



Aims and Prospect of Clean Coal Technologies Center Activities

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Large project:

Centrum Czystych Technologii Węglowych (Clean Coal Technologies Centre)

The Innovative Economy Operational Programme

Priority Axis 2:

R&D Infrastructure

Activity 2.1:

Development of high research potential centres



Basic Information

Applicant: Główny Instytut Górnictwa (Central Mining Institute), Katowice, Poland

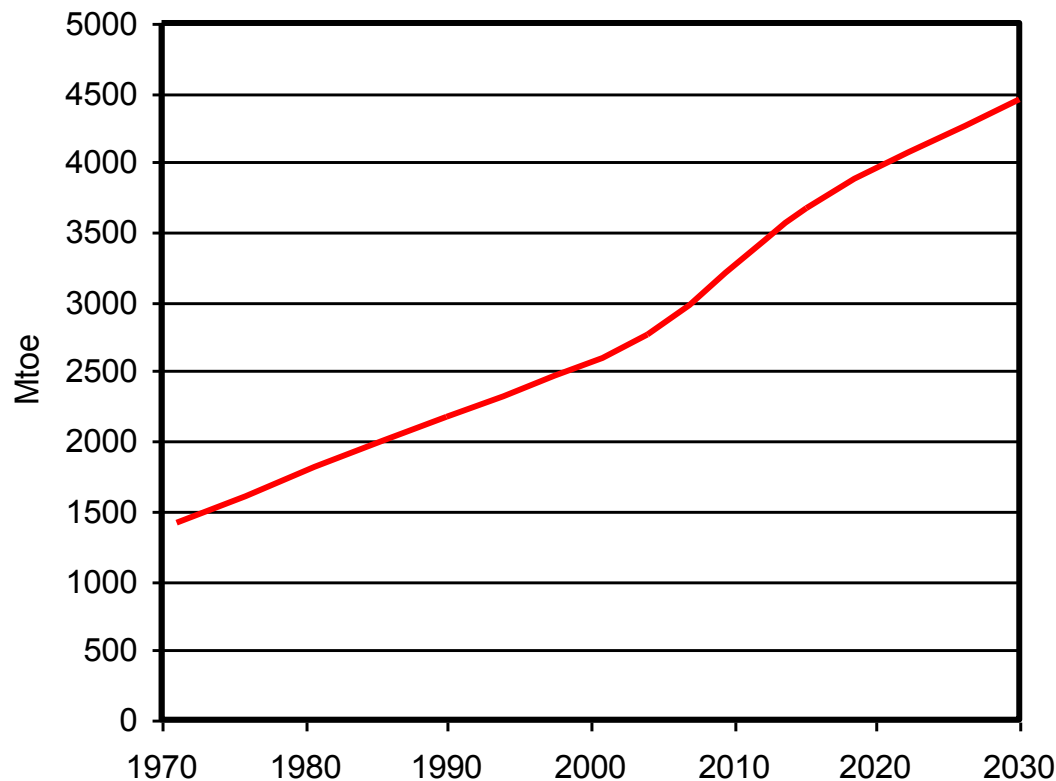
Cooperating entity: Instytut Chemicznej Przeróbki Węgla (Institute for Chemical Processing of Coal), Zabrze, Poland

Project end date: 30th September 2012

Total costs: 161 710 ths. PLN



World coal demand starting from 1971 with the forecast demand till 2030





Changes in coal production and consumption between 1981-2008

(BP-Historical Data, 2008)

		1981-2000	2000-2008
World	production	+21,4	+50,0
	consumption	+29,4	+41,3
EU	production	-50,5	-17,0
	consumption	-33,8	-4,5
Poland	production	-27,3	-15,1
	consumption	-36,4	+3,1

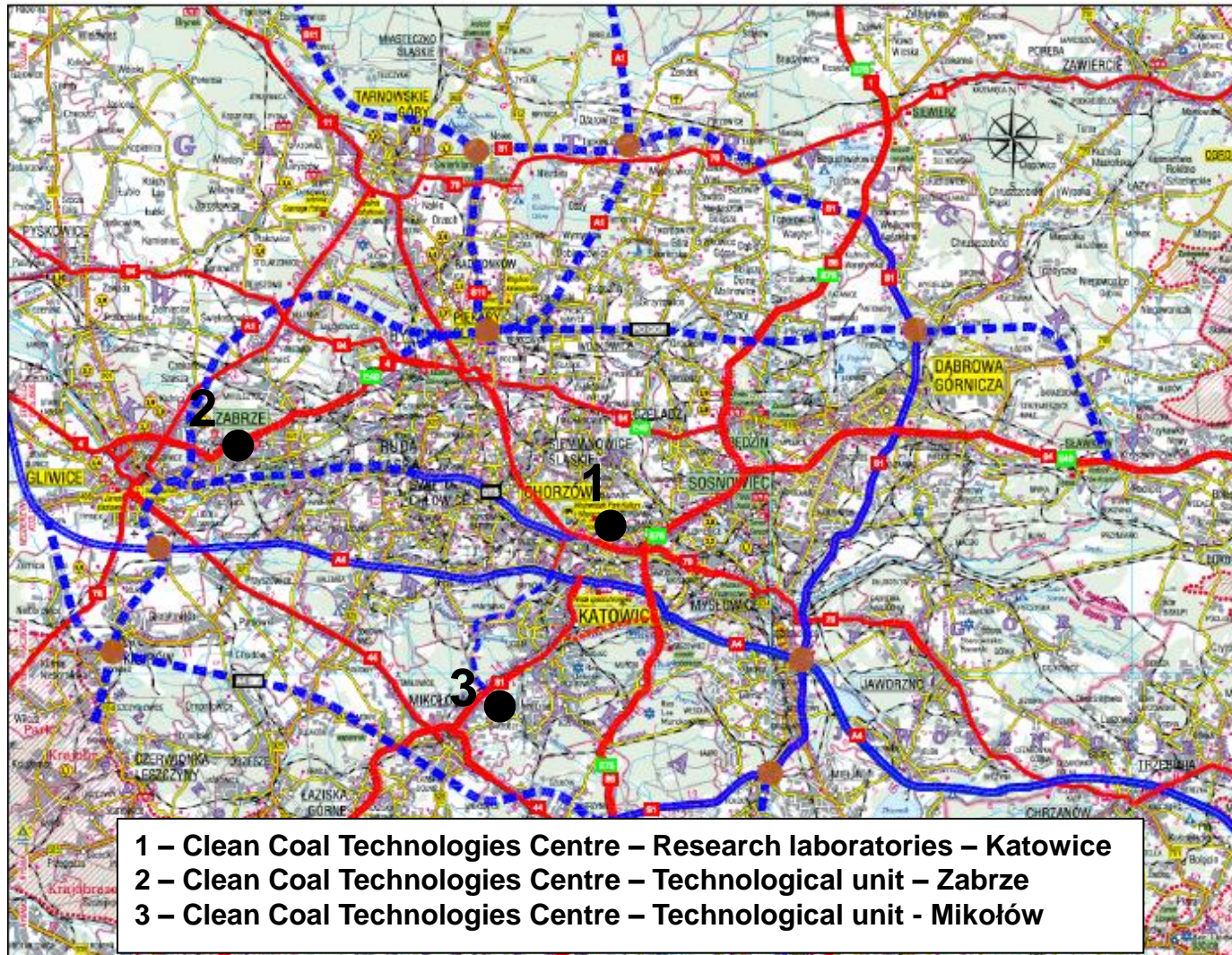


The basic objective of the Project

Creation of research infrastructure enabling R&D activities aiming at increasing the competitiveness of Polish economy by applying novel solutions in the field of clean coal technologies and thus ensuring energy security as well as limiting the degradation of the environment.



The location of the Project





The location of the Project

Central Mining Institute, Katowice

- research laboratories

Interdisciplinary works in the field of:

- Identification of deposits of coal and accompanying mineable materials
- Preparation of coal for various utilization technologies, including analyses of coal properties
- Investigation of coal processing bases and products properties
- Identification of CO₂ storage potential
- Process engineering and nanotechnology
- Mitigation of environmental impact of coal utilization processes
- Environmental monitoring



The location of the Project

Experimental mine Barbara CMI, Mikołów

– technological unit

R&D works in laboratory, large laboratory and PDU scale on the following experimental stands:

- Stand for tests on atmospheric and high pressure underground coal gasification in reactors simulating a coal seam
- Stand for tests on coal gasification in moving bed reactors
- Stand for tests on direct hydrogenation of coal
- Stand for gas separation applying PSA and membranes
- Stand for tests on gas combustion in turbines and engines
- Stand for analyses of various aspects of underground coal gasification in real conditions in generators constructed in a coal seam



The location of the Project

Institute for Chemical Processing of Coal, Zabrze – technological unit

<i>Installation</i>	<i>Capacity</i>
Pressure oxy-combustion of coal	25 - 50 kg/h
Pressure coal gasification in CFB reactor	50 - 100 kg/h
Combustion chamber with induced turbulence	15 - 30 kg/h
Cleaning and cooling of process gas	460 kg/h
Cross-current dryer	100 kg/h
CO ₂ removal plant (amine method)	20 - 100 m ³ /h
Chemical looping reactor	10 m ³ /h
Gas turbine	30 kW _e
Testing station for residential heating boilers	10 - 100 kW
Experimental degassing of coal	40 kg/cycle
Coal preparation section (grinding, screening, drying)	1500 kg/h
Center of process simulation, operation, control and data storage	-



Expected impact of the Project's implementation on the economy:

1. Improved efficiency of coal utilization, increased conversion efficiency and decreased cost of final energy
2. Increased competitiveness, rationalization of the energy production cost and coal derivative products
3. Increased national energy security and diversification of energy resources
4. Implementation of policy decreasing climate change effect associated with anthropogenic greenhouse gasses emissions
5. Adaptation of production and utilization of energy resources to the needs of sustainable development



Main targets

1. To activate and increase the competitiveness of Polish coal utilizing enterprises
2. To enable basic and development research in the field of CCT to be performed in the laboratory to pilot scales
3. To enable full utilization of own resources in terms of experience as well as human and material resources of both Institutes

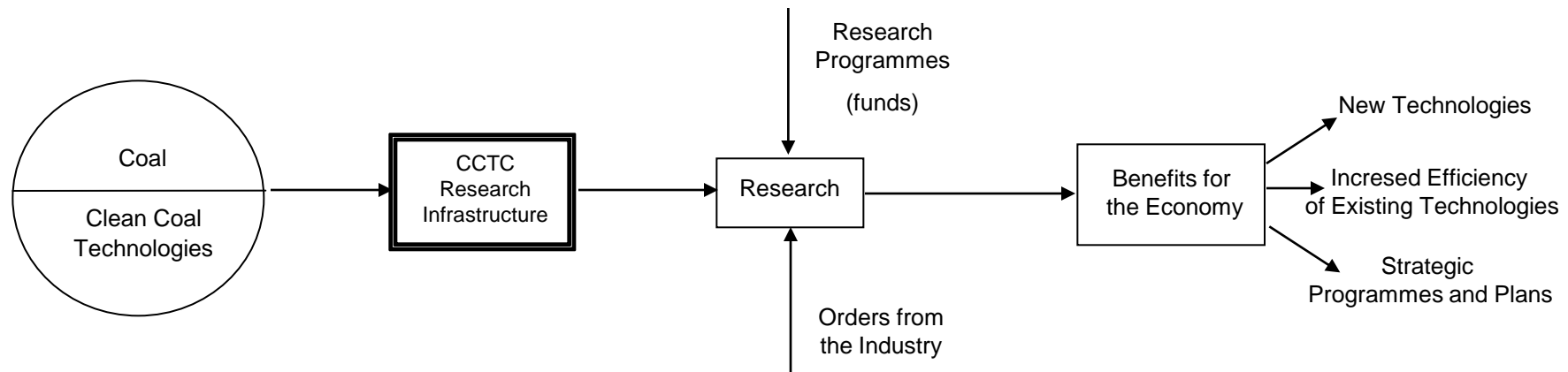


Main targets

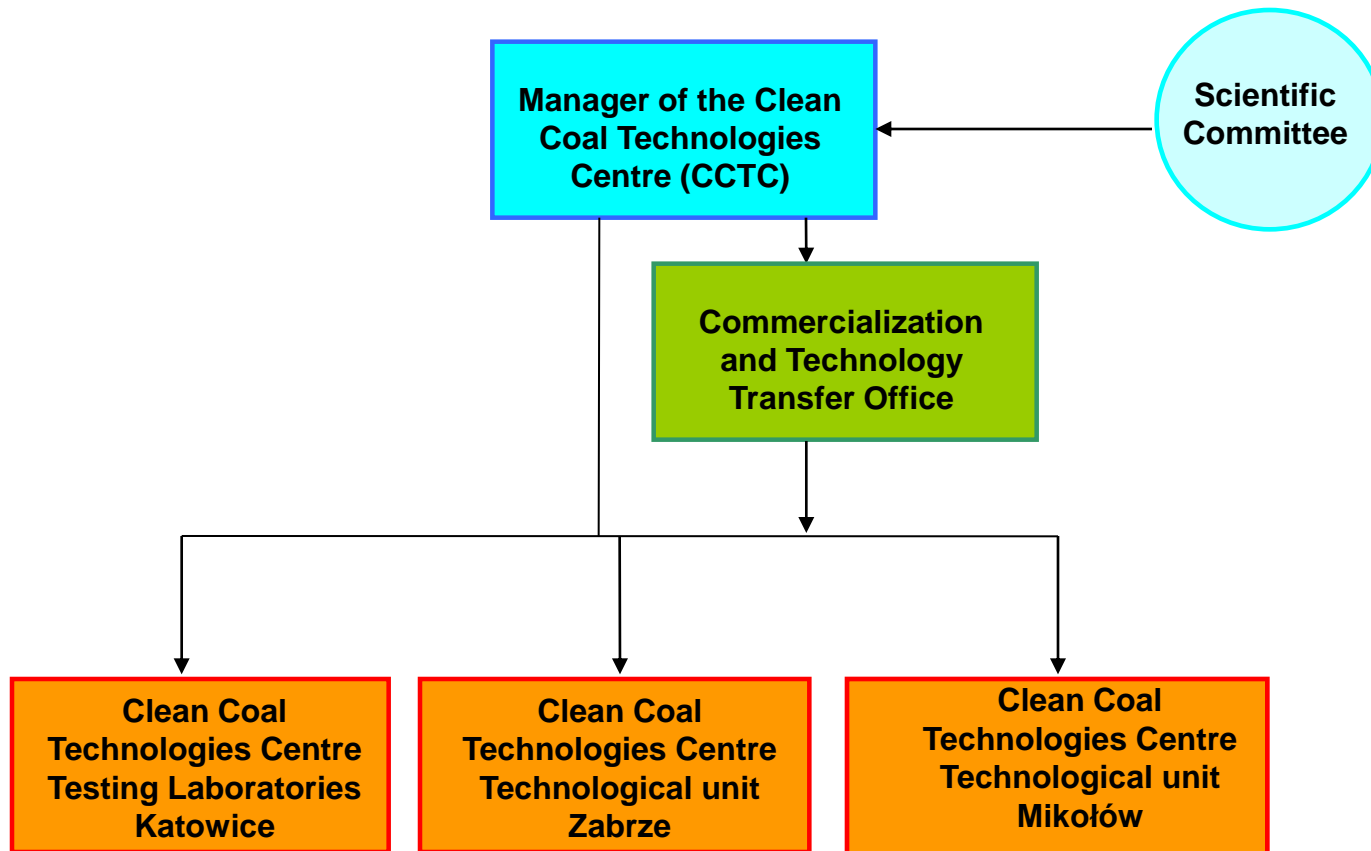
4. To create the possibility of making the research installations accessible to researchers from outside the Centre, which will result in consolidation of the efforts made in order to solve basic CCT related problems
5. To enable widening of the national and international cooperation of both Institutes
6. To enable widening and reaching higher level of the offer of works performed by both Institutes



General Assumption for CCTC Activities

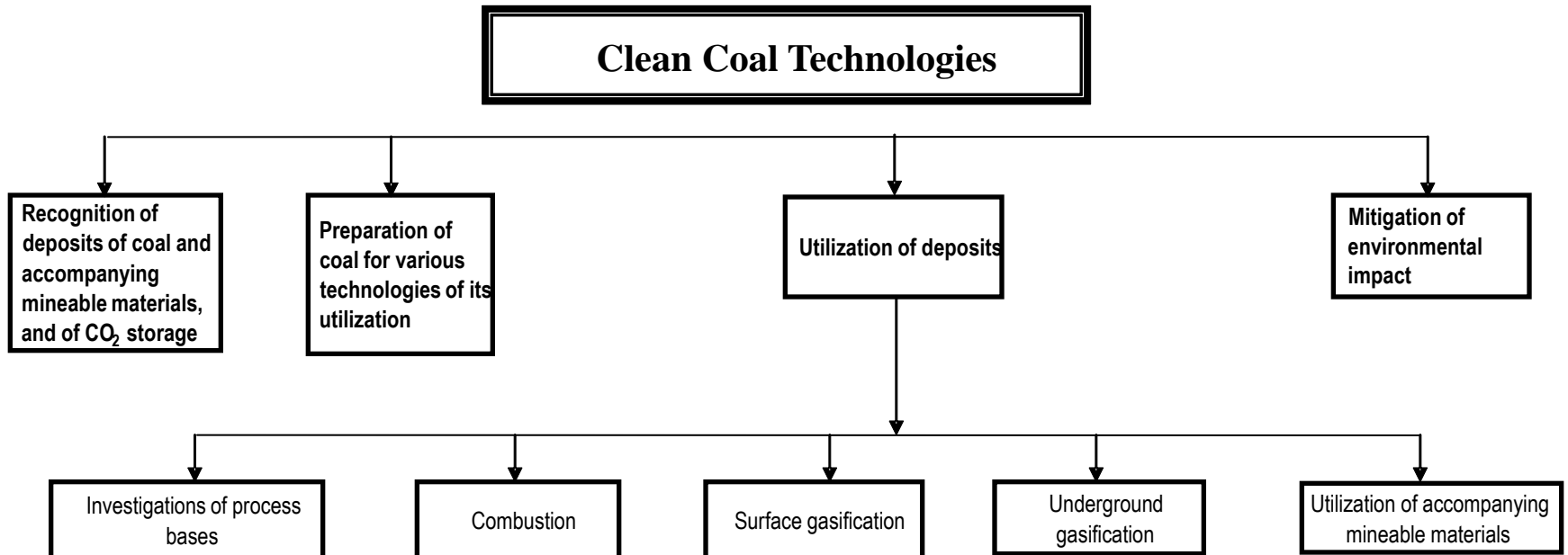


Organization chart of the Clean Coal Technologies Centre





Expected Research Programme





Project Financial Sustainability

The analysis of the Project cash flow proved its financial sustainability - taking into account the expected revenues resulting from the realization of the research programme until 2022.

It was shown in the Feasibility Study.



Summary

Based on the Polish natural energy resources, the energy use and the world's trend in the continuous upgrading of power production technologies by improvements in the effectiveness of the industrial systems, while taking into account the environmental aspects, like e.g. reduction of greenhouse gases emission from combustion systems, R&D activities in the field of CCT seems justified and of strategic importance for Poland.



Summary

Development of the Clean Coal Technologies Center aiming at the research on the improvement of coal utilization efficiency in compliance with requirements of sustainable development constitutes the subject of priority activities in terms of strategic development of energy sector in Poland.



Thank You