Opinion of the European Economic and Social Committee on ‘The Perspectives of European Coal and Steel Research’

(2005/C 294/03)

On 1 July 2004 the European Economic and Social Committee, acting under Rule 29(2) of its Rules of Procedure, decided to draw up an opinion on ‘The Perspectives of European Coal and Steel Research’.

The Consultative Commission on Industrial Change, which was responsible for preparing the Committee’s work on the subject, adopted its opinion on 13 June 2005. The rapporteur was Mr Lagerholm and the co-rapporteur was Mr Gibellieri.

At its 419th plenary session, held on 13 and 14 July 2005 (meeting of 13 July 2005), the European Economic and Social Committee adopted the following opinion by 57 votes to none with 3 abstentions.

1. Introduction

1.1 Prospects opened up by the Research Fund for Coal and Steel

1.1.1 ECSC collaborative research ended with the expiry of the ECSC Treaty on 23 July 2002. However, the surplus capital contributed by the steel and coal industries during the Treaty’s period of operation now makes it possible to perpetuate this type of collective research. Indeed, the decision to transfer this capital to the Communities and devote it to research was taken in the Treaty of Nice. The capital amounts to EUR 1.6 billion (estimated value of the capital known at the time when the ECSC bonds were released). The Research Fund for Coal and Steel (RFCS) was created in February 2003. The legal basis was laid down in the annex to the Treaty of Nice relating to the expiry of the ECSC and by the Council decisions of 1 February 2003 (2003/76/EC, 2003/77/EC, 2003/78/EC) published in the Official Journal of 5 February 2003.

1.1.2 Technical and financial guidelines lay down the conditions for the operation of the programme.

1.1.3 After three years of operation of the new system, the aim of this document is to point out certain differences which have emerged in the operation of the Fund and, above all, to attempt to identify future prospects.

1.1.4 First and foremost, apart from a few points to which we will return later, the spirit of ECSC collaborative research has been maintained, not least because of the proven high level of efficiency of ECSC research funding and this is a matter for satisfaction.

1.2 Financial aspects: a temporary and noticeable reduction in grants

1.2.1 The RFCS is managed by the Coal and Steel Unit of DG Research. In budgetary terms, it is the interest on the aforementioned capital, resulting from a long-term placement, which is used to finance the research. The available annual budget therefore depends on the income from investment. An allocation key determines the steel and coal proportions, which are 72.8% and 27.2% respectively. In practice, over the last two operating years, this has meant a budget of about EUR 43 million (43.68 million in 2003; 43.68 million in 2004 and 41.20 million for 2005) for steel research. This financial aid applies to about 50 projects per year. As far as the coal aspect is concerned, the level of funding allocated by the RFCS budget over the three last years has been of the order of EUR 16.13 million in 2003, 15.27 million in 2004 and 16.13 million for 2005.

1.2.2 A significant reduction in the total amount of subsidies should be noted, since they represented about EUR 55 to 56 million for steel and EUR 28 to 31 million for coal at the end of the 1990s and into the beginning of the present decade. It should also be noted that the average subsidy available per participant will be further reduced significantly in the next few years, in view of enlargement and the resulting increase in the number of participants in the programme. Indeed, the new Member States will make their contribution as before, but gradually and only between 2006 and 2009. Their contributions to the capital will be made in successive instalments (making a total of EUR 169 million) but the full effects will not be felt until 2011.

1.2.3 The cost-effectiveness of ECSC steel research has already been established (return of 13 units for each unit invested). Considerable effectiveness has been displayed in carrying out industrial research centred on the essential needs of the steel industry, in partnership with those directly concerned, i.e. industrialists and, where necessary, other partners such as component manufacturers or the main customers. There is still an essential need for this type of research today, so as to maintain the competitiveness of the European steel industry at its present level, i.e. among the best in the world. The pilot and demonstration projects which constituted the originality of the ECSC programmes have diminished significantly over the last few years; they must remain the instrument of choice and the preferred vehicle for rapid transfer of technological developments to the operational units (factories).

1.2.4 ECSC-funded European coal research has been highly efficient. Evaluation (1) shows average benefit factors ranging from 7 to 25. Moreover, RTD often results in substantial spin-off benefits for other industries for example, in surveying, tunnelling, and material testing methods.

(1) Performed in 1995 by Geoffrey Walton Practice and Smith Vincent and in 1996 by the Coal Research Committee of DG XVII
1.3 Monitoring and management of the programmes

1.3.1 Major changes have taken place as regards the process of selection of annual projects for approval. On the one hand, the Commission is assisted by a coal and steel committee (COSCO) in which representatives of the Member States take part as well as by Steel Advisory Groups (SAGs) and Coal Advisory Groups (CAGs) with representatives of industry and other relevant stakeholders. On the other hand, the assessments are made by independent experts. In material terms, the Commission has ensured that these assessments are carried out properly since the system was set up, under conditions which are improved each year.

1.3.2 The quality of the projects selected and hence of the RFCS programme, depends on the quality of the assessments. Since it is industrial research programmes which are being evaluated, it is essential that this be done by experts with specialised knowledge of industrial needs and priorities, of past research and its results and of the skills of the partners involved. The experts of the technical groups, for example, meet these conditions but the Commission and the steel industry groups still need to optimise the practical conditions for these experts’ participation.

1.3.3 For steel, nine technical groups henceforth replace the previous 17 executive committees as regards the monitoring of projects and the transfer of technological information, with a substantial reduction in the number of the participating experts. This development will be partly compensated by the increased involvement of experts from the 10 new Member States. The tutelage system set up (allocation of the monitoring of one project or a limited number of projects to one expert) seems effective in ensuring more direct monitoring of projects; it makes it easier to discuss the monitoring and makes it more rigorous. A mid-term assessment of the new RFCS projects will be carried out in spring 2005 and will provide more information in this respect.

1.3.4 Regarding coal, three technical groups (TGs) have begun to replace the five Executive Committees operating under the ECSC Coal Research programme. Their fields of interest are mining technologies (TG1), conversion technologies (TG2) and clean coal technologies (TG3), respectively.

1.3.5 The level of involvement of companies and institutions based in the 10 Accession States in the year 2000 ECSC proposals was almost nil, as opposed to 4.2 % and 14.16 % for steel and coal proposals respectively at the time of the 2004 RFCS call. The total number of representatives from the 10 new Member States on the various committees and advisory and technical groups is 25 (11 COSCO, 5 SAG, 4 CAG, 3 steel TGs and 2 coal TGs).

2. Steel

2.1 General situation in the steel sector

In 2004 the buoyant global economy provided a significant boost to the European economy but domestic demand failed to pick up substantially. The prospects for 2005 largely depend on the performance of the world economy, since the euro-zone is very much dependent on final demand generated elsewhere.

The key as to whether the global economy and with it the steel market will continue to expand this coming year is, China and other Asian countries. China appears to have entered a phase of controlled slowdown and its growth is becoming more sustainable.

2.1.1 With the moderation in world economic growth expected this year and the slow development of the recovery in continental Europe, it is expected that real consumption growth will expand at a slower rate than in 2004. However, since stocks levels of some products are too high in some countries, a moderation in apparent consumption growth can also be expected.

2.2 Future prospects for steel research

2.2.1 Results of the first calls for tender following the expiry of the ECSC: a considerable fall in the number of successful proposals in the RFCS programme

With the help of a new standard contract, 49 contracts were signed in 2003 and 51 in 2004; nearly 50 should be signed in 2005. The rate of success has fallen considerably, since the number of proposals submitted has not diminished in relation to the amount of aid available — quite the reverse. For example, 116 proposals were submitted in 2002, 143 in 2003 and 173 in 2004. The rate of success of the projects is about 30 % at present, whereas it was 50-55 % at the beginning of this decade. This recent tendency has been observed at a time when the new Member States are still participating relatively little in the RFCS programme.

2.2.2 The Steel Technology Platform: the right framework for a long-term vision of steel research

The steel industry has to confront many challenges in different areas such as the need for competitiveness arising from globalisation; the rapid growth of new, large producers (at present China); environmental rules which concern both processes and products; the requirements of customers and shareholders; health and safety at work and training.
The ambition of the steel industry is to maintain and even reinforce a global leadership, which is both sustainable and competitive.

To meet this ambition, a group of personalities decided to launch a determined, long-term and structured R&D action, in the framework of a Steel Technology Platform. This platform was launched on 12 March 2004.

The CCMI is one of the platform’s partners and is represented on its Steering Committee.

2.2.2.1 Six working groups, involving more than 100 people and corresponding to the 4 pillars of sustainable development, have been set up: profit, partners (involving both automotive and construction sectors), planet and people, as well as energy. These working groups have devised three large and complementary R&D industrial programmes with wide-ranging social impacts, each encompassing several R&D Themes and Research Areas.

2.2.2.2 Three industrial programmes with large wide-ranging social impacts are proposed:

- Safe, clean, cost-effective and low capital-intensive technologies
- Rational use of energy resources and residue management
- Appealing steel solutions for end users

2.2.2.3 Concerning the first large programme, great flexibility is needed in the whole steel industry production chain in order to cope with the expanding range of products that will have to be supplied at low cost. Much more compact lines with very short response times and extended ranges of capability would be of benefit to the steel sector. On the other hand, where conventional technologies are mature and robust enough to guarantee stable performance, intelligent manufacturing technology should contribute to the development of more flexible processes. New production concepts, such as intelligent manufacturing processes and efficient production organisation, need to be designed and developed, based on breakthrough organisational technologies to ensure the evolution of new processes, products and services.

2.2.2.4 Three major themes have been identified in the first large programme:

- Novel integrated routes for ‘oxide free’ and energy efficient processing
- Flexible and multifunctional production chain
- Intelligent manufacturing

2.2.2.5 The second large programme is also focussed on three major R&D themes:

- The greenhouse-gas challenge
- Energy efficiency and resource savings
- Development of green products that take into account the social impact of materials

2.2.2.6 The third large programme addresses the challenge of meeting customer’s demands for a broad variety of ever more sophisticated high-performance materials for, essentially, two markets: the automotive and the construction sectors. A third (energy) is being considered this year.

2.2.2.7 All together, these three programmes aim to play a major role in boosting competitiveness, economic growth and the related impact on employment in Europe. The corresponding R&D themes and areas that have been identified in those programmes are bringing a strong contribution to the sustainable development approach. Protecting the environment (greenhouse gases emissions, particularly CO₂ emissions) and increasing energy efficiency constitute both major transversal issues in the universe of the proposed RTD programmes. Security and safety represent the third very important objective to be addressed, not only in the relevant industries but also in customers’ everyday life as users of steel solutions (cars, buildings, energy production and transport, etc.) by developing new clever and safer steel solutions.

2.2.2.8 Another major transversal theme, that involving human resources aspects, has also been taken into consideration (attracting and securing qualified people to help meet the steel sector ambition). In this respect:

- A large European network (Top Industrial Managers for Europe (TIME), 47 universities from all 25 Member States), involved in education, training, communication and dissemination activities has been identified among the stakeholders of the EU Steel Technology Platform. This network should play a leading role in both analysing how the education system could meet future requirements for qualified people in the European steel industry and devising effective approaches to addressing its anticipated shortcomings.

- Human resources as the holders of a company’s core competencies, represent a key asset that should be dynamically optimised. A survey of the steps taken by European steel producers in terms of change management and progression towards a ‘knowledge organisation’, leading to exchanges of best practices, should significantly contribute to such an optimisation process.

2.2.2.9 The vision of the future described in the Strategic Research Agenda adopted by the Steering Committee of the Platform on 15 December 2004 sketches out the prospects of steel research for the coming years and decades.
2.2.2.10 A second version of the Strategic Research Agenda will set priorities and make proposals with regard to the placing of themes and research fields in the various European programmes: RFCS, RDFP (Framework programme, FP), Eureka, national and regional programmes, etc. Thus, it will include the main consensus-based topics for research to be pursued by the RFCS.

2.2.2.11 The nature of the research themes described in the Strategic Research Agenda, combined with the skills of the necessary partners, should guide the choice of appropriate European programme. For example, though not exclusively, RFCS for research specific to steel and RDFP for research involving partners from more than one industrial sector (e.g. suppliers and component manufacturers where the development of new technologies is concerned; customers and users — such as automobile and construction industries — where it is a question of developing innovative steel solutions etc.). Similar guidance should exist in the context of joint technological action for large, long-term programmes requiring sizeable investments and centred on European themes selected by consensus.

2.2.2.12 To achieve its full effectiveness, the approach suggested above requires, of course, that the different programmes be coordinated. Thus the Platform's Strategic Research Agenda must be a document of choice for the forthcoming revision of the steel guidelines. Moreover, coordination of programmes should make it possible to give all projects the same opportunity, regardless of which European programme they come under.

2.2.2.13 The next FP7 and other European programmes (Eurêka, etc.), national and even regional programmes, should offer the possibility to implement the Strategic Research Agenda. However, the Joint Technology Initiatives, together with loans of the European Investment Bank, will enable the development of emergent breakthrough technologies and their implementation on wide industrial scales, over the coming decades.

2.2.2.14 In addition, the consensus-based selection of priority specific themes for the steel programme in the platform's Strategic Research Agenda should build a reserve of priority topics (requiring both considerable funding and considerable technical resources) to be submitted in response to the annual calls for tender for RFSC steel research. Doing so would also offer an opportunity to avoid the fragmentation of subsidies, to reduce administrative costs by reducing the number of proposals and, above all, to achieve greater efficiency by concentrating resources on topics that are vital for the steel industry's competitiveness.

2.2.2.15 One of the projects (ULCOS, Ultra Low CO2 Steel Making) of the 2nd programme of the steel platform is aiming at reducing drastically the CO2 emissions in steelmaking. It has the following characteristics:

— an issue that concerns the whole of Europe and is incorporated in the 7th Framework Programme;

— clearly identified industrial objectives which are important for the long-term competitiveness of the steel sector;

— a consortium that has already been formed with the leading players in the European steel industry.

Their commitments are contained in a consortium agreement. Given the characteristics of this project industry advised, in February 2005, the Commission of the platform's interest in setting up a Joint Technology Initiative (JTI). However, ESTEP was not selected for a JTI in the Commission's proposal of 6 April 2005 to the European Parliament and Council.

2.2.2.16 Finally, regular updating of the programmes should make it possible to keep them perfectly matched to industrial needs.

3. Coal

3.1 General situation in the coal sector

3.1.1 Europe is the world's third largest coal consumer. In terms of provision of energy to the European Union, coal is one of the central pillars supporting the balanced energy mix and its role has clearly increased with EU enlargement. It is an essential feedstock fuel for iron and steel making, while in the electricity sector with a share of 32 %, it remains a fuel of choice by virtue of its security of supply and competitiveness.

3.1.2 European coal mining is a highly developed sector of industry. Compared to deposits overseas, the geological conditions for hard coal in Europe are demanding. The challenge of exploiting these deeper deposits has resulted, however, in a leading position for European mining technology. Today, European mining technology holds more than half of the expanding world market — not least as a result of ECSC RTD funding (7).

3.1.3 A commitment to maintaining Europe's leading position assumes appropriate research funding, which will favour not only employment in this sector but also the Community's balance of payment and has associated multiplier effects. This applies to both mining as well as clean coal utilisation since technological advances have to focus on all critical aspects of the coal chain.

(7) The World Energy Council has predicted a rapidly growing total investment volume of EUR 3,000 billion over the next 25 years for the construction and equipping of mines.
3.2 Research perspectives in the coal sector

3.2.1 The sector has an excellent research infrastructure, which cooperates well at European level. For years it has involved partners from the former Accession (now New Member States) in joint research projects. The FP5–funded Network on European Sustainable Mineral Industries (NESMI), comprising about 100 stakeholders in European mining industry and science, exists since 2002. An important outcome of NESMI is the European Technology Platform for Sustainable Mineral Resources (ETPSMR), announced at the NESMI conference on 15 March 2005, which is to be launched in September 2005.

3.2.2 The strategic objectives for coal RTD are:

— Securing Europe’s future energy supply
— Developing innovative and sustainable production technologies
— Improving the efficiency of coal utilisation so as to reduce emissions
— Sustainable usage of energy resources
— Creating European added value through R&D-based technology leadership.

3.3 RTD in mining technology

3.3.1 RTD has to give priority to productivity and cost cutting throughout the whole production process:

Exploitation at low cost whilst avoiding operational downtimes requires an optimum knowledge of the deposit obtained by prior exploration. New underground exploration methods should therefore be developed in a multidisciplinary approach. In order to achieve further cost savings in planning, development and operational control, it is necessary to continue the development of modern surveying systems, including satellite technology.

3.3.2 The safe and cost-effective development of deposits requires intelligent and flexible manufacturing systems, such as novel road driving and winning methods with the application of robots, advanced automation and artificial intelligence. Key terms here are further automation, improved process control and embedded systems for operation and maintenance.

3.3.3 The development objectives in automation concern intelligent, autonomous sensors and actuators, wireless sensor networks, new physical measuring procedures, localisation and navigation systems and intelligent image processing systems.

3.3.4 Improved and highly rationalised strata control techniques are a matter of high priority for ensuring the more economic and safer support of mine exploitation, especially at greater depth. A particular aid to planning, which is of very great interest here, is the further development of rock mechanical modelling.

3.3.5 A key issue, necessary in all phases of the production process is improved information technology, including sensing, monitoring, and analytical techniques. In detail, this involves communication, particularly mobile underground communication, including related IT terminals. Virtual reality, successfully developed in a RFCs joint project, could further improve mine-control station technology. Increased computer-assisted process management will improve both efficiency and safety in the workplace.

3.3.6 Assembly and dismantling is an obstacle to any further progress in productivity owing to the confined spatial conditions and steadily growing dimensions and unit weights. One major objective therefore, is to reduce the assembly and dismantling times using new assembly/dismantling techniques and to restrict the components to a small number of standardised, compact components. Once again, modern IT technology can be used as a supporting measure. Something similar applies with respect to the transport of material underground. The prime objectives here are the automation of transport using modern sensor systems and optimised material handling.

3.3.7 The costs of environmentally relevant actions and the question of public acceptance of mining in densely populated regions make environmental protection, with a view to elimination or reduction of various harmful influences of mines or coking plants on the environment an important subject for research. Any methodological progress achieved in these areas will have both considerable export potential and an enormous impact on other industries and is badly needed by society as a whole. This concerns active mines as well as closure measures and follow-up use.

3.3.8 Examples of the need for R&D include more precise procedures for forecasting both the recurrent rises in mine-water levels and gas emissions after closure. In addition, general technical progress in other sectors of industry should also be used as far as possible and their modification for underground hard coal mining supported. Key words in this connection are nanotechnology, bionics, sensors from aerospace technology and robotics.

3.4 RTD in Clean Coal Utilisation

3.4.1 The major objectives here also represent two stages for clean coal utilisation:

— Improved efficiency in order to reduce emissions and for a sustainable use of resources, and
— CO₂ sequestration and storage.
3.4.2 For clean coal utilisation, the current preferred option is to increase efficiency because it reduces emissions and helps to achieve the aim of conservation of resources. This strategy is favoured due to the fact that there will be an anticipated need for replacement and new construction in excess of 200 GW power plant capacities (EU15) in Europe for the period 2010 to 2020. For fossil-fuel-fired power plants, a percentage of approximately 60% is forecast, with coal alone contributing 23%. This presents a major opportunity to use maximum efficiency technologies.

3.4.3 With the steam-power plant technology achievable today maximum efficiencies of 45%-47% are possible with the use of hard coal. An increase to more than 50% can be expected, primarily due to a further rise in the process parameters of pressure and temperature (to more than 700 °C). A key role is played here by the development and testing of new, high-temperature materials. Compared with the technology currently installed in Germany, this would mean savings of about 30% in CO₂ emissions.

3.4.4 It is therefore possible to achieve a significant contribution to the reduction of CO₂ emissions while at the same time conserving resources in the short term mainly by developing these conventional steam-power plant processes. This should therefore be a major focus for future research funding.

3.4.5 In addition to more highly developed conventional power-plant processes, combined processes may also provide an alternative in the medium to long term. The main possible variants here are the integrated coal gasification process (IGCC) and pressurised pulverised coal firing. With these it would be possible to achieve efficiencies of substantially higher than 50%. Ongoing research into this must be intensified.

3.4.6 Furthermore, research is needed into the development of zero-emission power plants, providing there is the political will to achieve this. The installation of the equipment needed to separate carbon dioxide however, produces a loss of 6 to 14 percentage points in plant efficiency. This not only increases the cost of the end product but also contradicts the objective of the conservation of resources. Optimised power-plant designs with maximum possible efficiencies form the basic technologies with a view, in particular, to the long-term objective of a CO₂-free power plant.

3.4.7 The zero-CO₂ power station is a long-term vision. Preventive climate protection demands the timely development of processes for the technically and economically rational separation of environmentally relevant trace gases from power-station emissions with a view to preventing the release of CO₂ into the atmosphere.

3.4.8 At present, the development of CO₂ separation technologies (the first part of the process) appears to be simpler to achieve than the reliable and long-term storage of the carbon dioxide after separation (the 2nd part of the process) because very little is known about the long-term behaviour of large quantities of CO₂ in enclosed storage chambers. At the present time the debate is focused mainly on sequestration in depleted oil and gas deposits or in deep salt aquifers. Such an undertaking will require substantial logistical investment.

3.4.9 According to current expertise there is no insurmountable technical obstacle to such a development, though the concept is fraught with considerable economic and ecological risk. Minimising this risk is one of the major tasks facing both industry and governments in the years ahead.

4. Conclusions and Recommendations

After a period of transition of three years, the RFCS research programme has proved to be efficient and effective, having substantially integrated the network of experts of the former ECSC Research Programmes. The EESC recommends maintaining, for the foreseeable future, both the same consultative bodies (COSCO, SAG and CAG, Technical Groups) for the management of the programme and the same evaluation procedure. The EESC asks the Commission to consider how to increase the participation of experts in technical groups.

4.1 Although for administrative reasons the RFCS Research programme includes both coal and steel, each sector has its specific characteristics and needs that should be managed in order to enhance the realisation of technical and scientific objectives of improving their competitiveness. The EESC supports the establishment of European Technology Platforms in which both the steel and the coal sectors can find the appropriate environment for developing and coordinating their RTD policies and activities utilising all available European resources.

4.2 The EESC is strongly in favour of a rapid and substantial integration of enterprises, research centres and universities of the new Member States in the RFSC research programme and in the activities related to the relevant European Technology Platforms for the steel and coal sectors.

4.3 Steel

In the coming decades, the EESC foresees an essential need in the steel industry for collaborative research in order to maintain and even reinforce that industry’s current global leadership position; a position that is both sustainable and competitive. The utilisation of steel is essential for meeting the future requirements of society — and for the creation of new market opportunities. In the future the steel industry will have to address, in particular, the need for more environment-friendly products and new steel solutions.
4.3.1 The EESC identifies the following main issues:

— Protecting the environment (reduction of CO₂ emissions in particular) and increasing energy efficiency constitute both major transversal issues in the RTD programmes. New processes have to be developed that would be more integrated and flexible than existing ones.

— Security and safety also represent a very important objective to be addressed, not only in the relevant industries but also in customers' every-day life as users of steel solutions (cars, buildings, energy production and transport, etc.) by developing new, more intelligent and safer steel solutions. Weight reduction in developing new steel products represents a shared objective as well. However, the social impact of materials would bring a valuable contribution to the long term objectives of the steel sector (strengthening the competitive position of steel products and the sustainability of steel production processes).

— Attracting and securing qualified people constitutes another very important objective in helping to meet the ambitions of the steel sector.

— The consensus-based identification of priority specific themes for the Steel Technology Platform constitutes a reserve of priority topics to be implemented with the different European RTD instruments (RFCS, FP7, national and even regional programmes). However the different programmes need to be coordinated.

— The support of the European authorities in order that the steel sector platform be adopted as a priority platform that will benefit from a Joint Technology Initiative.

4.4 Coal

The EESC welcomes the new European Energy Priorities stressing the significance of clean coal technologies for climate and environmental protection and the security of energy supply in the Union and announcing its commitment to clean coal technologies as a key priority for research in the 7th RTD Framework Programme.

The programme should aim, therefore, at the improvement of efficiency in order to reduce emissions and for a sustainable use of resources as well as CO₂ sequestration and storage measures. As the broader orientated European Mining Technology Platform will provide strategies and instruments for cross sectoral mining research, the complementary character of the RFCS programme should be retained and the programme should aim at specific coal mining RTD.


The President
of the European Economic and Social Committee
Anne-Marie SIGMUND