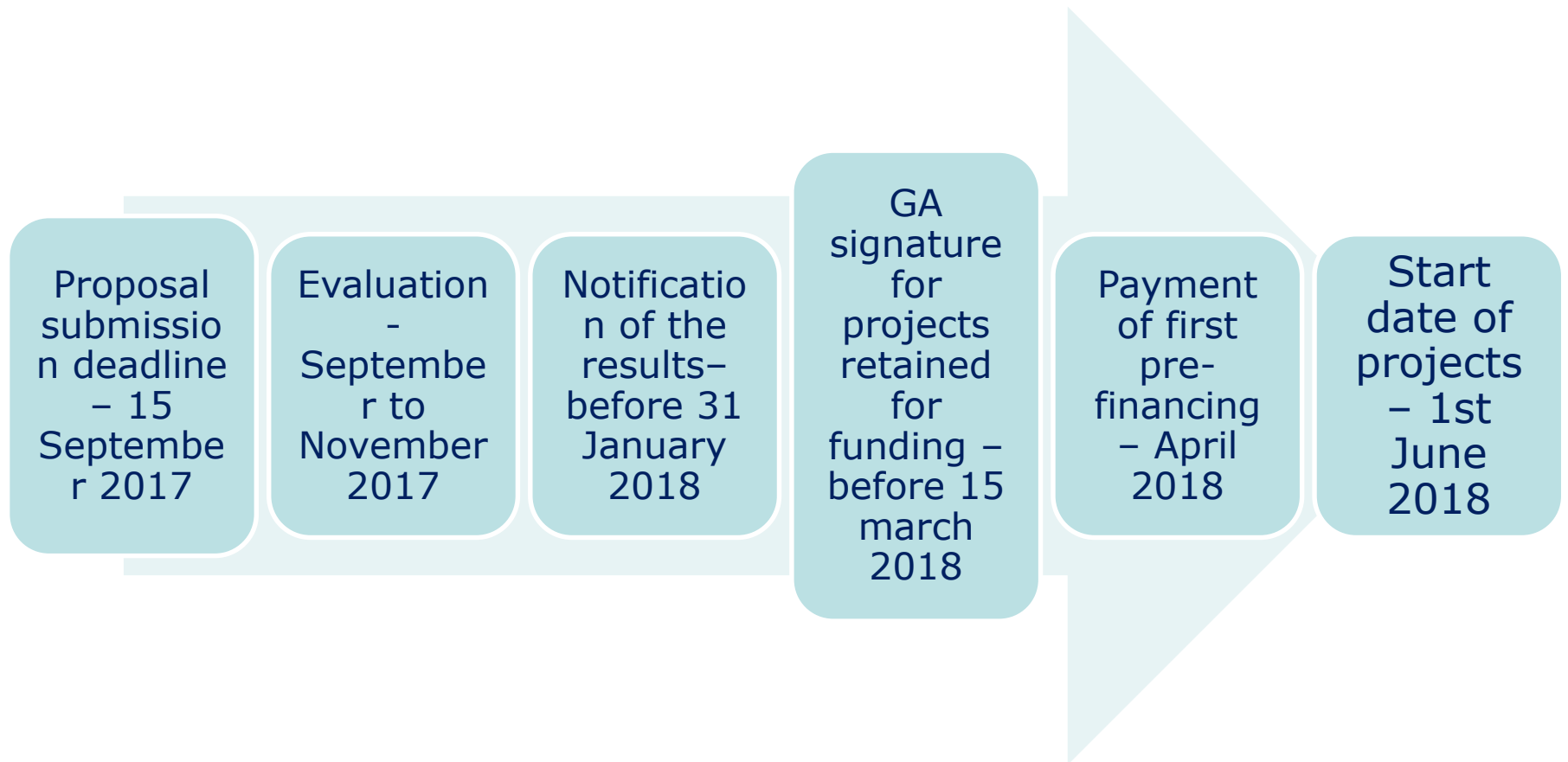
Phase 3: Central evaluation (Brussels)

For each proposal a consensus meeting takes place with the participation of the 3 evaluators and a Commission's Project Officer

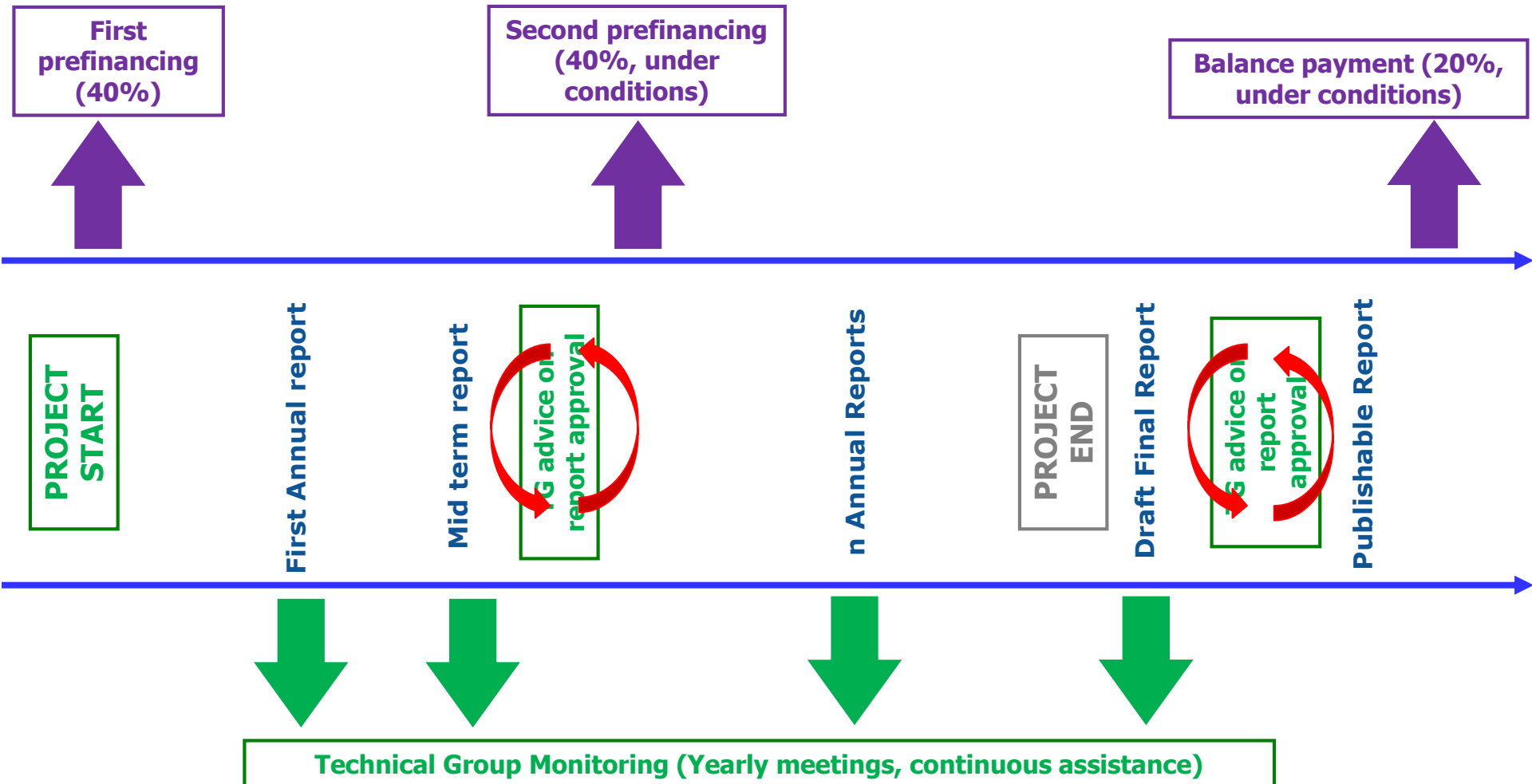
Evaluation and Selection Process



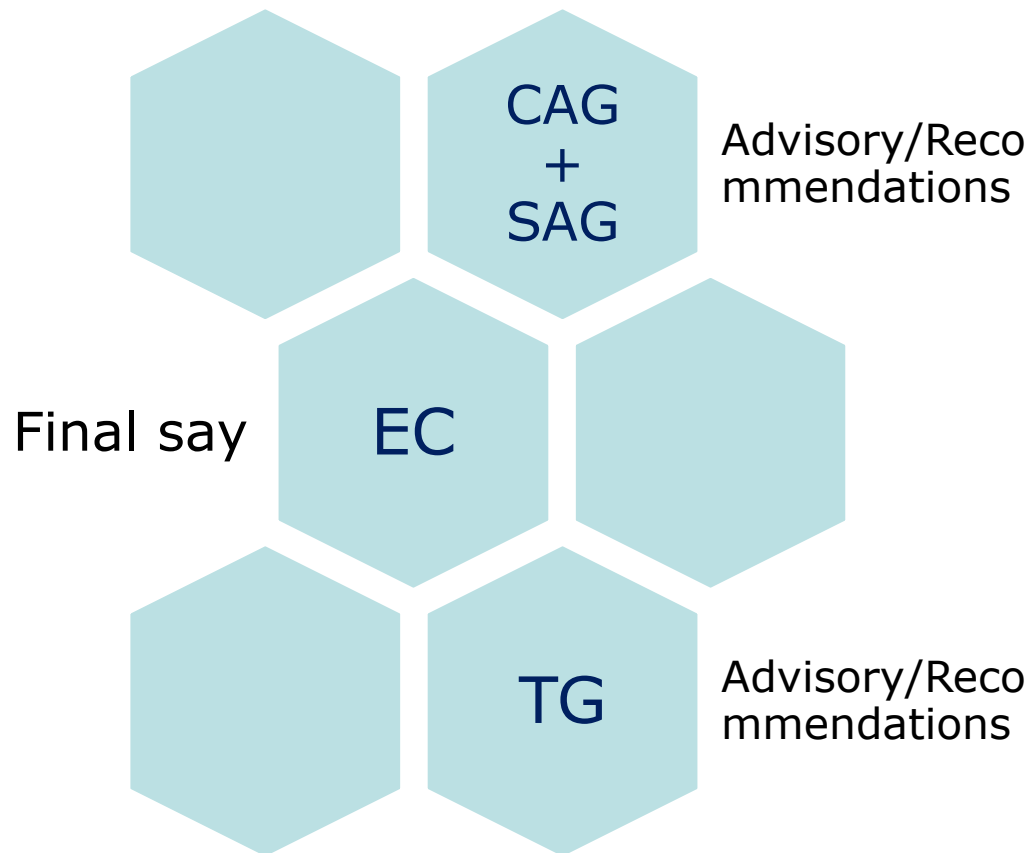
Proposed calendar



Management of the programme: Project timeline (Majority of the current projects)



How to define the RFCS R&D Priorities



2017 Annual Priorities Coal

1. Addressing health or environmental risks during OR after mine operation;
2. Improved monitoring of coke oven conditions;
3. Innovative energy conversion cycles to increase revenue streams from coal power generation or steel industry while reducing carbon footprint;
4. Pilot projects validation of emerging AND innovating technologies leading to efficiency improvements AND CO2 emission reduction.
5. Pilot/Demonstration projects improving the competitiveness of coal excavating techniques worldwide

2017 Annual Priorities Steel (1/2)

1. Online analytics of large data streams coming from various sources (using Big Data technologies) to improve plant/process reliability OR to realise machine supported decisions on product quality OR to improve the flexibility of production scheduling;
2. Improvement of workers` potential by use of advanced tools (including management of knowledge) to improve working conditions, safety, training, knowledge preservation;
3. Improvement in resource OR energy efficiency in iron OR steelmaking processes, by use of by-products/residuals or waste heat;

2017 Annual Priorities Steel (2/2)

4. Pilot projects validation of emerging AND innovating technologies leading to efficiency improvements AND CO2 emission reduction;
5. Cost effective lightweight steel solutions for new vehicle concepts or components with improved LCA or safety performance;
6. Adapting processing from upstream to downstream steps to overcome the challenges raised by innovative steel grades (enhanced functional or smart properties) by novel OR improved process OR control techniques.

Some Remarks & Advice (1/2)

- **Strong competition**
- **High quality** level of proposals
- **Long process:** start early with experienced partners !
- Descriptions should be **short & concise**, but don't expect the evaluators to dig out necessary information
- **Explain improvements in case of resubmission**
- **Test your application** by 'neutral' proof-readers
- Make use of the **RFCS projects synopsis** (good overview about recent projects)
- **Enrol as an expert (Evaluator)**
- Typical projects:
 - Focused industrial subjects, almost **problem solving**
 - Dedicated and **manageable consortium** (5/8 partners)
 - Average funding ~ **1 – 2 M€**

Some Remarks & Advice (2/2)

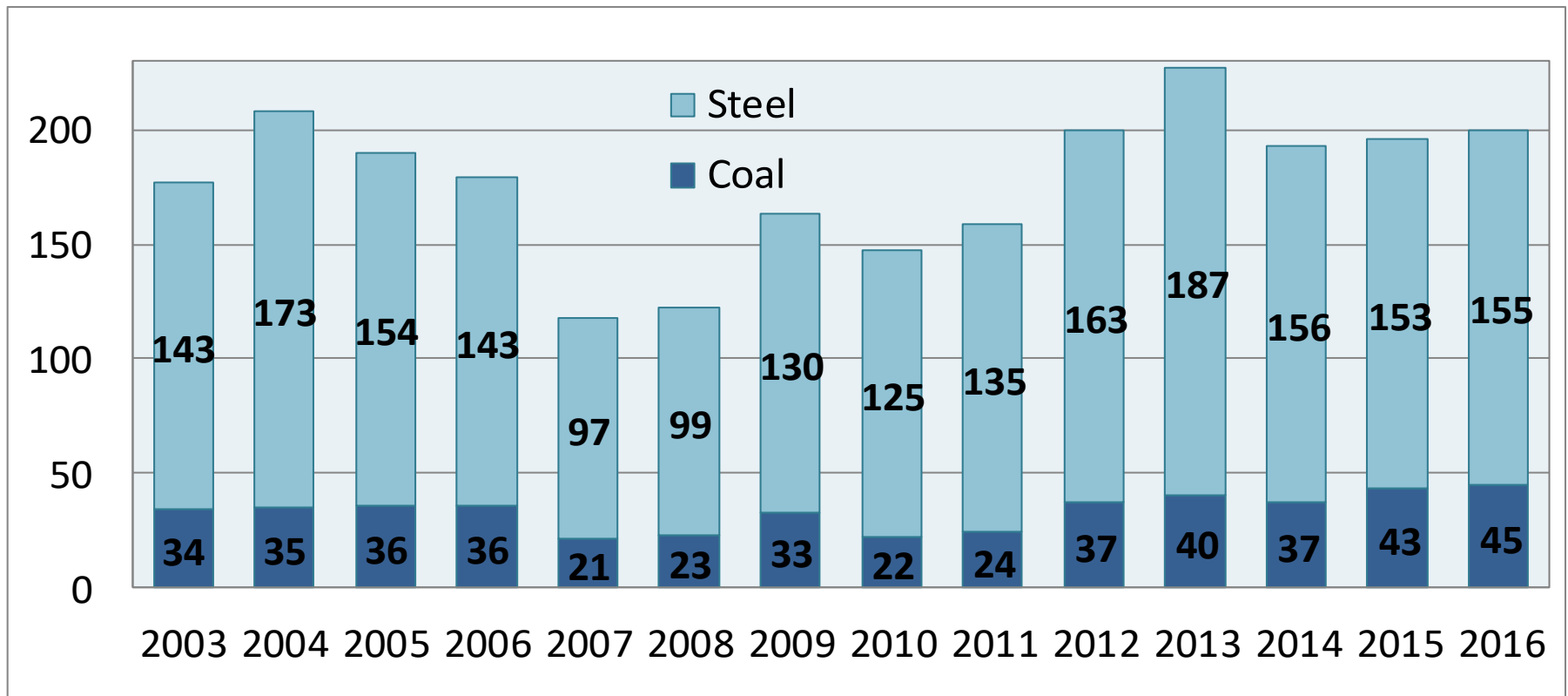
- Once the Grant Agreement is signed, **project extensions will be granted only in very exceptional circumstances**. However, in any case the consortium can still apply for a temporary suspension of the project, until the negative events affecting the execution of the project have been fully overcome.
- It is recommended to commit sufficient time for the preparation of the final report at the end of the project.
- **Before applying, look at the Participant Portal and RFCS website for all the information and documents needed**

RFCS Planning 2017

- Information to applicants: February 2017
- Commission Decision: April 2017
- Signature of Grant Agreements: April 2017
- New Info pack: June 2017
- Earliest Pre-financing: May 2017
- Start of most projects: 1 July 2017
- Deadline for the Call 2017: 15 September 2017
- Remote evaluations: September/October 2017
- Central evaluations: November 2017
- 18th CAG meeting: 5 December 2017
- 20th SAG meeting: 7 December 2017
- 19th COSCO Meeting: 21 December 2017

Previous Results

Proposals received



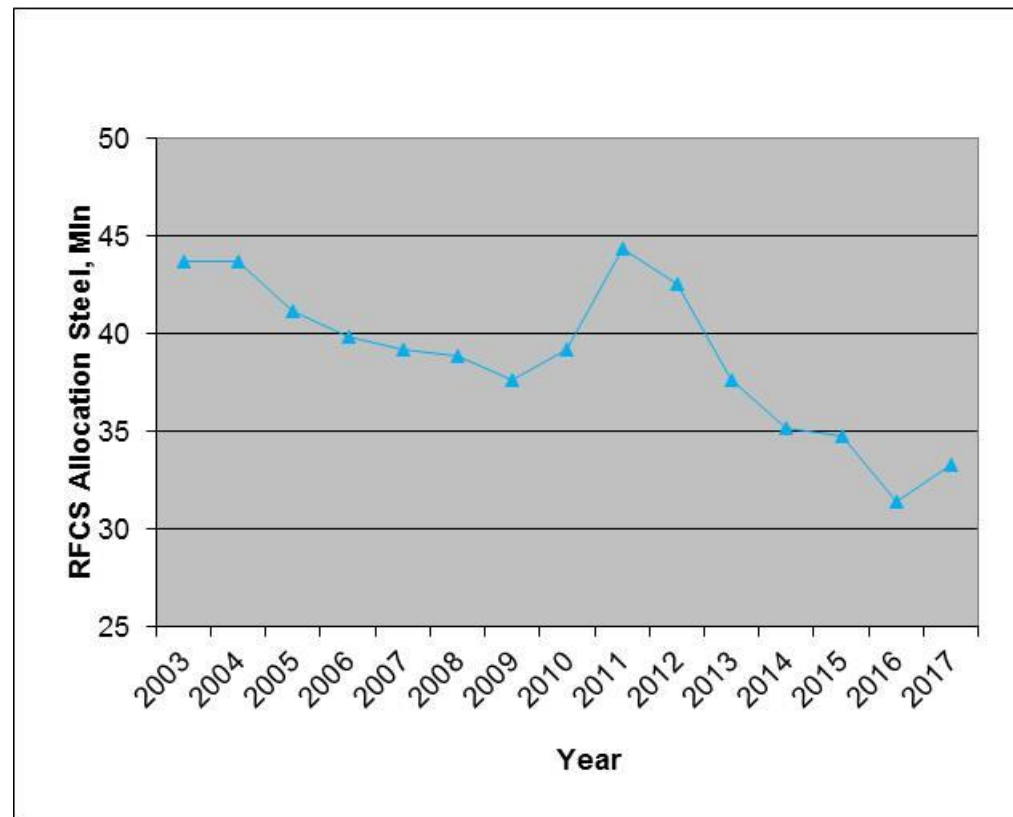
Results of the 2016 Evaluations

Coal 45 proposals submitted
8 proposals successful
28 proposals on reserve list
9 proposals under threshold
0 proposals not eligible
Success rate: 18%

Steel 155 proposals submitted
30 proposals successful
83 proposals on reserve list
39 proposals under threshold
3 proposals not eligible
Success rate: 19%

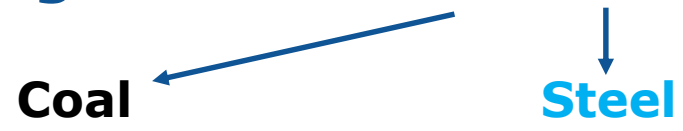
Evolution of Available RFCS Budget

| Year | Allocation | | |
|------|------------|------------|-------------------|
| | Coal | Steel | Total (€) |
| 2003 | 16.320.000 | 43.680.000 | 60.000.000 |
| 2004 | 16.320.000 | 43.680.000 | 60.000.000 |
| 2005 | 15.368.000 | 41.132.000 | 56.500.000 |
| 2006 | 14.892.000 | 39.858.000 | 54.750.000 |
| 2007 | 14.654.000 | 39.221.000 | 53.875.000 |
| 2008 | 14.535.136 | 38.902.864 | 53.438.000 |
| 2009 | 14.067.568 | 37.651.432 | 51.719.000 |
| 2010 | 14.649.784 | 39.209.716 | 53.859.500 |
| 2011 | 16.572.892 | 44.356.858 | 60.929.750 |
| 2012 | 15.902.446 | 42.562.429 | 58.464.875 |
| 2013 | 14.071.240 | 37.661.260 | 51.732.500 |
| 2014 | 13.155.620 | 35.210.630 | 48.366.250 |
| 2015 | 12.974.400 | 34.725.600 | 47.700.000 |
| 2016 | 11.723.200 | 31.376.800 | 43.100.000 |
| 2017 | 13.112.171 | 33.256.638 | 42.100.000 |





RFCS budget available for funding in 2017: 42.100.000 €



| | Coal | Steel |
|---|-------------------------|-------------------------|
| % Total budget | 27.2% | 72.8% |
| Allocation budget RFCS 2017 | 11.451.200,00 € | 30.648.800,00 € |
| Appropriations amounts carried over from unspent budget 2016 | + 1,732.297,83 € | + 3.030.078,67 € |
| Subtotal | 13.183.497,83 € | 33.678.878,67 € |
| Provisions for other expenses in 2017* | -157.760,00 € | -422,240,00 € |
| Total | 13.025,737,83 € | 33.256.638,67 € |

* Evaluation, publications, interests for late payments, monitoring and assessment

Portuguese Beneficiaries in RFCS

Σ RFCS Coal: Participation in 10 projects;

Σ RFCS Steel: Participation in 82 projects;

Σ RFCS: Application for 515 projects (432 steel, 83 coal); 89 successful (24 %)

RFCS 2016: **NO COAL APPLICATIONS IN 2016**
(2 in 2015)

Application for 38 steel projects
(37 in 2015)

6 successful projects (15,7 %)

Other R&D opportunities and way forward

***SPIRE** (PPP) under HORIZON 2020
(CO₂ reduction and energy/resources
efficiency)*

*Big Ticket initiative for breakthrough
innovations on **STEEL** (ultra low-
carbon future and circular economy)*



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Research Fund for Coal & Steel

Monitoring &
Assessment Report



Quantitative Benefits (23 projects analysed)

For the project partners:

1 Euro of RFCS funding resulted in a **benefit of 3.3 Euros/year for the beneficiaries.**

Estimation of the potential accumulated **benefits for the beneficiaries → 400 M€.**

For the sectors:

55 M€/year of RFCS co-funding has the potential to generate **benefits of 684 M€/year** across the European coal and steel sectors

Qualitative Benefits

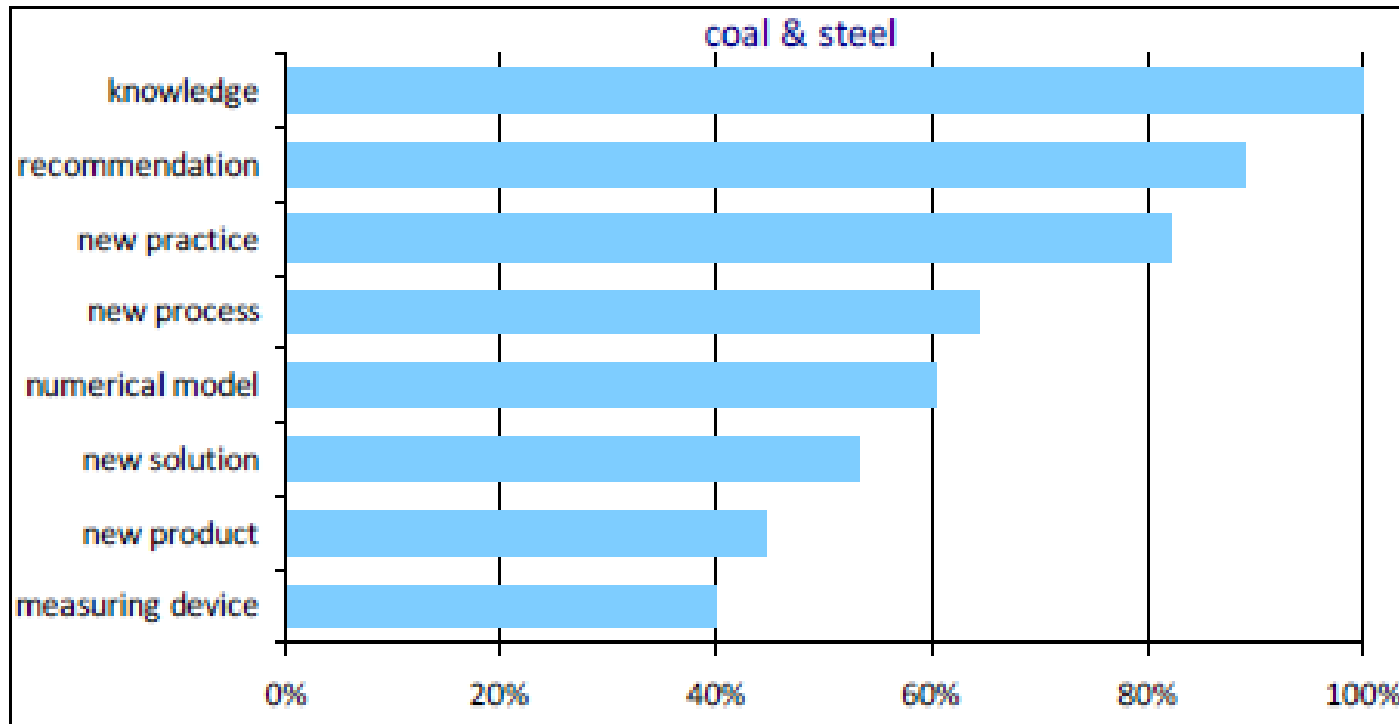


Figure 7.2 Typology of the outcomes of the selected projects

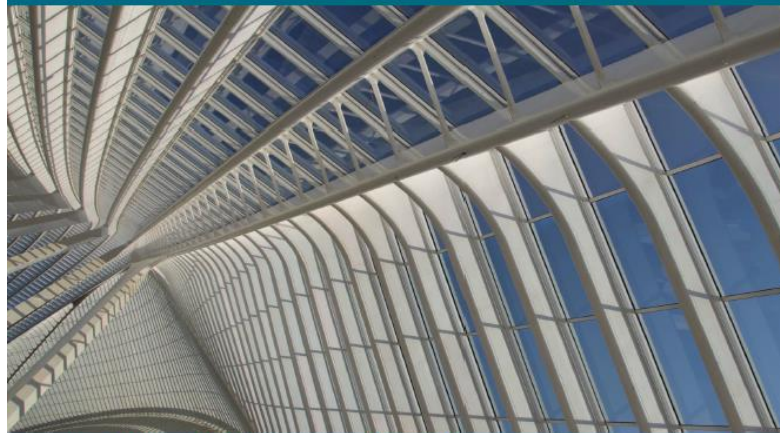


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The Future of European Steel

Innovation and sustainability
in a competitive world and EU circular economy



Written by D. Rossetti, April - 2017

Research and
Innovation

EN



Summaries of RFCS Projects 2003 – 2014

Full list of projects co-financed by the Research Fund
for Coal and Steel of the European Commission



Synopsis of the RFCS projects 2015

*List of projects co-financed by the Research Fund for Coal and
Steel of the European Commission*

Research and
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Synopsis of the RFCS projects for 2016

10.0 version :

Research and
Innovation

Date: 17/03/2017

Web Links / RFCS Info (1/2)

- **RFCS website:** http://ec.europa.eu/research/industrial_technologies/rfcs_en.html

The website now contains :

- the latest news about activities in Coal and Steel
- information for stakeholders on how to participate
- a link to successful RFCS projects

When accessing the CORDIS website a reference to the new website is given,

- **Latest published technical reports:**

<http://bookshop.europa.eu/>

- **Register as Technical Expert:**

<http://ec.europa.eu/research/participants/portal/desktop/en/experts/index.html>

Web Links / RFCS Info (2/2)

Helpdesk

rtd-steel-coal@ec.europa.eu

Helpdesk

Participant Portal

<http://ec.europa.eu/research/participants/api/contact/index.html>

Documents in Participant Portal:

<https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/ind>

My contact

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(RFCS)*

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If you have any questions do not hesitate in sending me an email

Thank you for your attention !

Examples of successful projects:

- **NEMAEQ**
- **IMPECABL**
- **LIGPOWER**
- **CFB 800**



European Commission

Success Stories

Themes

- > Agriculture & food
- > Energy
- > Environment
- > ERA-NET
- > Health & life sciences
- > Human resources & mobility
- > **Industrial research**
 - Building & construction
 - Coal & steel
 - Industrial processes & robotics
 - Materials & products
 - Nanotechnology
 - Standards, measures & testing
 - Other
- > Information society
- > Innovation
- > International cooperation
- > Nanotechnology
- > Pure sciences
- > Research infrastructures
- > Research policy
- > Science & business
- > Science in society
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- > SMEs
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Countries

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 - Algeria
 - Argentina
 - Australia
 - Austria
 - Belarus

> Industrial research - Coal & steel

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Engineering longer lives for bridges



Bridges are an integral part of today's road and rail transport network, but maintaining them puts significant strain on public finances. The EU-funded project Long Life Bridges has found a way to keep them safe at lower cost. It has also built a prototype of a device designed to extend the lifetime of bridge cables.

Published: 25 February 2015

Mapping greenhouse emissions to prevent climate change



EU-funded researchers have used advanced modelling and geo-spatial information to compile more accurate greenhouse gas inventories for Poland and Ukraine. The approach could substantially improve the accuracy of national inventories of greenhouse gases and boost Europe's efforts to reduce emissions.

Published: 30 June 2014

OXYMOD – Cleaner power thanks to mathematics



Mathematical modelling has in recent years proven to be a useful and cost-cutting tool for designing and modernising coal-fired power plants. The OxyMod project – supported by the European Union (EU) Research Fund for Coal and Steel (RFCS) – has striven to extend existing combustion modelling capabilities to oxy-fuel combustion conditions. This should

lead to preparation and pre-engineering of large demonstration power plants in Europe using modern and clean oxy-fuel CO2 capture technology in the

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NEMAEQ - New mechanisation and automation of longwall and drivage equipment

Project aimed at increasing the productivity and reducing production costs. Research results:



Coal/rock distinction; collision avoidance, less maintenance and downtime

Used a wide variety of sensors: Infrared; RADAR; impact sound sensors

Wireless communication and when necessary fibre-optic links

Networked sensors and dedicated software

Cost reduction through: productivity increase; decrease of labour cost, increase of running time

NEMAEQ: Financial Benefits

Productivity increase with a fully automated shearer loader system

1.5 M€/y/longwall; potential 45 M€/y within EU

Cost reduction: decrease of labour cost, increase of running time

0.1 M€/y/longwall; potential 3 M€/y within EU



IMPECABL - Improving environmental control and coke battery life through integrated monitoring systems

Project aimed at **reducing emissions** from coking plants and **extend life time** and **productivity rate**.

Prolonging lifetime of coking plant to 40 – 50 years.

Techniques developed provide plant management with **investigative and monitoring tools** for early detection of problems in older coking plants.

Results can lead to a **reduction of capital cost of 10%**. Based on the European coke production and assuming only 5% reduction for the sector → **potential cost reduction of 0.75€/t or 32 M€/y**

LIGPOWER – More efficient cleaning concept for stepping up availability of lignite-fired power plants

Strong interest from the power generation community to apply **suitable cleaning technologies** for **enhancing availability** of coal fired power plants.

The use of efficient cleaning facilities results in an **increase of 1% plant availability**, leading to a **benefit of 1M€/y for a 600 MW** unit. In Europe 3 units are covered within the assessment period → 3M€/y benefit.

In addition benefit from the avoidance of **unnecessary investment** is estimated at **10 M€**.

CFB 800 – Circulating Fluidized Bed combustion for coal-fired power plants

The CFB is considered to be one of the very important technologies leading to the increase of efficiency in power generation and decrease of emissions.

The CFB project aimed at scaling up design for CFB technology to 800MW size with a net efficiency of 45%. 0,2 Mt/y of CO₂ can be avoided by using 5% biomass (corresponding to a **benefit of 1,6 M€/y**). Further savings can be achieved by using a coal/petcoke ratio of 80/20 → potential **benefit of 7,4 M€/y** savings in operational costs.