

**Amended proposal for a Council Decision laying down the multiannual technical guidelines for the research programme of the Coal and Steel Research Fund <sup>(1)</sup>**

(2001/C 180 E/04)

(Text with EEA relevance)

COM(2001) 121 final — 2000/0364(CNS)

*(Submitted by the Commission pursuant to Article 250(2) of the EC Treaty on 8 March 2001)*

<sup>(1)</sup> OJ C 29 E, 30.1.2001, p. 254.

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INITIAL PROPOSAL

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THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community,

Having regard to the Decision [ . . . /ECSC ] of the Representatives of the Governments of the Member States meeting within the Council on ... concerning the financial consequences of the expiry of the Treaty establishing the European Coal and Steel Community, in particular Article 5(3) thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Parliament,

Whereas:

- (1) The net revenues from investments on assets of the 'ECSC in liquidation' are being assigned to the 'Coal and Steel Research Fund', which is intended to fund research projects outside the framework programme in the coal and steel industries
- (2) The 'Coal and Steel Research Fund' is to be managed by the Commission in accordance with principles similar to those governing the present ECSC coal and steel technical research programmes and on the basis of multiannual technical guidelines which should constitute an ideal extension of those ECSC programmes, providing a high concentration of research activities and ensuring that they supplement those of the Community framework programme for research and technological development,

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AMENDED PROPOSAL

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Unchanged

Having regard to the Protocol annexed to the Treaty of Nice on the financial consequences of the expiry of the ECSC Treaty and on the Research Fund for Coal and Steel,

Having regard to Council Decision [ . . . / . . . ], and in particular Article 4, paragraph 3 thereof,

Unchanged

- (1) The net revenues from investments on assets of the 'ECSC in liquidation', and on completion of the liquidation, the 'Assets of the Coal and Steel Research Fund', are being assigned to the 'Coal and Steel Research Fund', which is intended exclusively to fund research projects outside the framework programme in the sectors related to the coal and steel industry.
- (2) The 'Coal and Steel Research Fund' is to be managed by the Commission in accordance with principles similar to those governing the present ECSC coal and steel technical research programmes and on the basis of multiannual technical guidelines which should constitute an ideal extension of those ECSC programmes, providing a high concentration of research activities and ensuring that they supplement those of the Community framework programme for research and technological development.
- (3) This Decision respects the fundamental rights and observes the principles recognised in particular by the Charter of Fundamental Rights of the European Union as principles of Community law,

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HAS DECIDED AS FOLLOWS:

*Article 1*

The multiannual guidelines for the research programme of the Coal and Steel Research Fund, hereinafter called 'technical guidelines', are set out in the Annex.

*Article 2*

The technical guidelines shall be reviewed or supplemented, where appropriate, every five years commencing on 1 January 2008. To this end, and at the latest in the first six months of the last year of each five-year period, the Commission shall reassess the operation and the effectiveness of the technical guidelines and shall propose all necessary amendments.

If it sees fit, the Commission may carry out such reassessment and shall propose any appropriate amendments before the expiry of the five-year period.

*Article 3*

This Decision shall take effect on 24 July 2002.

## ANNEX

**TECHNICAL GUIDELINES FOR THE EUROPEAN  
COAL AND STEEL RTD PROGRAMME FOR THE PERIOD  
2002-2007**

**1. Introduction**

The Member States of the European Coal and Steel Community (ECSC), meeting within the Council, have transferred to the European Community the assets of the ECSC, which is to be wound up, after the expiry of the Treaty, on 23 July 2002. They have charged the European Commission with the task of using such assets to discharge all legal liabilities of the European Coal and Steel Community, and have agreed that such assets are to be managed according to their instructions in such a way as to complete this task and to provide funds for the benefit of financing continuing research in sectors related to the coal and steel industries.

## AMENDED PROPOSAL

HAS ADOPTED THIS DECISION:

Unchanged

Unchanged

The Member States of the European Coal and Steel Community (ECSC) have transferred to the European Community the assets of the ECSC, which is to be wound up, after the expiry of the Treaty, on 23 July 2002. The European Commission will undertake to use such assets to discharge all legal liabilities of the European Coal and Steel Community, and such assets are to be managed with the aim of providing funds for the benefit of financing continuing research in sectors related to the coal and steel industries.

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**2. The Programme**

Unchanged

**2.1. Objectives**

As a continuation of the ECSC Coal and Steel Research and Technical Development (RTD) Programmes and with an eye to sustainable development, a European Coal and Steel RTD Programme (hereinafter 'the programme') is established. The objective of the programme is to support the competitiveness of the Community coal and steel industries. The programme shall be consistent with the scientific, technological and political objectives of the European Union, and complement the activities carried out in the Member States and within the existing Community programmes, such as the framework programme. Coordination, complementarity and synergy between these programmes are an objective, and mutual exchange of information is encouraged between projects financed under the programme and related projects that are financed under the framework programme.

**2.2. Main principles**

The programme grants financial contributions to research, pilot and demonstration projects by promoting cooperation with and between undertakings, research centres and universities. Accompanying measures are also implemented as well as support and preparatory actions.

The programme covers production processes, product treatment and properties (including in-use properties), environmental improvements and safety at work related to the coal and steel industry.

The definitions of 'coal' and 'steel' are provided in Appendix A; they refer to those of the ECSC Treaty, updated to meet the needs of sustaining the competitiveness of the Community coal and steel industry and widened to include products that may enhance it. These definitions may be modified when any further positive impact on competitiveness can be expected.

**2.3. Scope**

These guidelines set out the structure and management of the programme, its scientific and technical content and priorities in complementarity to other existing programmes, and the modalities of participation.

These guidelines include the call for proposals for the programme described in § 4.1 and its scientific/technical and socio-economic priorities described in Appendices B and C. Any modification of the Appendices B and C shall follow the procedure described in § 3.1.

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2.4. *Participation*

Any undertaking, research institute or natural person established in the territory of a Member State of the ECSC at the date of the expiry of this Treaty and of a new Member State of the EC under the conditions set out in Article 8 of the decision of the representatives of the Governments of the Member States meeting within the Council concerning the financial consequences of the expiry of the ECSC Treaty, can participate in the programme and apply for a financial contribution, provided that it intends carrying out an RTD activity or can substantially contribute to it.

Any undertaking, research institute or natural person established in the territory of a Member State of the ECSC at the date of the expiry of this Treaty and of a new Member State of the EC under the conditions set out in Article 7 of Council Decision [ . . . ] laying down the provisions required for implementing the Protocol annexed to the Treaty of Nice on the financial consequences of the expiry of the ECSC Treaty and on the Research Fund for Coal and Steel, can participate in the programme and apply for a financial contribution, provided that it intends carrying out an RTD activity or can substantially contribute to it.

## 2.4.1. Participation of candidate countries for EU membership

Unchanged

Undertakings, research institutes or natural persons in candidate countries for EU membership are entitled to participate without receiving any financial contribution under the programme. These conditions are subject to modification in accordance with the conditions established in the relevant Europe Agreements and their additional protocols, and in the decisions of the respective Association Councils.

Undertakings, research institutes or natural persons in candidate countries for EU membership are entitled to participate without receiving any financial contribution under the programme. These conditions are subject to modification in accordance with the conditions established in the relevant Europe Agreements and their additional Protocols, and in the decisions of the respective Association Councils.

## 2.4.2. Participation of third countries

Unchanged

Undertakings, research institutes or natural persons from third countries are entitled to participate on a project-by-project basis and without receiving any financial contribution under the programme, when this is in the interest of the European Community.

2.5. *Allowable projects, accompanying measures and other actions*

Research, pilot and demonstration projects, accompanying measures, and support and preparatory actions can be financed under the programme.

A research project is intended to cover investigation or experimental work to acquire new knowledge to facilitate the attainment of specific practical objectives such as the creation of new products, production processes or services.

A pilot project is characterised by the construction, operation and development of an installation or a significant part of an installation on an adequate scale and using suitably large components with a view to verifying the practicability of theoretical or laboratory results and/or increasing the reliability of the technical and economic data needed to progress to the demonstration stage, and in certain cases to the industrial and/or commercial stage.

A demonstration project is characterised by the construction and/or operation of an industrial-scale installation or a significant part of an industrial-scale installation which should make it possible to bring together all the technical and economic data, in order to proceed to industrial and/or commercial exploitation of the technology with the least possible risk.

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The accompanying measures concern the promotion of the use of knowledge gained, clustering of projects, dissemination of results, stimulation of training and mobility of researchers in connection with projects funded under the programme.

The support and preparatory actions are those appropriate to the sound and effective management of the programme, such as the periodic monitoring and assessment referred to in § 5, studies or networking of related projects funded under the programme and the framework programme.

### 3. Management of the Programme

The programme is managed by the Commission. One expert group and two advisory groups are established to assist the Commission:

- (a) the Coal and Steel Expert Group described in § 3.1;
- (b) the Coal Advisory Group and the Steel Advisory Group described in § 3.2.

#### 3.1. *The Coal and Steel Expert Group*

The Commission is assisted by an expert group called the Coal and Steel Expert Group composed of representatives of the administration of the Member States and chaired by the Commission.

The Expert Group advises the Commission on:

- (a) the allocation of funds;
- (b) the drawing-up of terms of reference for the monitoring and the assessment of the programme referred to in § 5;
- (c) any updating of the Appendices to these guidelines;
- (d) other issues in relation to the programme.

The Commission makes available to the Group overall information about the programme, the progress and the measured or estimated impact of all funded RTD actions.

#### 3.2. *The Technical Advisory Groups*

The Coal Advisory Group (hereinafter 'Coal AG') and the Steel Advisory Group (hereinafter 'Steel AG') are technical advisory groups, independent from each other, established to assist the Commission. For the coal-related and the steel-related RTD aspects, respectively, each AG:

- (a) advises on the overall development of the programme, including the information package and the preparation of the next guidelines;
- (b) contributes to ensure consistency and avoid duplication with other RTD programmes at Community and national level;

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- (c) assists in setting out the guiding principles for monitoring the RTD projects;
- (d) advises on the work being undertaken on specific projects;
- (e) advises on defining the priorities of the programme;
- (f) advises on the preparation of a manual for the evaluation and selection of RTD actions;
- (g) advises on the evaluation of proposals of RTD actions;
- (h) advises on other measures when so requested by the Commission.

Each AG is composed of a maximum of 30 members appointed by the Commission to serve in a personal capacity for the duration of these guidelines. Appointments may be withdrawn. The Commission considers proposals for appointment received in one (or more) of the following way(s): on proposal by the Member States; on proposals by the organisations referred to in § 3.2.1 and § 3.2.2; in reply to a call for applications for inclusion on a list of possible members.

The Members should be active in the field concerned and aware of the industrial priorities. In each AG, a balanced and appropriate expertise, and the broadest possible geographic representation should be ensured. The presence of at least one member from each interested country is aimed at.

The AG meetings are chaired by the Commission, which also provides the secretariat. When needed, the chairperson may request members to vote; every member is entitled to one vote. Additional experts may be invited by the chairperson to participate in meetings, when appropriate.

The two AGs convene in joint meetings should the need be, e.g. to provide advice on matters of relevance for both sectors.

### 3.2.1. The Coal Advisory Group

For the period covered by these guidelines the composition of the Coal AG is as follows:

Members	Maximum Total
(a) From coal producers or related research centres	8
(b) From organisations representing coal producers at European level	2
(c) From coal users or related research centres	8
(d) From organisations representing coal users at European level	2
(e) From organisations representing the workers	2
(f) From organisations representing equipment suppliers	<u>2</u>
	24

The members should have a wide background knowledge and individual expertise in one or more of the following areas: coal mining and utilisation, environment and social issues.

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## 3.2.2. The Steel Advisory Group

For the period covered by these guidelines the composition of the Steel AG is as follows:

Members	Maximum Total
(a) From steel industries/national federations or related research centres	21
(b) From organisations representing producers at European level	2
(c) From organisations representing the workers	2
(d) From organisations representing downstream processing industries or steel users	<u>5</u>
	30

The members should have a wide background knowledge and individual expertise in one or more of the following areas: raw materials; ironmaking; steelmaking; continuous casting; hot and/or cold rolling; steel finishing and/or surface treatment; development of steel grades and/or products; steel applications and properties; environmental and social issues.

4. **Implementation of the Programme**4.1. *Call for proposals*

One continuously open call for proposals is hereby established with a cut-off date for submission for evaluation on 15 September of each year from 2002 to 2007.

The Commission establishes and makes publicly available an information package providing proposers and interested parties with operative information on the programme, modalities for participation and those on the management of proposals and projects, application forms, rules for the submission of proposals, model contract(s), allowable costs, maximum financial contribution allowable and methods of payment.

Applications must be submitted to the Commission according to the rules contained in the information package which can be obtained from the Commission upon request.

The proposed projects must be concerned with the production and/or processing of coal, iron and/or steel or with the properties, fabrication and/or utilisation of coal and/or steel products. The scientific/technical and socio/economic priorities for the period covered by these guidelines are provided in the Appendices B and C, for coal and steel RTD, respectively.

4.2. *Content of proposals*

Each proposal must include a detailed description of the proposed project and contain full information on the objectives, partnership with details of the role of each partner, management structure, expected results and prospects for their applications, and estimate of industrial, economic, social and environmental expected benefits.

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The proposed total cost and its breakdown should be realistic and effective, and favourable cost/benefit ratios should be expected from the project.

#### 4.3. *Evaluation and selection of proposals*

The Commission will ensure a confidential, fair and equitable evaluation of proposals.

The Commission will establish and publish a manual for the evaluation and selection of research and technological development actions (as specified in § 3.2.f).

The evaluation will be carried out under the responsibility and coordination of the Commission as follows:

1. After reception, registration and eligibility check of the proposals, the Commission evaluates the proposals with the assistance of the Technical Advisory Group concerned and of independent experts, and establishes a ranking of the proposals;
2. The Commission establishes the list of retained proposals;
3. The Commission consults the Advisory Group concerned and the Expert Group as described in § 3.1;
4. The Commission decides on the selection of projects and on the allocation of funds.

The Commission establishes technical groups to assist in the monitoring of research projects and activities.

#### 4.4. *Contracts*

Proposals selected as specified in § 4.3 are the subject of a contract. Contracts are based on the relevant model contract drawn up by the Commission, taking into account, as appropriate, the different activities involved.

Contracts define the financial contribution under the programme established on the basis of the allowable costs, as well as the modalities of cost reporting, closure of accounts and audits.

#### 4.5. *Financial contribution to projects*

The programme is based on cost-sharing RTD contracts. The total financial contribution including any other additional public funding shall conform to the applicable rules on State aid as defined in the relevant aid code.

The maximum total financial contribution, as a percentage of the allowable costs defined in § 4.6, is:

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- (a) for research projects: 60 %
- (b) for pilot and demonstration projects: 40 %
- (c) for accompanying measures, support and preparatory actions: 100 %

## 4.6. Allowable costs

The allowable costs cover only actual costs incurred for the work carried out under the contract. Contractors, associated contractors and subcontractors cannot claim any budgeted or commercial rates. The allowable costs are broken down into the following four cost categories.

## 4.6.1. Equipment

Equipment purchased or leased, which can be directly related to the project, may be charged as a direct cost. The allowable costs for leased equipment shall not exceed any allowable costs for its purchase.

## 4.6.2. Personnel

The costs of actual hours worked on the project only by scientific, post-graduate or technical staff and manual labour directly employed by the contractor may be charged. Any additional personnel costs, e.g. scholarships, require prior written approval by the Commission. All personnel time charged must be recorded and certified.

## 4.6.3. Operating costs

Operating costs comprise third party assistance, travel and subsistence costs incurred by allowable personnel working on the project, and other operating costs, which comprise exclusively the cost of:

- (a) raw materials;
- (b) minor items of regular consumption;
- (c) the use of consumable items;
- (d) energy (directly used for the project);
- (e) the maintenance or repair of equipment specifically used for the project;
- (f) the transport of equipment or products for and in the course of the project;
- (g) the alteration and transformation of existing equipment to the extent necessary for the proper performance of the project;
- (h) computing services;

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- (i) the rent of equipment specifically used for the project;
- (j) miscellaneous analyses;
- (k) special examinations and tests.

## 4.6.4. Indirect costs

All other expenses ('overhead costs' or 'overheads') which may arise in connection with the project and which are not specifically identified in the preceding categories are covered by a lump sum of 30 % of the allowable personnel expenditure.

4.7. *Technical reporting*

Each Commission contract is the subject of reporting by the contractor(s).

For RTD projects, semi-annual technical reports are due. These reports are to document the technical progress made. After the completion of work, a final report including the assessment of exploitation and impact has to be provided. This report will be published by the Commission in full or summarised form depending on the strategic relevance of the RTD project. The decision is taken by the Commission after consultation, if necessary, of the relevant AG.

Final reports of accompanying measures may be published, where appropriate.

**5. Annual Reviews, Monitoring and Assessment of the Programme**

An annual review of the activities of the programme and of the progress of the RTD work is carried out by the Commission. The report containing the annual review is transmitted to the Expert Group.

A monitoring of the programme is carried out and includes an estimate of the expected benefits; the monitoring report is issued by the end of 2006. The report is transmitted to the AGs, the Expert Group and the Council.

An assessment of the programme is carried out on completion of the projects financed during the period covered by these guidelines. The benefits of the RTD to society and to the relevant sectors have also to be assessed. The assessment report is published.

The Commission draws up the terms of reference for the annual review, the monitoring and the assessment; for the two latter the Commission is assisted by the Expert Group as referred to in § 3.1. Both monitoring and assessment are carried out by panels of highly qualified experts appointed by the Commission.

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**6. Transitory Clause**

The Commission takes appropriate measures to ensure a smooth transition from the ECSC RTD programmes to the programme. The ECSC contracts still running after the expiry of the ECSC Treaty are managed by the Commission in compliance with their specific contractual obligations, aiming at harmonising the management of the ECSC and the programme contracts.

Appendix A

Unchanged

**European Coal and Steel RTD Programme**

Definition of the Expressions 'Coal' and 'Steel'

**1. Coal**

- (a) Hard coal;
- (b) Hard coal briquette;
- (c) Coke and semi-coke derived from hard coal;
- (d) Lignite;
- (e) Lignite briquettes;
- (f) Coke and semi-coke derived from lignite.

The term 'hard coal' includes the Higher-Rank coals and the Lower-Rank 'A' coals (or sub-bituminous coals) of the 'International codification system of coal' of the Economic Commission for Europe of the United Nations <sup>(1)</sup>. The term 'lignite' includes the Low-Rank 'C' coals (or ortho-lignites) and the Low-Rank 'B' coals (or meta-lignites) of the same classification. The programme shall exercise its function in relation to lignite other than for the making of briquettes and semi-coke, only for its conversion into electricity or its combined conversion into heat and electricity.

The term 'hard coal' includes the Higher-Rank coals and the Lower-Rank 'A' coals (or sub-bituminous coals) of the 'International codification system of coal' of the Economic Commission for Europe of the United Nations. The term 'lignite' includes the Low-Rank 'C' coals (or ortho-lignites) and the Low-Rank 'B' coals (or meta-lignites) of the same classification. The programme shall exercise its function in relation to lignite other than for the making of briquettes and semi-coke, only for its conversion into electricity or its combined conversion into heat and electricity.

**2. Iron and Steel**

Unchanged

- (a) Raw materials for iron and steel production, such as iron ore, sponge iron and ferrous scrap;
- (b) Pig iron (including hot metal) and ferro-alloys;
- (c) Crude and semi-finished products of iron, ordinary or special steel (including products for re-use and re-rolling), such as liquid steel cast by continuous casting or differently, and semi-finished products, such as blooms, billets, bars, slabs and strips;

<sup>(1)</sup> International Codification System for Medium and High Rank Coals (1988), International Classification of In-Seam Coals (1998) and International Codification System for Low-Rank Coals Utilisation (1999).

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- (d) Hot finished products of iron, ordinary and special steels (coated or uncoated products, excluding steel castings, forgings and powder metallurgy products), such as rails, sheet piling, structural shapes, bars, wire rods, plates and universal plates, strips and sheets, and tube rounds and squares;
- (e) End products of iron, ordinary steel or special steels (coated or uncoated), such as cold rolled strips and sheets, and electrical sheets;
- (f) Products of the first-stage processing of steel that can enhance the competitive position of the above steel products, such as tubular products, drawn and bright products, cold rolled and cold formed products.

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Unchanged

*Appendix B*

**European Coal and Steel RTD Programme**

Scientific/Technical and Socio-economic Priorities for the Period  
2002-2007

COAL RTD

Research and technological development are a major instrument for supporting Community energy objectives with regard to the supply, competitive and environment-friendly conversion and utilisation of Community coal. Moreover, the growing international dimension of the coal market and the global scale of the problems confronting it means that the European Union has to take a leading role in meeting challenges related to modern techniques, safety in mines and protection of the environment on the world scene, providing for the transfer of know-how that is required for further technological progress, and improved working conditions (health and safety) and environmental protection. The priorities for coal research are set out below.

**1. Improving the competitive position of Community coal**

The principal objective is a reduction of the mine's total production costs, improvement in the quality of the products or reduction in the costs of using coal. Research projects encompass the entire coal production chain:

- (a) modern exploration techniques for deposits;
- (b) integrated mine planning;
- (c) high-efficiency, largely automated road heading and winning technologies corresponding to the particular geology of European hard coal deposits;
- (d) appropriate support technologies;
- (e) transport systems;
- (f) power supply services, communication and information, transmission, monitoring and process control systems;

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(g) coal preparation techniques, geared to the needs of the consuming markets;

(h) coal conversion;

(i) coal combustion.

Research projects are also aimed at scientific and technological progress, leading to improved knowledge of the behaviour and control of deposits in relation to rock pressure, gas emissions, the risk of explosion, ventilation and all other factors affecting mining operations. Research projects with these objectives must present the prospect of results applicable in the short to medium term to a substantial part of Community production.

### 1.1. *Priorities*

Priority is given to projects that promote:

(a) the integration of individual techniques in systems and methods and the development of integrated winning methods;

(b) substantial reduction of production cost;

(c) benefits in terms of mine safety and the environment.

## 2. **Health and safety in mines**

The required developments mentioned must be accompanied by appropriate efforts in the field of mine safety, as well as in gas control, ventilation and air-conditioning. Furthermore, underground working conditions raise the need for specific improvements in occupational health and safety aspects.

## 3. **Efficient protection of the environment and improvement of the use of coal as a clean energy source**

Research projects with this objective seek to minimise the impact of mining operations and the use of coal in the Community on the atmosphere, water and the surface in an integrated management strategy with respect to pollution. With a view to a Community coal industry undergoing constant restructuring, the research is also geared to minimising the environmental impact of underground mines destined for closure.

### 3.1. *Priorities*

Priority is given to projects that envisage:

(a) the reduction of greenhouse gas emissions, in particular methane, from coal deposits;

(b) the return to the mine of mining waste, fly ash and desulphurisation products, accompanied, where relevant, by other forms of waste;

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- (c) the refurbishment of waste heaps and the industrial use of residues from the production and consumption of coal;
- (d) protection of water tables and purification of mine drainage water;
- (e) the reduction of the environmental impact of installations which use mainly Community coal and lignite;
- (f) the protection of surface installations against the effects of subsidence in the short and long term;
- (g) the reduction of emissions from coal utilisation.

#### 4. Management of external dependence on energy supply

Research projects with this objective relate to the prospects for long-term energy supply and concern the upgrading, in economic, energy and environmental terms, of coal resources, which can not be extracted economically by conventional mining techniques. Projects include studies, the definition of strategies, fundamental and applied research and the testing of innovative techniques, which offer prospects for the upgrading of Community coal resources. Preference is also given to projects integrating complementary techniques such as adsorption of methane or carbon dioxide, coal bed methane extraction, underground coal gasification, etc.

Appendix C

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### European Coal and Steel RTD Programme

Scientific/Technical and Socio-economic Priorities for the Period  
2002-2007

#### STEEL RTD

With the general aim of increasing competitiveness and contributing to sustainable development, the main emphasis of RTD is on the development of new or improved technologies to guarantee an economic, clean and safe production of steel and steel products characterised by steadily increasing performance, suitability for use, customer satisfaction, prolonged service life, easy recovery and recycling.

#### 1. New and improved steelmaking and finishing techniques

RTD should aim at the improvement of steel production processes to enhance product quality and increase productivity. The reduction of emissions, energy consumption and the environmental impact as well as an improved use of raw materials and the conservation of resources should form an integral part of the developments. The following fields should be addressed:

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- (a) iron-ore reduction processes;
- (b) ironmaking processes;
- (c) electric arc furnace processes;
- (d) steelmaking processes;
- (e) secondary metallurgy techniques;
- (f) continuous casting and near net shape casting techniques with and without direct rolling;
- (g) rolling, finishing and coating techniques;
- (h) hot and cold rolling techniques, pickling and finishing processes;
- (i) process instrumentation, control and automation;
- (j) maintenance and reliability of production lines.

## 2. Development and utilisation of steel

RTD on the utilisation of steel is essential for meeting the challenges of future steel user requirements and creating new market opportunities. The following fields should be addressed:

- (a) new steel grades for demanding applications;
- (b) steel properties addressing mechanical characteristics at low and high temperatures such as strength and toughness, fatigue, wear, creep, corrosion and resistance against fracture;
- (c) prolonging service life, in particular by improving heat and corrosion resistance of steels and steel structures;
- (d) steel containing composites and sandwich structures;
- (e) predictive simulation models on microstructures and mechanical properties;
- (f) structural safety and design methods, in particular in relation to fire and earthquakes;
- (g) technologies dealing with forming, welding and joining of steel and other materials;
- (h) standardisation of testing and evaluation methods.

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**3. Conservation of resources and improvement of working conditions**

Both in steel production and in steel utilisation, the conservation of resources, the preservation of the ecosystem and safety issues should form an integral part of the RTD work. The following fields should be addressed:

- (a) techniques for recycling of obsolete steel from various sources and classification of steel scrap;
  - (b) steel grades and design of assembled structures, which facilitate the easy recovery of steel scrap and its reconversion into usable steels;
  - (c) control and protection of the environment at and around the workplace;
  - (d) recovery of steelworks sites;
  - (e) improvement of working conditions and quality of life at the workplace;
  - (f) ergonomic methods;
  - (g) occupational health and safety;
  - (h) reduction of exposure to occupational emissions.
-