

# 1 INTRODUCTION

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# 1 INTRODUCTION

## 1.1 Coal and steel in Europe

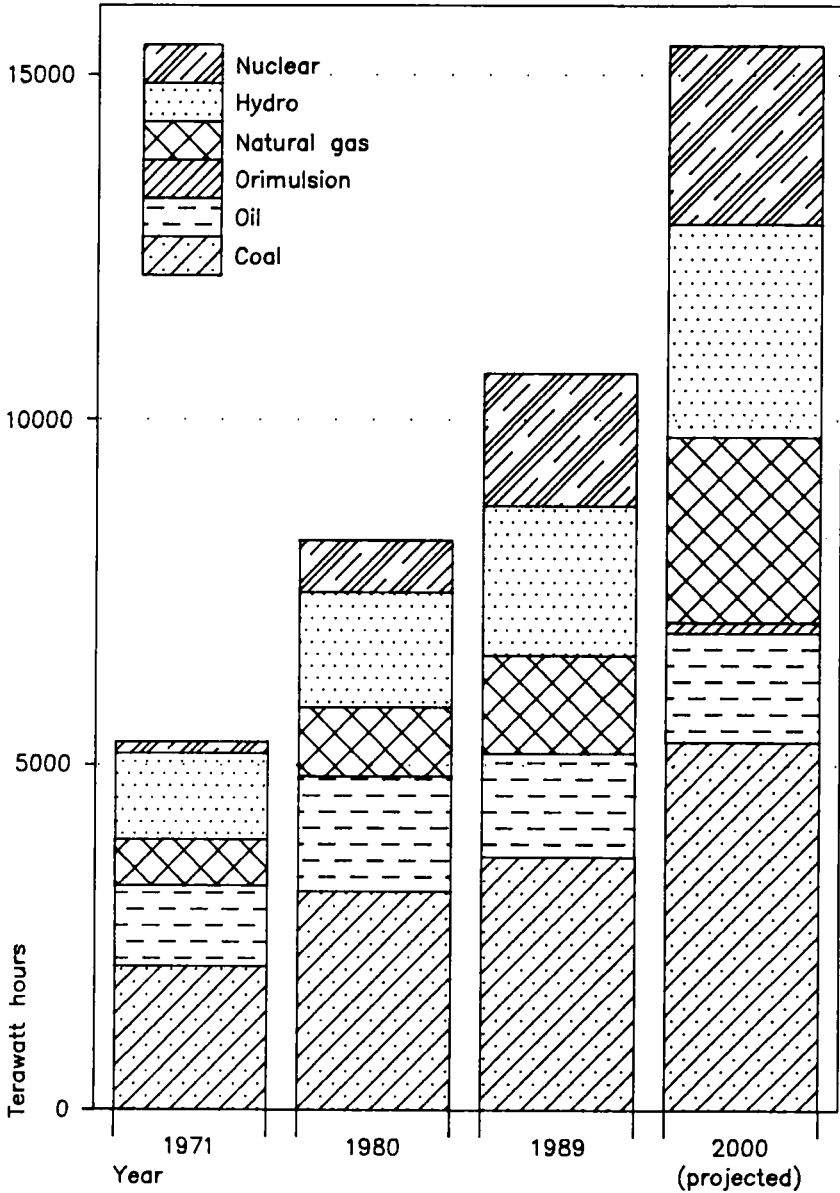
### 1.1.1 Coal

Coal was the fuel on which the industrial revolution of the eighteenth and nineteenth centuries was based, and it is still an important primary energy source. However, in many of its former uses it has been replaced by other fuels such as oil and natural gas. In 1989 approximately one third of world electricity generation used coal as a fuel (see Figure 1.1). Within the European Community, coal provides 20% of the primary energy source and is used to produce 40% of the electricity generated.<sup>123</sup>

The major coal producing countries in the European Community are Belgium, France, Spain, United Kingdom, Germany and Greece. Italy, Portugal and Eire also produce some coal, though in smaller amounts. The Netherlands and Denmark produced coal in the past, but their mines have closed and they join Luxembourg as non coal-producing members of the European Community. Figure 1.2 illustrates the main coal fields of the European Community. Box 1.1 describes the formation and geology of coal.

The majority of coal produced in the European Community countries is 'hard coal' *i.e.* bituminous or anthracite coal (see Box 1.1). Major deposits of lignite, or brown coal, are found in Eastern Germany, and lignite is also mined in Greece, Eire, Northern Ireland, Italy and, formerly, Denmark. Table 1.1 shows the hard coal production of each country for 1980 and 1990.

Early mining activity exploited near-surface outcrops of coal. From the fourteenth century onwards underground mining techniques were developed. The depth of mines increased as surface deposits became exhausted and mining techniques improved. Most West-European coal in the past 150 years has been produced from deep mines, often in difficult geological conditions. Production costs in these mines are high and, under pressure from cheaper imports and the decline in coal



**Figure 1.1:** World electricity production by fuel (after IEA Coal Research, 1992<sup>123</sup>)

utilisation, the number of deep mines in the European Community has fallen considerably. Mine closures have had a severe impact on the communities which have grown up around the mines. These communities are now characterised by high rates of unemployment and social deprivation. There is a need to bring the large tracts of land affected by coal mining back into productive use and in many areas much work has already been done, leading to rejuvenation of local economies through improvements to the environment and incentives for inward investment.

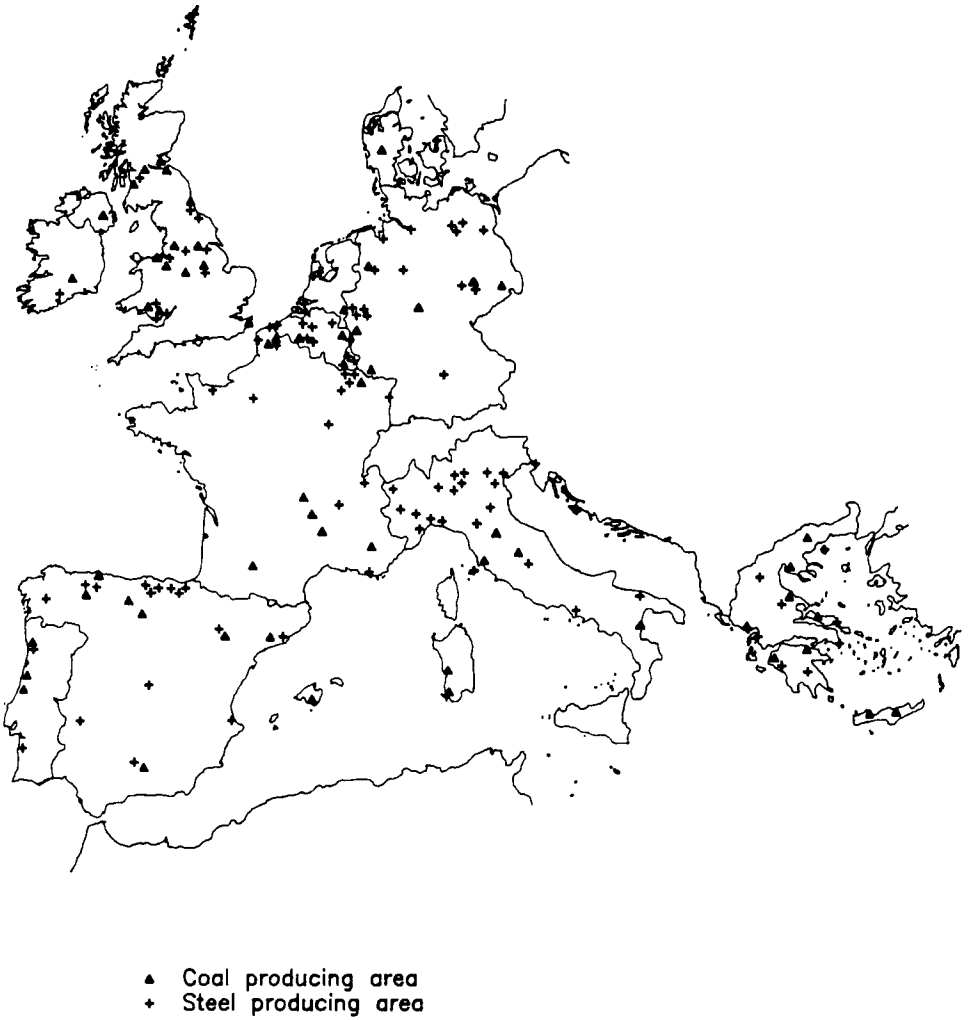
With the development of large earth-moving machinery it has become economical to remove overburden several tens of metres thick overlying coal seams and so mine coal by opencast methods. Opencast coal mining in Western Europe has, generally, involved progressive restoration, so dereliction caused by opencast mining is not a major problem. This is not so in the countries of the former Eastern Bloc. As a result, in the Eastern Länder of Germany there are large tracts of barren land produced by the opencast mining of lignite (see Section 17.7).

**Box 1.1:** Formation and geology of coal (Tucker, 1981<sup>242</sup>)

Coal is formed by the action of heat and pressure on accumulations of partially-decayed vegetable matter, such as peat. Over time and under conditions of increased temperature and pressure, the carbon content of the coal increases and the content of volatile matter decreases, giving a transformation from peat through lignite (brown coal), sub-bituminous, bituminous, sub-anthracite to anthracite coal. Thus, lignite generally formed in the Mesozoic or Tertiary periods, is of a younger age than anthracite, which was formed in the Carboniferous period.

Most European coal was formed in coastal deltas, where progressive sedimentation of particles occurred as the delta was built out into the sea. Coarse sands were deposited over layers of silts, with vegetation then developing on those sands. Thus coal measures typically consist of layers of mudrocks containing marine fossils, or sometimes a marine limestone, overlain by non-marine mudrocks, siltstone, sandstone and then the seam of coal. Coal seams in these formations are generally less than 3m thick. Seat earths, the material at the base of the coal seam, which was originally the soil in which the vegetation grew, may contain nodules of iron ore (siderite). The changing position of the delta over time, and events such as tectonic movements and changes in the sea level resulted in cycles of deposition, producing repetitions of the coal measures sequence.

In some coal basins, such as those of the carboniferous rocks of France, the coal was formed in continental basins, associated with lakes. In these areas rapid subsidence produced thick beds of coal, in some cases hundreds of metres thick.



**Figure 1.2:** Main coal and steel producing areas in the European Community

**Table 1.1:** Hard coal production in the EC for the years 1980 and 1990 (after IEA Coal Research, 1992<sup>123</sup>)

Country	Steam production		Coking production		Total production	
	1980	1990	1980	1990	1980	1990
Belgium	2.5	1.5	4.0	-	6.5	1.5
Denmark	-	-	-	-	-	-
Eire	0.1	-	-	-	0.1	-
France	13.8	8.5	4.2	1.8	18.0	10.3
Germany (Western)	35.4	27.5	55.4	44.2	90.8	71.7
Greece	-	-	-	-	-	-
Italy	-	-	-	-	-	-
Luxembourg	-	-	-	-	-	-
Netherlands	-	-	-	-	-	-
Portugal	0.1	0.2	-	-	0.1	0.2
Spain	8.1	10.5	1.4	0.3	9.5	10.8
United Kingdom	96.0	75.2	9.7	1.6	105.7	76.8
<b>TOTAL</b>	<b>156.0</b>	<b>123.4</b>	<b>74.7</b>	<b>47.9</b>	<b>230.7</b>	<b>171.3†</b>

Figures are in million tonnes of coal equivalent (Mtce)

† Includes a further 46.9 Mtce of brown coal

Steam production: coal for electricity generation

Coking production: coal for production of coke

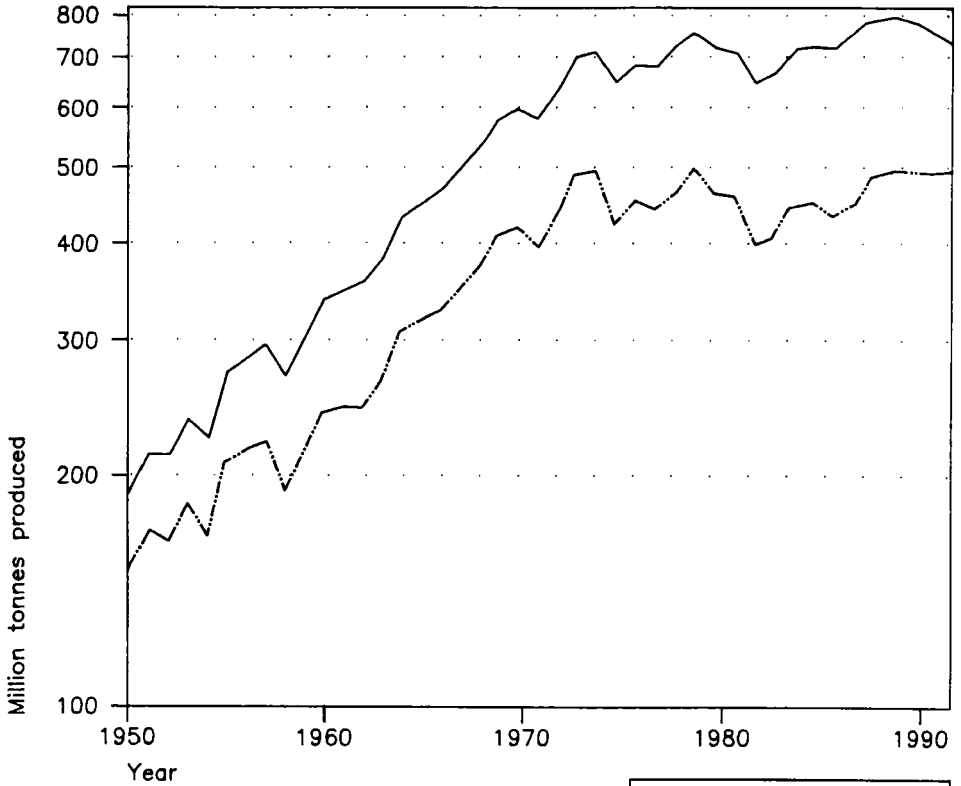
### 1.1.2 Steel

Steel is an alloy of iron with small amounts of carbon and, in the case of alloy steels, other metals such as nickel and chromium. Iron ore has been mined in several countries of the European Community, including the United Kingdom, France, Belgium, Germany and Spain. European production of iron ore has now, however, been largely replaced by imported ore from Africa and Brazil. Iron ore is reduced to form pig iron, a form of iron containing approximately 4% carbon and other

impurities, in blast furnaces. The use of coke in this process forms a connection between the coal and steel industries which resulted in many iron and steel works being located in the vicinity of coal mines. Steel is made by refining pig iron and/or scrap steel and iron. An increasing proportion of steel is being produced from scrap rather than from pig iron. Section 9.1 gives more details on the processes involved in iron and steel making. Table 1.2 outlines the crude steel production by process for each of the European Community member countries. Steel producing areas in the European Community are shown in Figure 1.2. World steel production has risen four-fold since 1950 (see Figure 1.3). Considerable economies of scale have been achieved in the iron and steel industry by concentrating production at fewer but larger works. This trend, as well as increasing competition from steel-producing nations outside of the European Community and the increasing use of other materials such as plastics in place of steel, has led to the closure of many steel sites in the past three decades, causing dereliction and economic decline of towns once dominated by their steel works. This decline is

**Table 1.2:** Crude steel production by process, 1991 (after IISI, 1992<sup>124</sup>)

	Production million metric tons	Oxygen %	Electric %	Open Hearth %
Belgium	11.3	90.9	9.1	-
Denmark	0.6	-	100.0	-
Eire	0.3	-	100.0	-
France	18.4	71.1	28.9	-
Germany	42.2	77.9	20.3	1.8
Greece	1.0	-	100.0	-
Italy	25.1	41.1	58.9	-
Luxembourg	3.4	100.0	-	-
Netherlands	5.2	95.6	4.4	-
Portugal	0.5	42.3	57.7	-
Spain	12.9	43.5	56.5	-
United Kingdom	16.5	76.1	23.9	-
<b>TOTAL</b>	<b>137.4</b>	<b>67.9</b>	<b>31.6</b>	<b>0.6</b>



Average growth rates % per annum		
Years	World	Western world
1950-60	5.9	4.6
1960-70	5.9	5.7
1970-80	1.9	1.0
1980-90	0.7	0.6
1990-91	-4.4	-0.1

Million tonnes produced		
Year	World	Western world
1950	190	153
1960	336	241
1970	594	419
1980	716	464
1981	707	459
1982	645	398
1983	664	407
1984	710	445
1985	719	451
1986	714	433
1987	736	449
1988	780	489
1989	786	498
1990	770	493
1991	736	492

**Figure 1.3:** World crude steel production, 1950-1991 (after IISI, 1992<sup>124</sup>)

illustrated by the fall of more than 50% in employment in the European steel industry between 1974 and 1991, shown in Table 1.3.

### 1.1.3 The European Coal and Steel Community (ECSC)

The European Coal and Steel Community (ECSC) was created in 1950 by the Treaty of Rome, which was signed in 1951 and ratified on 25 July 1952. The ECSC has its headquarters in Luxembourg. At the time of establishment the members of the ECSC were: Belgium, France, Germany, Italy, Luxembourg and the Netherlands.<sup>149</sup> The other six European Community member states (Denmark, Greece, Eire, Portugal, Spain and the United Kingdom) joined the ECSC later.

The main aims of the ECSC were initially to reconcile Franco-German relationships and later, more generally, to promote and increase productivity and social well-being in the steel and coal communities. All barriers against the trade of coal and steel between the member countries were abolished and the ECSC became a free market.

**Table 1.3:** Employment in the steel industry, 1974 and 1986-1991 (after IISI, 1992<sup>124</sup>). Figures are in thousands employed at the end of the stated year.

	1974	1986	1987	1988	1989	1990	1991
Belgium	64	33	30	30	30	28	28
Denmark	2	2	2	2	2	2	1
France	158	68	58	53	49	47	44
Germany	232	143	133	131	130	126	147
Italy	96	66	63	59	58	57	56
Luxembourg	23	12	11	11	10	9	9
Netherlands	25	19	19	18	18	17	17
Portugal	4	6	6	5	4	4	4
Spain	89	51	45	41	39	37	36
United Kingdom	194	57	55	55	54	51	45
<b>TOTAL</b>	<b>887</b>	<b>457</b>	<b>422</b>	<b>404</b>	<b>393</b>	<b>377</b>	<b>387</b>

The use of technology and economic research was seen as a method of improving the status of the members of the ECSC. Thus an obligatory levy system was introduced, whereby 1% of annual production was paid into a fund. This source of funds has made possible and financed the research for and production of this book.

## **1.2 The role of the European Community in environmental protection**

The reclamation of derelict land arising from the coal and steel industries can be set in the wider context of the policy of the European Commission on environmental matters. This Section describes how this policy has developed and some of the principles on which it is based.

In 1974 the growing number of groups protesting about environmental degradation combined their strengths in the form of the European Environmental Bureau (EEB).

The EEB's principal objective was to influence and ensure that an environmental policy was established and set into motion at a Community level. It succeeded and on 22 November 1973 a programme of "action on the environment" was established and the Community's first common environment policy began.

The Community's environment policy is not a set of static rules, but it does have one strict fundamental aim:

"to help bring economic expansion into the service of Man by preserving the environment in which she/he lives and managing the natural resources upon which economic expansion depends".<sup>80</sup>

The need to manage resources is implicit if we are to safeguard our future economy.

The main objectives laid out by the policy were to:

- prevent and eliminate pollution and nuisances;
- maintain and protect the biosphere;
- manage resources to maintain an ecological balance;
- ensure that development improves the quality of living and working conditions;
- take care that environmental aspects are included in regional planning;
- collaborate with international institutions and others outside the Community to seek common solutions to environmental problems.<sup>80</sup>

Several sets of principles have been defined by the Community in order to attain these objectives. The main ones include:

- the ‘polluter pays’ principle;
- prevention is better than cure;
- environmental action must take place at the appropriate level: local, regional, national, Community or international.<sup>80</sup>

The second action programme was instigated in 1977, and by 1983, the time of the third action programme, the Community programmes had become more focused, such that the principles which form the basis of the policy could be seen to emerge.<sup>88</sup>

In 1987 the importance of having a dynamic policy on the environment was fully acknowledged and was given a recognised position through “explicit legal and political backing” in the amendments to the Treaty of Rome, known as the Single European Act.

The fifth environment action programme commenced in 1992. This was directed by the terms of the Single European Act, which sought to establish a unified common market. The fifth environment action programme seeks to safeguard the aims of environmental policy to ensure

that the economic expansion resulting from the Single European Market does not have negative implications for the quality of the European environment.

It is imperative then that economic development and environmental protection are considered together. It would be meaningless to improve the wealth and social status of the individual and of the Community as a whole if the fundamental quality of the conditions of their very environment, and thus their future survival, is undermined in the process.

### **1.3 Derelict land arising from the coal and steel industries**

#### **1.3.1 The scale and nature of dereliction**

Derelict land has been defined as “land so damaged by industry and other development that it is incapable of beneficial use without treatment”. This is the definition adopted by the UK Government. It is estimated that there are approximately 200,000ha of such damaged land in the member states of the European Community, its distribution being a function of the intensity of the past industrial activity in given areas. Approximately 40,000ha of this land have resulted directly from the activity of the coal and steel industries.<sup>200</sup> The continued contraction of these industrial sectors, and resultant coal mine and steelworks closures, provides an ongoing challenge to those involved in regional development in the coalfields and steel towns of Europe.

Dereliction is often associated with the visual appearance of a site: unused buildings in a state of disrepair, unkempt vegetation, the presence of deposits of unsightly wastes such as spoil from mining or slag from metal processing. The air of neglect at such sites attracts unwelcome activities such as fly-tipping and theft of stone, bricks or other materials from buildings, causing further deterioration in the appearance of a site. Other properties of derelict sites are less obvious but may be of a more serious nature and present greater technical difficulties. Examples include

physical hazards from open mine shafts and unstable ground, and chemical hazards from the presence of toxic waste materials. Derelict land may affect the area surrounding it by pollution of water and air, for example by the wind-blown dispersal of fine-grained particles of dusts from unvegetated spoil heaps or seepage of toxic substances into watercourses from contaminated ground.

### **1.3.2 Dereliction in individual countries**

#### *Introduction*

Patterns of industrialisation and the degree of industrial decline, and thus the amount of derelict land, vary from one European country to another. The United Kingdom and Germany became industrialised at an early stage and have seen much restructuring of their industrial base in recent decades. These countries have had to give a high priority to reclaiming derelict land to prevent the economic collapse of regions once dependent on the coal and steel industry. Other countries, which historically have not had a large industrial base, such as Eire and Greece, or in which the decline in traditional industries such as coal and steel has not yet occurred, for example Spain, have not had to give such a high priority to tackling problems of dereliction. Policies relating to derelict land have generally not been developed in such countries and little reclamation has been carried out.

The following sections, provide a precis of the coal and steel industries, and the associated state of dereliction, in each of the member countries of the European Community.

Table 1.4 shows the estimated areas of derelict land from the coal and steel industries in the member states of the European Community. The legislation in each country of relevance to the reclamation of derelict land is summarised in Box 1.2.

## Spain

One hundred and sixty-seven coal mines were in operation in Spain in 1990, employing just under 40,000 people. In 1985, when Europe was forced to reassess coal output and decrease production by 40%, Spain, although part of the European Coal and Steel Community (ECSC), was not obliged to restructure its coal industry. Coal production in Spain decreased by only 16% between 1985 and 1993. In 1991 the Spanish government implemented a plan to restructure the industry and significantly reduced its financial aid.

The Spanish steel industry, based on locally produced ores, is an important part of the economy of Asturias and the Basque country (see Section 17.9). Major closures of steel-making capacity, which have taken place elsewhere in Europe, are imminent.

**Table 1.4:** Derelict land arising from coal and steel production in the European Community (RETI, 1993<sup>199</sup>)

Country/ region	Estimated area of dereliction (ha)		Country/ region	Estimated area of dereliction (ha)	
	Coal	Steel/iron		Coal	Steel/iron
<b>Belgium</b>			<b>Portugal</b>	□	□
- Wallonia	4715	574	<b>Spain</b>		
- Other regions	□	□	- Basque Country	□	660
<b>Denmark</b>	3000	□	- Aragon	600	200
<b>France</b>	□	□	- Cantabria/Murcia	□	100
<b>Germany</b>			- Andalusia	100	□
- Ruhr	3188	724	- Castile y Leon	500	□
- Aachen	680	240	- Asturias	4500	□
- Saar	110	90	- Catalonia	500	□
- Eastern Länder	□	□	<b>United Kingdom</b>		
<b>Greece</b>	300	□	- England	5814	605
<b>Eire</b>	□	□	- Scotland	1870	503
<b>Luxembourg</b>	□	548	- Wales	3800	236
<b>Netherlands</b>			- Northern Ireland	□	□
- East	750	□			
- West	200	□			

□ Not known

### *Portugal*

The development of the steel and coal industries in Portugal has been limited. In 1993 one coal mine and two small iron mines were being worked.

### *Greece*

Lignite is mined but this activity is gradually declining, leaving abandoned and despoiled land. The only recorded abandoned lignite site is Alivéri mine which covers 300ha. It closed in 1989 due to exhaustion of reserves.

There is no great pressure to reuse abandoned land in Greece. As a consequence no official organisation or body exists to promote the reclamation of derelict land.

### *Italy*

The steel industry has played a major role in the Italian economy despite the lack of the natural resources necessary for steel production in Italy.

The industry has seen many changes in structure and in its production methods. The general trend was one of increased production from the 1950s through to 1970, followed by decline in the 1970s. The 'Steel Plan' was approved in 1978 which led to restructuring and a change of emphasis in the type of goods produced. The steel crisis in 1980 and another heavy recession led to further legislation and incentives to close down private companies.

By 1986 no further aid was being given to the steel industry. The resulting closure of works had, by 1992, produced 750ha of derelict land.

**Box 1.2:** Legislation relevant to the reclamation of derelict and contaminated land in the European Community (after RETI, 1993<sup>199</sup> and RETI-CEE-BRGM, 1992<sup>200</sup>)

**Spain** There is no national law relevant to the coal and steel industries; rather there are several regional laws on restoration of mining land.

**Portugal** No specific laws.

**Greece** All derelict land is owned by the state. There is no great pressure to reuse derelict land and, as a consequence, no official organisation exists to promote reclamation.

**Italy** No laws or regulations exist specifically to deal with dereliction itself. The urban planning instruments and laws on the reorganisation of industrial production and of environmental regulations are applied.

**Denmark** No laws specific to dereliction exist, but the government does recognise the problem of contamination and established the Chemical Wastes Act, 1982. Under this act, regional and local authorities are obliged to carry out surveys to identify sites and localities requiring action in order to prevent chemical contamination of groundwater.

**Luxembourg** The Minister of Economy encourages the reuse of abandoned land. Sites are cleaned up before they are sold. This treatment is financed by the government and the European Commission with some limited input from individual communes. The potential for contamination is recognised by the government. This is shown by the fact that industries whose use of land may cause contamination are required to provide assurance against civil liability and guarantees that the land will be reclaimed after operations have ceased.

continued .....

**Box 1.2 continued**

- France** No specific laws. Applicable legislation falls into four main categories: (1) Control of industrial facilities when operational and after cessation of operations; (2) Environmental protection; (3) Public health and civil defence; (4) Local and Departmental health regulations.
- Netherlands** The Dutch government has a well-developed policy on protection of soil and their aim is that soil should be fit for all types of use. The Interim Soil Clean-up Act 1983 introduced Guideline values for soil clean-up which are widely used in several countries. The Soil Protection Act 1987 incorporates legislation to prevent soil pollution.
- Belgium** Only in the Wallonian Region is there a law dealing specifically with derelict industrial land. This is the 1978 Act on the Rehabilitation of Disused Economic Sites in Wallonia. It establishes in principle the obligation for a proprietor of a disused site to clean and restore it.
- Eire** No specific laws.
- United Kingdom** The Department of the Environment, Scottish Office and Welsh Office periodically carry out surveys of derelict land which record the area and type of dereliction. Legislation relevant to the reclamation of derelict land includes: Derelict Land Act, 1982; Environmental Protection Act, 1990; Water Resources Act, 1991, and Town and Country Planning Act, 1990.
- Germany** Land reclamation in Germany is subject to both Federal and Länder laws. The main legislation is included in: (1) the Bundes-Immissionsschutz-Gesetz; (2) the Abfallgesetz; (3) the Baurecht; and (4) the Wasserhaushaltsgesetz. There are other more general statutes on planning, mining and safety.

There are few coal deposits in Italy and what does exist is poor quality lignite. These reserves lie mainly in Sardinia, Tuscany, Umbria and Basilicata, and production from these areas is not sufficient to meet demand in Italy. Even in 1929, the year of peak production, Italy only produced approximately 1 million tonnes of coal when demand was 16 million tonnes.

The coal industry has, nevertheless, produced 3,100ha of abandoned and derelict land (see Table 1.4).

Some examples of coal and steel site decline and abandonment, and plans for future reclamation, are provided in Section 17.6.

### *Denmark*

The exploitation of lignite coal deposits, located in the Central West of Jutland began during the 1940s. These deposits were of poor quality and by the early 1950s production had ceased at all but one mine. This one mine remained open until 1970.

Approximately 3,000ha of land was exploited for its lignite. This land lies abandoned mainly as sand dunes and ponds, planted and naturally revegetated areas. The mining activity has left a legacy of unstable ground and water pollution.

The only steelworks in Denmark is Danish Steelworks Limited. The works were founded in 1940 at Frederiskvaerk, and are still in operation.

### *Luxembourg*

Steel was an important factor in the economy of Luxembourg. The steel industry was based on utilisation of iron ore deposits located in the southern part of Luxembourg and in Lorraine, across the border in France.

Closures of steelworks began in 1975 with the restructuring of the industry necessitated by the decline in demand for steel. Much former steelworks land now lies derelict.

### *France*

Coal and steel production has been an important part of both the history and economy of France. Coal deposits in France lie in three main regions: lignite is produced in the south at Gardanne, Provence, whereas hard coal is found in the Nord-Pas de Calais and Lorraine regions. The French coal industry is in decline, and many mines have closed. In 1993, coal was only produced in Lorraine, and these remaining mines are scheduled for closure by the year 2005.

The French steel industry was based in Lorraine, where it utilised local iron ores. Although the iron ore mines have closed and steel production in France has declined, steel is still produced, and in 1993 France was the third largest producer in the EC.

Examples of dereliction resulting from the closure of French coal mines and steelworks, and the reclamation now being undertaken, are given in Section 17.4.

### *The Netherlands*

The coal industry in the Netherlands dates from the Middle Ages. Coal extraction took place mainly in the south in the Limburg province. The two mining basins in the province, the eastern and western, became the most industrialised areas of the Netherlands. By 1965 the coal mining basins had become the most densely populated areas of the country, with 70% of the population directly involved in the coal industry. At the end of the 1960s competition from natural gas led to the decline and eventual closure of the coal industry.

The Dutch steel industry is based in two regions: IJmuden and Albasserdan. Two steelworks are in operation. There is also land that was once occupied by steel companies where steel making has ceased, and this land has been reclaimed and is being used for new industries. Contamination on these sites was found to be below levels considered to present significant risk.

### *Belgium*

Belgium was once one of the most important coal producing countries in Europe. The coal and steel industries in Wallonia date from the nineteenth century, and in Flanders from the late 1940s. The industry is less important in Flanders than in Wallonia.

The coal industry in Wallonia began to decline in 1964-65 and in 1993 4,715ha of land formerly occupied by the coal industry lay derelict. In Flanders the coal industry covered an area of 1,320ha in 1950-52. Coal production had ceased by the 1990s, though there are no estimates of the amounts of derelict land it has created.

The Belgian steel industry is still active, notably in the Wallonian region around Mons and Charleroi, but also at Gent, Genk and near Brussels. Some sites of former industrial activity in the coal and steel producing areas are discussed further in Section 17.5.

### *Eire*

The coal and steel industries do not play a major role in the Irish economy. There is one steelworks situated at Cork, and the coal industry is based on small lignite deposits.

No problem of dereliction arising from these industries is recognised.

### *United Kingdom*

Coal deposits are distributed throughout England, Scotland and Wales and there is an opencast lignite mine in Northern Ireland. The main English basins are situated in the East and West Midlands, Yorkshire, Lancashire and the North-East. In Scotland the coal deposits lie in the central belt, within Strathclyde, Central, Lothian and Fife regions. In Wales the deposits are divided into a northern and southern basin.

The coal industry has witnessed fluctuations in the market as has the rest of Europe. Many of the former mines throughout the United Kingdom have now closed, and coal is mined in a limited number of large deep mines, and various opencast areas. In the 1990s a programme of further mine closure and the planned privatisation of the industry is likely to further change this picture.

The steel industry has also undergone many changes over the years. In 1967 most of the steel industry, consisting of 38 steel works, was nationalised to form British Steel. British Steel has since been privatised and in 1993 only four integrated steelworks and a number of smaller units remained.

The Department of the Environment (DoE), the Scottish Office and the Welsh Office periodically carry out surveys of derelict land which record the area and type of dereliction. The government encourages reuse of derelict land and has provided financial aid through the derelict land grant (DLG) to regenerate derelict industrial sites.

### *Germany*

The coal and steel industries in the Western Länder of Germany are situated in 3 main areas: The Ruhr, Aachen and Saar. There are also steel plants in Osnabrück, Braunschweig and Saltzgitter.

The Ruhr is one of the most industrialised regions of Europe, with coal and steel forming the base of its economy. The decline of these industries in recent decades has resulted in large areas of derelict land, much of which is undergoing reclamation. The development agency, the Landesentwicklungsgesellschaft, of North-Rhine Westphalia has been active in promoting reclamation. The steel industry in The Ruhr is structured from private companies, dominated by Krupp, Hoesch, Thyssen and Klöckner, and these contribute to the fact that, in 1993, Germany was the largest steel producing nation in the EC. The coal companies regrouped in 1968 to form 'Ruhrkohle Ag'.

In the Aachen area the last coal mine will close in 1997. Only one steel site is still working.

The coal industry in Saar was restructured in the 1950s when it faced a decline in the market for coal. The steel industry saw a similar decline around 1974. Both market declines resulted in the closure of facilities and creation of derelict land.

In the Eastern Länder of Germany opencast mining for lignite has been carried out on a large scale for several decades and lignite supplies 69% of the energy in the region. The major deposits are in Saxony (see Section 17.7).

Approximately 1,200ha of land are occupied by the steel industry, and it is expected that 50% of this land will soon become derelict.

### **1.3.3 Future trends**

In many parts of Europe, where industrial development has created wealth as well as dereliction, considerable advancement in the methods used to reclaim and reuse land have been made. The lessons learned in these countries and the methods which have been developed need to be publicised so that other countries may benefit from this experience.

In some regions industrial closure is imminent, and local solutions to the dereliction and economic decline which may be produced by such closure are often unclear. National and European funding for reclamation and redevelopment are only part of the solution. An appreciation of the constraints to and opportunities for reclamation, and a firm understanding of the mechanisms involved are essential if former industrial land is to be brought back into beneficial use.

#### **1.4 The stimulus for reclamation**

This brief introduction to the coal and steel industries has indicated the scale of the problems in Europe caused by the decline of these industrial sectors. Large communities have lost their economic base and large areas of land have been left, at best degraded and unused, and in many situations sources of danger. Whilst the steelworks, mines and other enterprises were active the environmental degradation they caused was sometimes obscured by the industrial activity, and in many situations condoned or accepted as the price of economic survival. The industries and their inherent problems developed over a long period; closure and run-down on the other hand, has been rapid. The rapidity of this change in circumstances has magnified the degradation and pollution which has resulted.

Within the European Community there are centres of experience where the ability and desire to rehabilitate dereliction came early, triggered sometimes by disaster, as at Aberfan in the UK, in 1966 (see Section 6.1), or else by severe industrial contraction, as in the Ruhr in Germany. Years of experience in landscape rehabilitation and industrial regeneration have resulted in the development of skills and techniques which are able to convert weaknesses and threats into strengths and opportunities. The dirt and grime of the original industrial landscape have given way to a cleaner and advanced technological environment. New landscapes have created new lives for communities and individuals. The benefits of long running reclamation programmes can be measured on a macro, regional

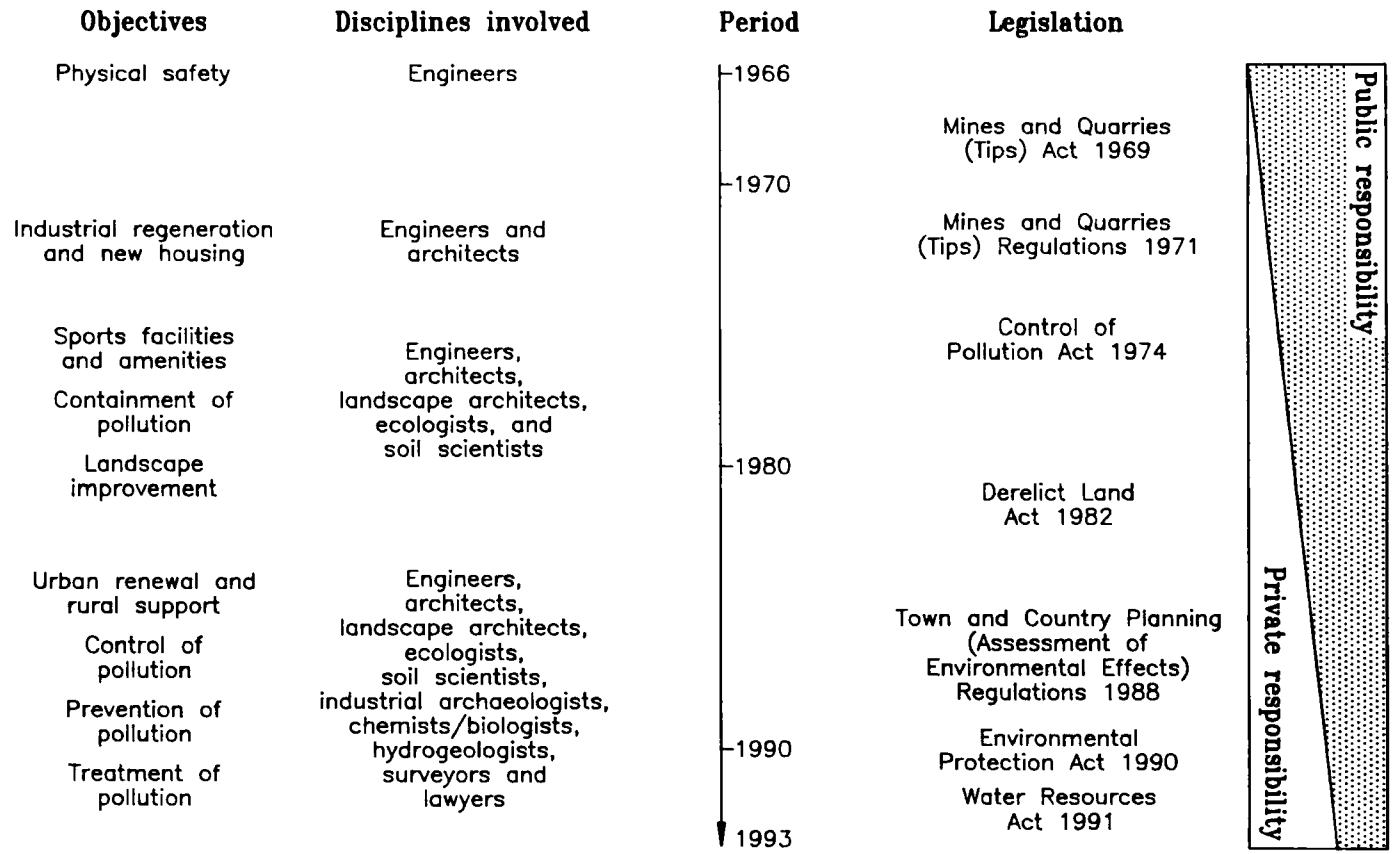
scale and at the level of the individual. There is clear evidence in regions of the United Kingdom and Germany of the social and economic benefits which flow from this work.

Less fortunate regions, burdened with yet more declining enterprises based on coal and steel, and with a legacy of dereliction, should be encouraged by the progress made by pioneer regions in the field of derelict land reclamation.

The reclamation of derelict land in the coal and steel industries embraces many different aspects and has become increasingly complex as environmental awareness and regulation have developed through the last few decades. Figure 1.4 provides an indication of how, in the United Kingdom, the engineer has been joined in the design team by a great many others, and illustrates that the early emphasis on public responsibility and the safety of the community has developed into a holistic approach to the environment. Most significantly there has also been a change in emphasis with regard to responsibility. Total responsibility for derelict land lay in the public sector in the 1960s and 1970s, but with the implementation of acts and regulations dealing with pollution, the private sector, commercial enterprises and individuals are having to accept ever greater levels of responsibility for the consequences of their activities.

## **1.5 Reclamation strategy**

Sites occupied by the coal and steel industry frequently cover large areas of land and the concentration of a large number of sites in a town or region means that, following the decline in these industries and the closure of mines and steelworks, large tracts of land become unused and derelict. The scale of the derelict land problem in industrial regions of Europe calls for a strategic approach, where the reclamation of derelict sites in a particular geographical area is carried out in an integrated manner. Post-reclamation land-uses of different sites can then



**Figure 1.4:** The evolution of the approach to derelict and contaminated land in England and Wales

complement each other and the infrastructure required for these developments be provided.

A reclamation strategy should make explicit the objectives of reclamation at any particular site. The overall aim is often to rejuvenate economically depressed areas, but this may be achieved through the objectives of, for example, improvement in appearance, provision of land for industry or housing, or removal of hazards and amelioration of pollution. The latter are, increasingly, dictated by statutory requirements and regulatory authorities. For example, a land owner may be required to take action to stop the pollution of ground or surface waters from a contaminated site, or to provide deterrents to the fly-tipping of refuse or other public nuisance on derelict land.

Development of a reclamation strategy for an area allows a rolling programme for reclamation and redevelopment to be implemented in a rational way, with resources appropriately directed to solve the most pressing environmental problems or development requirements first.

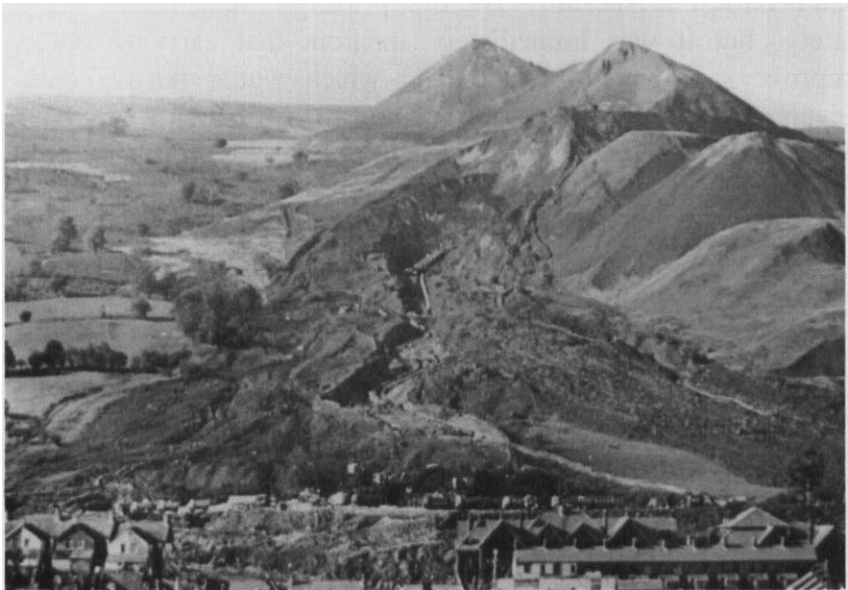
## **1.6 The experience of reclamation in Wales**

Wales provides an example where reclamation of derelict industrial land has played a key role in the economic rejuvenation and environmental rebirth of a region severely affected by early industrialisation and a protracted economic decline.

Wales is an extremely diverse and complex region, and this complexity derives from its geography and geology, soils and topography, climate, history and its people. Some of the finest landscapes in Europe can be found in Wales alongside what were, in the early part of this century, some of the densest and most deprived urban areas in Europe. The industrial areas of Wales developed from about 1750 on the twin economic pillars of iron and coal, supplemented by all the other elements which are needed to create an industrial society of immense wealth and

energy. Little attention was paid by anyone at any level of government or in any other facet of society to the environment in which most people lived and worked in the industrial areas.

Complacency was rudely shattered on 21 October 1966 when a slide of colliery spoil engulfed a school and adjoining houses at Pantglas, Aberfan, a village in South Wales formed around an active colliery (see Section 6.1 and Photograph 1.1). The number of deaths totalled 144, including school children. The disaster affected everyone in Wales, and many other people too. The realisation that an industry which was the economic base of the region could cause such devastation was an emotional shock. At the highest levels of government it was resolved that such an event should not occur again under any circumstances and this was reflected in opinions throughout the country.



**Photograph 1.1:** The Aberfan disaster: colliery spoil from tips on the hillside has swept away houses and the local school. In this photograph the operation to clear away the spoil has begun (source: Report of the tribunal appointed to inquire into the disaster at Aberfan on October 21 1966<sup>5</sup>)

Many of the elements of the United Kingdom's central government are administered in Wales through the Welsh Office which is a separate government department answerable to a Secretary of State. Many aspects of government policy and control change in degree or emphasis when they are applied in Wales, and this includes the clearance, treatment and redevelopment of derelict land.

After the Aberfan disaster the government embarked on what has been the biggest derelict land clearance in Europe, with over £250 million having been spent by 1993 and a supplementary £1,000 million spent on development.

Many colliery spoil heaps in South Wales, set on steep hillsides above towns and villages, were potentially unstable, threatening landslides as had occurred at Aberfan. The first priority in reclamation was therefore safety, but it was immediately apparent that carrying out works to improve safety could create land which would be available for the development of new industries and housing in an area where land suitable for modern development was virtually non-existent.

The earliest reclamation schemes involved:

- controlling ground and surface water which were the main causes of instability in coal tips;
- reducing the angle of tip faces to increase stability and enable machines to move across the new landform;
- developing vegetative cover, usually grass, though with some tree planting, on the new landform;
- a very nominal and generally inadequate management and maintenance programme for vegetation.

From the outset the Welsh Office looked to district authorities, that is local government, as the promoters of schemes. The Welsh Office also established a principle which is still applied today. This principle was that the whole programme should be administered by a very small team

of specialists within the Welsh Office, who looked to other organisations such as local government and private consultants to design schemes, and to private contractors to carry out the work. The administration of the land reclamation programme has now been taken over by the Welsh Development Agency (WDA), established in 1976 to develop a new industrial base for the Welsh economy. The main tasks of the WDA have been to regenerate Welsh industry, clear industrial dereliction and improve the environment. The scale of the work carried out has been such that the WDA confidently predicts that all sites of major dereliction will have been removed by the year 2000. At central government, Agency and local government levels in Wales it is recognised that it is in the best business interests of Wales to improve the quality of the environment. This must be the most important lesson to have been learned. Reclamation and regeneration has created new jobs in new technologies, tourism, health care, housing and leisure, and has increasingly involved a partnership between the public and private sectors.

Although the most severe and technically difficult problems lay in the narrow industrial valleys of the South, the initiative was applied throughout Wales. Over the years one of the key roles played by the Welsh Development Agency has been as a 'clearing house' for good ideas and problem solving. Economy in design, materials and construction are common features of reclamation schemes in Wales and much of this is due to the co-ordinating and overseeing role of the Agency's land reclamation team.

Wales is a small country, and this smallness has helped the Agency to provide local control. Agency staff are convinced that because the majority of the reclamation projects were within 1 to 2 hours drive from their office this gave them an effective control over, and familiarity with, the varied problems presented by the many projects being undertaken.

Reclamation schemes have also become more sophisticated. Design teams invariably contain engineers, landscape architects and

environmental scientists, ecologists and botanists for example, but one frequently finds geologists, hydrogeologists, mining engineers, and industrial archaeologists involved. One of the lessons learned is that many interesting industrial artifacts were lost in the early years of the reclamation programme. Later schemes have taken into account the industrial history of the sites. Some notable sites have been retained and refurbished as museums and interpretative centres.

The sites reclaimed under Welsh Office and Welsh Development Agency programmes by 1991 have been used as follows:<sup>253</sup>

- 130 sites have been used for industrial development;
- 70 sites have been used for housing;
- 50 new or improved roads have been built;
- 50 sites have been used for playing fields;
- 12 country parks have been created.

From the earliest days of the reclamation programme the emotional stimulus of the Aberfan disaster has been a driving force. The main thrust of the reclamation programme has been to improve the environment of Wales for the sake of improvement, knowing instinctively at first but with ample proof now, after twenty-seven years of experience, that new landscapes mean new lives for the people.