

# COMMISSION OF THE EUROPEAN COMMUNITIES

SEC(74) 1423 Final

Brussels, 18 April 1974

Medium-term coal research aid programme (1975-80)  
under Article 55 ECSC

---

COMMISSION OF THE  
EUROPEAN COMMUNITIES

---

All enterprises, research institutes and individual persons wishing to engage in research within the meaning of Article 55 of the ECSC Treaty may make application to the Commission of the European Communities for the grant of financial assistance.

Such applications must relate to fields of research specified in the medium-term assistance programme reproduced as Part A of this Communication. Upon receipt, applications will undergo selection by the Commission, which will bear in mind the need to ensure that financial expenditure is concentrated upon research projects which best satisfy the criteria of this medium-term programme.

The information regarding application for and granting of financial assistance, which has already been published in the Official Journals of the European Communities, No. 70 of 9 May 1963, No. C 99 of 31 July 1970, and No. C 74 of 10 July 1972, is reproduced below as Part B of this Communication.

Applications should be submitted before 1 September of each year in order to be effective in the following year.

../..

A

Medium-term Assistance Programme for Technical Research Coal (1975-1980)

Article 55 of the Treaty concerning the establishment of the European Coal and Steel Community specifies that the Commission of the European Communities shall foster technical and economic research relating to the production of coal and the advancement of its consumption and also to safety in the coal industry. For this purpose the Commission is required to organise appropriate collaboration between existing research centres.

The first action of the ECSC was to lay the foundations of collaboration between research workers and coalmining undertakings in the Community countries by providing for the necessary contacts. Since 1957 the High Authority of the ECSC has granted financial assistance to the coalmining industry with the object of giving a new stimulus to coal research.

In 1963 the High Authority of the ECSC, in its document entitled "Research Policy" (ECSC Bulletin No. 41, 1963), made known the principal areas of research which it proposed to support. In 1967 the High Authority produced its first medium-term assistance programme as an instrument of policy in the field of coal research and this was submitted to the Council of Ministers in 1968 by the Commission of the European Communities (CEC). Based on a Systematic Catalogue of all fields of Coal Research, there has been set up, in 1970, a second Medium-term Assistance Programme for the years 1970-1974 (revised 1972). This programme was submitted to the Council of Ministers, and has also been published in Official Journal of the European Communities (No. C 99 of 31 July 1970 and No. C 74 of 10 July 1972).

The position of coal in the actual Energy situation makes research efforts more urgent in that it resulted within a reasonable period in important economic and social advances. The current research programmes demonstrate this. The research effort must therefore be continued and intensified, the most advantageous fields being of course selected.

With the exception of lignite, the coalmining industry of the Community is, it is true, characterised by higher production costs than that of many other countries; on the other hand, as a source of energy obtained within the Community, coal represents a certain factor in regard to security of supply, principally for the steel industry and electricity generation. The coalmining industry thus has three objectives:

- to improve production costs, in particular by raising productivity;
- to improve the processing and utilisation of the products of coalmining;
- to improve working conditions and safety, as well as the protection of the environment.

These are also the objectives of the coal research activities and projects supported by the CEC.

In view of the rapid development of technology and the various factors and circumstances arising from the present situation of the coalmining industry and bearing in mind the general Community research policy and the Energy situation in the Community, the CEC has decided to set up a new medium-term assistance programme for research under Article 55 of the ECSC Treaty.

The aim of this new medium-term assistance programme for research is:

- to concentrate effort on these fields in which concrete results will most quickly be obtained;
- to harmonise research work;
- to facilitate the identification of those applications for assistance which relate to essentially practical developments;
- to select the most important projects for financial support from the CEC.

This medium-term programme has been drawn up by the CEC departments working in collaboration with the Coal Research Committee (CRC). This Committee, which consists of representatives of coal producers, coal research institutes, Universities and Trade Unions throughout the Community, was set up by the CEC with the task of providing expert advice in the research field.

The programme was prepared in three stages:

- Actualisation of the Systematic Catalogue of research fields, subdivided into groups;
- Revision of criteria for deciding the relative importance of the different fields and groups;
- Selection of fields from the catalogue on the basis of the criteria thus determined.

The systematic list contains the most important fields in which coal research could be undertaken, is planned or is already in progress.

There are nineteen fields, subdivided into the following five sectors:

- Mining engineering;
- Mine management;
- Processing;
- Coal utilisation;
- Environmental pollution.

The list of the nineteen fields is shown below, broken down into the various sectors.

A. OPERATIONS UNDERGROUND

- I Coal Measures
- II Development Work
- III Methane Studies, Climatic Problems, Rock Pressure and Supports.
- IV Methods of Working and Techniques of Coalgetting
- V Outbye Services Underground
- VI Telecommunication, Monitoring, Remote Control and Automation
- VII Safety and Accident Prevention
- VIII New Technology

B. OPERATIONAL MANAGEMENT AND PLANNING

- I Organisation and Management
- II Planning and control of operation

C. PRODUCT BENEFCATION

- I Mechanical Coal Preparation
- II Coking and Briquestting of Coal
- III New Chemical and Physical Processes

It is pointed out that technical matters relating to safety and working conditions, will be considered in the fields adopted, especially in those concerned with underground operations. Problems relating to environmental protection will be considered in the field concerned, and more particularly in that of coal processing. The reason for not entering fields A VII and E explicitly into the Medium-term Assistance Programme is, that the problems of environmental protection and of security are very closely connected with all techniques and technologies to be developed, and that research projects not sufficiently taking into account the environmental protection have no chance of being carried out. In addition, one will find the groups of section E, and particularly of fields E I and E II, in the other groups of the chosen fields (CI, CII, CIII). This may demonstrate the actual importance of environmental protection. In addition, the necessity to harmonise the investigations with other research in the sphere of safety, hygiene and operational medicine, which is also financed by the ECSC, will be borne in mind. This research covers principally the fields of environmental pollution, health and safety. \*

On the basis of the above-mentioned criteria the fields of research have selected with the following considerations in mind:

- Improvements in the operating results of the mines and in productivity can be achieved only by concentrating mining operations, both in space and in time, into very high production units and coal-faces. The fields of development/work, of natural influences underground, working methods and techniques, outbye services underground, remote control and automation and also planning and control of operation, have for this reason been included in the programme.
- These fields are of great significance in regard to mine safety. It is found that falls of ground and of coal in the face cause the majority of accidents, together with transport and mine gas.

---

\* A Medium-term Programme will be established for the Social research and will show, in detail, the research fields concerned.

- D.        UTILISATION OF COAL
- I    Electricity generation
  - II   New Fields of Utilisation
  - III  Marketing
- E.        HARMFUL EFFECTS (ENVIRONMENTAL)
- I    Measures Against Air Pollution
  - II   Water Purification
  - III  Noise Control

The criteria adopted are:

- the aims of the energy policy and general research policy of the Community;
- the value of the research, i.e. the increase in productivity and profitability which it will offer the industry, and also its effects upon working conditions, safety and environmental protection;
- the interest of the Community in the research;
- the probable date of completion of the research and its application in practice.

On the basis of these criteria the medium-term programme will consist of the following nine fields. There appears to be no purpose in arranging them in order of priority.

Operations Underground (Sector A)

- Development work
- Methane studies, Climatic problems, Rock Pressure and Supports
- Methods of Working and Techniques of Coalgetting
- Outbye services underground
- Telecommunication, Monitoring, Remote Control and Automation

Operational Management and Planning (Sector B)

- Planning and control of operation

Product Benefication (Sector C)

- Mechanical Coal Preparation
- Coking and Briquetting of Coal
- New Chemical and Physical Processes

- The market position demands research in the field of coal processing and this research should be concentrated upon coal preparation, coking and briquetting, in particular in widening the range of types of coal suitable for coking, improving coke quality, increasing the capacity and profitability of coking plant and discovering new uses for coal and dirt.

The medium-term assistance programme for coal research will operate for a period of six years. To the extent that conditions in the mining industry demand and having regard to the rapid progress of technical developments, it can be re-examined later on.

../..

The medium-term programme is shown below, subdivided by fields and groups and complemented by notes on projects and subjects.

A. OPERATIONS UNDERGROUND

	Field	Group	Designation	Notes
A	II		<u>Development work</u>	
		1	Conventional methods of driving roadways	Technique of drilling, shotfiring and removal of material.
		2	Fully mechanised driving of roadways	Heading machines which take the full section. Selective heading machines Mechanisation of supports. Transport problems related to driving of roadways. Integration of the equipment and organisation of the work. Automation of heading machines.
		3	New methods for rock-cutting.	
		4	Large hole drilling	
		5	Sinking by boring	
		6	Cutting machines for very short faces.	
		7	Mechanised driving of riseheadings (cross cuts).	
		8	Technical problems of ventilation	Improvement of climate and measures against methane and dust.
		9	Technical problems arising from roof pressure and strata supports.	

../..

Sector	Field	Group	Designation	Notes
A	III		<u>Methane Studies, Climatic Problems, Rock Pressure and Supports</u> 1 Presence, movement and release of methane 2 Degassing of seams and drainage 3 Mine Climate 4 Valorisation and utilisation of methane 5 Ventilation : (a) Measuring appliances (b) Techniques (c) Prediction and calculation. (d) Auxiliary ventilation 6 Rock mechanics 7 Rock pressure and supports (a) Stone drifts (b) Gateroads (c) Face (d) Face-ends (e) Other excavations 8 Roof and floor control in various geological and working conditions 9 Preventions of rockbursts and bumps 10 Powered supports	Development of methods of methane drainage. Pre-infusion from a distance. Underground storage of methane. Recovering methane from closed pits and old workings. Use of analogue models. Control of methane emission on high performance faces. Applied rock mechanics Formation of breaks and cleavages. Strata bolting Adapting to various geological conditions and methods of winning. Remote control and automation.

Sector	Field	Group	Designation	Notes
A	III	11	New support systems: (a) Face (b) Roadways (c) Face-ends	Shield supports, etc.
		12	Special problems relating to production in: (a) Thick seams (b) Steep seams.	
A	IV	<u>Methods of Working and Techniques of Coalgetting</u>		
		1	Workability of coal.	
		2	Winning in fully mechanised places. (a) Cutting machines and ploughs (b) Powered supports (c) Face conveyors (d) Stowing and caving (e) Face crushers	Improving equipment for controlling machines. Adapting to various winning conditions. Development and application for transport of equipment. Mechanisation and remote control.
		3	Fully integrated mechanised systems of production.	Problems of face-ends. Elimination of idle time. Programming individual processes and face operations. Remote control and automation in the face. Development of high power machines requiring little maintenance and repairs.
		4	Special problems of working. (a) Semi-steep seams. (b) Steep seams. (c) Thin seams. (d) Thick and very thick seams.	

Sector	Field	Group	Designation	Remarks
A	IV	5	New methods of winning	By hydromechanical methods. By auger mining in level seams. In steep seams. In thick seams.
		6	Technical problems of ventilation.	Ventilation, improvement of climate and measures against methane and dust.
		7	Technical problems arising from rock pressure and strata supports.	
A	V		<u>Outbye Services</u> <u>Underground</u>	
		1	Manriding.	
		2	Transport of products and material.	
		3	Mechanised loading points.	
		4	Automation of main haulage.	
		5	New transport systems.	Monorails. Conveyor trains (Coulloirs-roulants). Tyred vehicles, etc.
		6	Power supplies for underground operations.	Higher voltage supplies. Cylindrical transformer, etc. Fire resistant liquids
A	VI		<u>Telecommunication,</u> <u>Monitoring, Remote Control</u> <u>and Automation</u>	
		1	Telemetry	
		2	Monitoring systems.	Perfection and development of mine control centres. Monitoring equipment for underground electricity networks, etc.
		3	Remote control	Including interlocking systems for conveyors.
		4	Programmed control of individual methods of working and their equipment.	
		5	Optimisation of integrated processes and operations.	Ventilation. Reliabilits of electronic equipment.
		6	Automation	For example, main haulage systems, Ventilation.

B. OPERATIONAL MANAGEMENT AND PLANNING

Sector	Field	Group	Designation	Notes
B	II		<u>Planning, Organisation and Control of Operations</u>	
		1	Reduction in time of workings and pits and improvement of the rate of utilisation of the machines.	Continuous weekly working. Elimination of idle time. Treatment of data received at the control center.
		2	Improvement of ratio between nett and gross output.	
		3	Problems relating to the structure underground and at the surface.	Simplification of the structure. Improvement of knowledge on interdependence of services. Improvement of cost system. Studies of underground and surface services.
		4	Assessment of coal reserves including brown coal.	
		5	New planning techniques - integrated planning systems.	
		6	Mathematical models.	Selection of haulage methods
		7	Optimisation of underground workings	Cross-section of roadways, layout of districts, face and roadway operations.

C. PRODUCT BENEFICATION

Sector	Field	Group	Designation	Notes
C	I		<u>Mechanical Coal Preparation</u>	
		1	Properties of raw coal and treated products	Evaluation of parameters measurable quantitatively.
		2	Stockpiling and homogenisation	
		3	Mechanism of the mechanical treatment process	Reduction of proportion of smalls and finest material by gentle crushing of grades sizes.
		4	Development of conventional techniques for coal preparation	Treatment of fines (flotation). Development of vacuum filtration.
		5	Development and introduction of new methods	Electrostatic and pneumatic processes.
		6	Control of the process	Control systems. Automatic rapid methods for determination of ash, moisture and sulphur content. Relation between parameters quantitatively measurable and parameters of uncontrolled techniques (i.e. not directly measurable).
		7	Desulphurisation of the coal	
C	II	8	Waste disposal	
			<u>Coking and Briquetting of Coal</u>	
		1	Properties of coking coals and carbonisation products.	Automatic sampling and continuous preparation of samples. Evaluation of parameters measurable quantitatively. Evaluation of qualities of coals, e.g. size distribution of coke produced.
		2	Mechanism of coking (pyrolysis)	Widening of the coking coal basis. Pyrolysis under extreme conditions. Quantitative research on behaviour of coal swelling in coke ovens.
	3	Development of conventional coking techniques	Determination of swelling pressure of coals. Thermal studies on regenerators of coke oven batteries.	
		(a) New methods of research	Charging pre-heated coking coal. Blending charges.	
		(b) Increased capacities and the productivity of coke oven batteries.	Refractory material allowing a reduction in the width of the stretchers (wall thickness), i.e. bricks. Increasing the temperature of the flues.	

Sector	Field	Group	Designation	Notes
C	II	3	(c) Mechanisation and automation of the processes.	
			(d) Manufacture of Foundry coke	
		4	Thermal balance and process control.	<p>Optimisation of oven heating.                      Reduction of heat required for coking.                      Influence of higher temperatures of walls (arches) on quality of coke, swelling and productivity.                      Relation between the parameters (see part C I 6 and the variable technical parameters.                      Determination of temperature/time relationship.</p>
		5	Production and beneficiation of by-products and coking gas	<p>Increasing the yield of simple aromatics from coal tar.                      Beneficiation of complex aromatics from coal tar for utilisation in the chemical and plastics industry.</p>
		6	New methods of coking for coal	<p>Continuous coking process of small and fines for the production of formed coke.</p>
		7	New methods of briquetting brown coal.	<p>Based on rough coal, dried coal and small coke.</p>
		8	Methods of manufacturing smokeless briquettes from coal.	
		9	Technical and economic problems in environmental protection.	<p>Measures against emission during charging and discharging the ovens.</p>

Sector	Field	Group	Designation	Notes
C	III		<u>New Chemical and Physical Processes and Products from Coal</u>	
	IIIa		<u>Fundamental Research for New Chemical and Physical Processes</u>	
		1	Chemical constitution of coal	Studies of coal constitution and reactions involved in processing.
		2	Petrographic methods of analysis.	Classification. Physical and chemical constitution; properties of petrographic constituents. Use in process control.
		3	Physical properties of coal.	Physical properties as they affect the processing of coal.
	4	High intensity chemical reactions.	High temperature and/or pressure reactions in pyrolysis, gasification, hydrogenation, etc.	

../. ..

Sector	Field	Group	Designation	Notes	
C	IIIb		<u>New Products and Processes from Coal</u>		
			1	Gasification	Pressure gasification. High and low calorific value gas. Utilisation of heat from nuclear reactors.
			2	Production and beneficiation of hydrogen from coke oven gas and other gases.	Hydrogen for ammonia syntheses. Hydrogenation using coke oven gases.
			3	Dissolving coal and extracting constituents.	Conversion of extraction constituents into high value materials, e.g. electrode cokes, carbon fibres.
			4	Hydrogenation and hydrocracking of coal, extraction products and tar aromatics.	Production of hydrocarbons for chemical and plastics industries.
			5	Oxidation of coal, coal extracts and coal tar fractions.	Production of chemicals containing carboxyl groups, etc.
			6	Adsorption agents from coal.	Activated carbons and coals for the purification of gaseous and liquid effluents.
			7	Electrode coke and reducing agents from coal.	Special cokes with properties adapted to market requirements, e.g. for metallurgical and electrochemical industries.
			8	Building and other materials from coal and shale.	Cement from flotation waste, road-building materials, lightweight aggregates.
			9	Improved methods of combustion and utilisation of heat.	New and improved combustion methods. Combined cycles for power generation. High pressure methods. Plasma physics.
			10	Microbiological treatment of coal.	Production of protein.
11	Technical and economical problems in environmental protection.	New techniques and improvement of processes aimed at reducing noxious emissions.			