How to financially support the transition of coal regions in Europe with a view to the SDGs
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1. Introduction

The adoption of the 2030 Agenda for Sustainable Development marks a historic turning point in global policy development. Setting a universal agenda for the people, planet, prosperity, peace and partnerships (the 5Ps), it is expected to shape how we approach problems and challenges in the future. This is the first time that social, environmental, economic and governance issues have been included in a global and universal agenda, which sets out targets for developed and developing countries alike. Through breaking with silo thinking, the biggest strength of the new sustainable development framework is its potential to introduce holistic approach to answer local, regional and national challenges.

This new approach is also a great asset for finding solutions for the just transition of coal regions in Europe. As this report points out, tackling this issue goes well beyond the environmental concerns of coal use (both mining and combustion), having serious health implications not only in the regions or countries concerned, but also in neighbouring countries, social and cultural considerations, and of course economic aspects. Failing to address these multiple considerations, both potentials and negative consequences would not only threaten the successful realisation of the just transition, but would also mean a failure of the 2030 Agenda in the regional and European context. The present study will unveil these various considerations, draw some conclusions from positive and negative case studies and formulate some recommendations for the future in light of the current EU policy developments.

2. Fossil fuels in a warming climate

Throughout recent history, the coal industry has characterized much of Europe’s industrial and societal developments. This is further emphasized by the fact that the foundations of the European Union (EU) were established as a result of the political will to integrate the coal and steel resources of the six founding Member States. Today coal is still relevant and approximately a quarter of the EU’s gross electricity is generated by this conventional source of energy. For some Member States especially, e.g. Poland, the fuel plays a critical role in supplying electricity and heat for the majority of the population. Consequently, coal creates a secure and affordable energy supply, whilst bringing economic competitiveness and stability to the energy system (both economically and technically). Moreover, the usage expands for a variety of other industrial purposes, such as for cement manufacturing and is used in steel refineries, paper manufacturers, etc.¹.

Nonetheless, over the past 50 years it has become apparent that coal-fired power plants are responsible for generating the dirtiest form of energy and globally serve as the largest source of greenhouse gas emissions (GHG). This in turn means that the current coal reserves also have the highest GHG emission potential in comparison to any other

fossil fuel. In 2014, approximately 40% of the world's energy was produced by coal whilst it accounted for 70% of energy-sector emissions\(^2\). The burning of coal is responsible for the release of anthropogenic emissions such as carbon dioxide (CO2), sulphur dioxide, nitrogen oxides, mercury and numerous particulate matters\(^3\). The climatologist, James Hansen, has claimed that “coal is the single greatest threat to civilization and all life on our planets”. Although in Europe there is a general long-term trend of declining production and consumption of coal, it is still today the most frequently used fuel in large combustion plants and liable for the largest release of key pollutants in the continent\(^4\).

In 2015, 18% of the EU’s greenhouse gas emissions came from the chimneys of just 284 coal power plants.

![Figure 1. The role of coal in EU GHG emission. source: https://beyond-coal.eu/data/](https://beyond-coal.eu/data/)

Such intense emission releases accelerate climate change, a global phenomenon, which is responsible for an increased frequency and intensity of extreme weather events, change of precipitation patterns, increase of land and sea temperatures, causing melting polar caps and rising sea-levels, and ultimately a major cause if biodiversity loss. Specifically, carbon dioxide (CO2) serves as the most anthropogenic GHG released and remains in the atmosphere for hundreds of years. In 2016, the World Meteorological Organization (WMO) announced that there was a record surge of carbon dioxide (CO2) in the atmosphere and that this increase was 50% higher than the average in the past 10 years\(^5\). Correspondingly, 2016 was also announced to be the warmest year recorded, making it the third consecutive year in which temperatures records have been broken. Such atmospheric changes do not come without consequences and the impacts are already visible today, all which are expected to intensify in the coming decades having unprecedented impacts and causing critical ecological, societal and economic


\(^3\) https://www.eia.gov/energyexplained/index.cfm?page=coal_environment

\(^4\) EEA report “Releases of pollutants to the environment from Europe’s industrial sector” can be downloaded here: https://www.eea.europa.eu/themes/industry/releases-of-pollutants-from-industrial-sector

disruptions. In terms of economic value, it has been estimated that between 1980 and 2011 the damages inflicted by climate change on property, infrastructure and human health has resulted in direct losses of more than 90 billion EUR.

To avoid the most extreme effects of climate change, there is an urgency to reduce the global amount of GHG emissions released in the atmosphere. If this is ignored, society will be driven to live in dangerous temperatures and the impacts will have catastrophic costs in terms of human health, ecosystem and economic disruption. In recognition of this and as a response, numerous climate and energy policies have been devised on both the global and EU level. In 2015, the Paris Agreement signified the first ever universal, legally binding climate deal that was adopted by 195 countries. World leaders have pledged to limiting global temperatures increase to below 2 degrees above pre-industrial levels, with the aim to limit the increase to 1.5 degrees. Ultimately, this signifies the end of the usage of fossil fuels for electricity generation as a rapid decarbonisation of the power sector is necessary and thus there is also a need to phase-out the use of coal globally. In 2016, the EU officially ratified the agreement and accordingly has also committed to align its financial spendings to emissions reduction and climate resilient strategies. A study conducted by the Climate Analytics has found

6 https://ec.europa.eu/clima/change/consequences_en
that if the EU wants to meet its commitments made to the Paris Agreement, it has to abandon the usage of coal power by 2030.\(^7\)

Prior to the Paris Agreement, the EU had already adopted climate policies to combat global warming. In 2005, the EU Emissions Trading Scheme (EU ETS) was established, which has put a price on CO₂ emission in Europe through a system of ‘cap and trade’. However, the EU ETS has been heavily criticised for low efficiency in delivering decarbonisation mainly due to the low price put on carbon, carbon leakage, as well as being open to fraud and speculation. Under the current system energy-intensive industries benefit from free CO₂ emission allowances and some MSs have in the past used loopholes to prolong life of coal plants through ETS framework. What is more, the EU ETS only covers about 45% of emissions in the EU and it leaves the European economy without a hard cap on emissions. Also exemptions from EU competition law enable MSs to provide state aid for fossil fuel production/consumption, particularly through ‘capacity mechanisms.

Moreover, in 2010 the ‘Europe 2020 strategy’ was adopted with the aim to foster “smart, sustainable and inclusive growth” in Europe after the 2008 financial crisis. The strategy entails the climate and energy targets of reducing GHG by 20%, increasing the share of renewables in the energy mix by 20% and improving energy efficiency by 20%, by 2020. By reaching these targets the EU aims to combat climate change and air pollution, decrease energy dependence on foreign fossil fuels, whilst keeping energy affordable for consumers and businesses.\(^8\) To further develop these targets, the EU has set the long-term goal in the ‘Energy Roadmap 2050’ to reduce GHG 80% to 90% by 2050. Furthermore, in 2015 ‘Energy Union’ strategy was launched which has the aspiration to make energy more secure, affordable and sustainable. Specifically, it surrounds five interlinked policy areas; energy security, an integrated internal energy market, energy efficiency, economic decarbonisation and promoting research and innovation.

The EU is generally on track to meet its 2020 energy and climate targets. It has already achieved considerable reductions in energy consumption: in 2014 its primary energy consumption was only 1.6% above its 2020 primary energy consumption target.\(^9\) Also in 2015, greenhouse gas emissions in the European Union were 22% below the 1990 level, and despite a temporary limited increase in 2015, emissions remain on a decreasing trend.

From the point of view of shifting from the coal to renewable resources, the target of 20% share of RES is particularly important. Realising 20% renewable energy share by 2020 will be delivered with the help of the EU Renewable Energy Directive, which specifies national renewable energy targets for each country, taking into account its starting point and overall potential for renewables. These targets range from a low of 10% in Malta to a high of 49% in Sweden. In 2014, the share of renewable energy sources (RES share) in the EU-28 reached 16% of gross final energy consumption (figure 2).

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\(^7\) A stress test for coal in Europe under the Paris Agreement
\(^8\) https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2020-energy-strategy
\(^9\) COM(2017) 56, Assessment of the progress made by Member States in 2014 towards the national energy efficiency targets for 2020 and towards the implementation of the Energy Efficiency Directive 2012/27/EU
However, the performance of the different MSs shows great differences (figure 3.). 25 MSs already exceeded their 2015/2016 indicative RED trajectories in 2015, while four countries are currently projected not to meet their national RES binding targets by 2020 (Ireland, Luxembourg, the Netherlands and the United Kingdom). These countries will have the possibility to use cooperation mechanisms as stipulated in the RED, amongst EU countries and with countries outside the EU through statistical transfers of renewable energy, joint renewable energy projects or joint renewable energy support schemes.
Despite this progress, several practices still hinder the energy transition. The EU’s budget and European banks, including the European Investment Bank continue to provide financing for the production and consumption of fossil fuels in Europe. For example, between 2014 and 2016 on average 515 million EUR per year was provided for gas production and the building of new infrastructure. Moreover, through the Horizon 2020 Research and Innovation Programme, finance is also provided to false solutions such as Carbon Capture Storage (CCS), which could stimulate the existence of coal-fired power plants.

At present-day, the EU is negotiating its energy strategy for 2030, with the final outcome expected to be ready by 2018/2019. However, with the ‘Clean Energy for all Europeans’ package presented in November 2016, the European Commission published numerous legislative proposals and measures to further advance climate and energy policies after 2020. The three main goals of the strategy are putting energy efficiency first, achieving global leadership in renewable energy and providing fair deal for consumers. The legislative proposals are in correspondence with the 2030 binding targets agreed upon in 2014; at least 40% reduction in GHG compared to 1990, increasing the share of renewables in the energy mix by at least 27% and improving energy efficiency by 27%. It is important to note however, that the 2030 targets had been in fact set before the Paris Agreement was adopted and thus it may be questioned as to whether the decarbonisation goal is aligned with the objectives of the latter.

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10 Report ‘Phase-out 2020: monitoring Europe’s fossil fuel subsidies’
3. Coal regions in Europe in the environmental, social and economic context

While there seems to be a joint European commitment to fighting climate change and realise the energy transition through increasing energy efficiency and switching to renewables, coal continues to play an important role in several parts of Europe. Today black coal and lignite coal are actively mined in eleven countries and 42 regions across the EU, making it the most abundant fossil fuel in the EU (figure 4). This includes six MSs, which have black coal mines: the Czech Republic, Germany, Poland, Romania, Spain and the UK, but Germany and Poland alone account for nearly of half EU’s installed capacity and 54% of related emissions. In addition ten MS’s exploit lignite as a competitive fuel for power generation: Bulgaria, the Czech Republic, Germany, Greece, Hungary, Poland, Romania, Slovakia, Slovenia and Spain. According to a recent study by Climate Analytics, emissions from coal in the EU electricity sector need to be close to zero by 2030 (95% by 2030; 100% by 2031), with a quarter of operating coal-fired power plants switched off before 2020 and a further 47% going offline by 2025 in order to be able to meet the Paris Agreement.

Figure 4. Coal mines and jobs in Europe, Source: https://ec.europa.eu/energy/en/topics/oil-gas-and-coal/coal-and-other-solid-fuels

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11 A stress test for coal in Europe under the Paris Agreement
Indeed there are regions, which intend to fully phase out coal (e.g. in Germany by 2018), primarily for climate reasons. These regions focus on the restructuring process considering the social and economic consequences and potentials for the transition. On the other hand there are also regions, which intend to continue mining for several decades (e.g. in Poland), primarily for energy security and employment reasons. They focus on ecological ways of coal mining and use.

GHG emissions are not the only environmental reasons to give up coal mining and shut down coal plants though. Coal mining leads to local environmental destruction at mining sites, depletion and contamination of water supplies through the acidic water outflow from mines (containing acids and several heavy metals, like arsenic, copper or lead), air pollution through emitting methane, sulphur dioxide, and nitrogen oxides, carbon monoxide, as well as coal dust. Underground coal fires in abandoned coal mines and coal waste piles can burn for decades or event centuries, adding to the air and water pollution problem. Mining waste is one of the largest waste streams in the EU, containing materials that must be removed to gain access to the mineral resource, such as topsoil, overburden and waste rock, as well as often toxic tailings remaining after minerals have been largely extracted from the ore.

Emissions from combustion in coal fired power plants also include particulate matter are major causes of acid rain and ground level ozone smog. Sulphur dioxide and nitrogen oxides can be carried kilometres in the atmosphere before they are converted into acids and falling to the ground having harmful effects on plants, aquatic animals, as well as man-made infrastructure. Also, one major anthropogenic source of mercury is coal combustion.

Many of these environmental hazards have a direct impact on human health. The coal particle pollution is harmful for the people and their health, causing a number of chronic conditions such as strokes, heart attacks and chronic lung disease, which causes additional health costs and shortens people’s lives (figure 5).
Because coal related air pollution travels hundreds of kilometres in the atmosphere, there is no ‘safe spot’ whilst coal plants are running. Coal plants in Germany and Poland alone cause over 7,000 premature deaths abroad (4,700 from Poland and 2,500 from Germany) (see figure 6.). The biggest health impacts from coal abroad are seen in France with 1,200 premature deaths caused by coal pollution from Germany, the UK, Poland, Spain and the Czech Republic alone.\(^\text{12}\)

\(^{12}\) Europe’s dark cloud - How coal-burning countries are making their neighbours sick
A calculation of health related impacts of coal mining and coal combustion in the EU by Europe Beyond Coal shows that 19,500 premature deaths, 12,600 hospital admissions and 458,000 asthma attacks in children can be attributed to coal (based on 2015 data) (figure 7.).
In addition to the negative environmental impacts of coal, there are important economic and social aspects that need to be taken into account of the energy transition as well. Coal regions are usually industrial areas and are historically related to traditional sectors of the economy (energy sector, chemical and metallurgical industry), where economic modernisation has not yet taken place. These regions usually lack innovative climate and tend to be less attractive for new investments. This leaves these regions vulnerable in responding to the environmental and social challenges. For some MSs, local coal and lignite still plays an important role for electricity and heat supply (e.g. Poland, Greece), where they contribute to secure energy supply, and play a stabilizing role in the energy system (both technically and economically). In addition to its role in the energy sector, coal also has many other uses such as for cement manufacturing. It is also an essential ingredient in specialist products such as activated carbon and carbon fibre which is used in aerospace, civil engineering, military sector, etc. Even though Poland’s coal mining sector is uncompetitive with extraction costs above international prices and only survives with state aid, the government continues to support this sector for political reasons.

Investors are also changing their approach to fossil investments. In line with current and future climate policies, it is very likely that demand for coal will drastically drop, which makes investments in the coal markets financially far too risky. Consequently, investors are withdrawing capital from fossil fuels. Such a global divestment movement already resulted in 5.5 tn USD worth of divestment, to which most recently more than 40 Catholic institutions joined on the anniversary of the death of St Francis of Assisi. Similarly, national energy companies from every EU nation – except Poland and Greece

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13 Report Indigenous coal in the EU energy transition by European Economic/Social Committee  
Besides economic implications of the transition of coal regions, **social** implications also need to be considered. In the EU coal mining regions, the coal mining provides direct jobs for about 240 000 workers. Jobs are also provided in mining equipment industry, supply chain and indirect jobs. The close down of coal mines (and coal plants) gives rise to unemployment rate and an increasingly unbalanced supply/demand on the labour market, while the educational profile of former miners (manual skills predominating), is not fully compatible with labour market’s needs in terms of qualifications and personal aspects (motivation). At the same time the employment in coal mining on national and regional level does not represent a large share in the total employment. Even in Poland, which has the highest employment rate in the sector among EU countries, the 115 500 coal mining jobs represents 0.71% of the total employment.

Coal producing regions often developed a cultural identity linked to coal mining, which includes individual and cultural identity, as well as identity politics. Thus the energy transition in these regions may foster questions of identity and self-esteem that are connected to the workers’ former professional activities, the community and social networks that depend directly or indirectly on mining.

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4. Case studies of transitions of European coal regions

4.1 Southern Poland

The coal sector was one of the main pillars of the Polish economy especially in the country’s southern region before the 1990s. After the collapse of the communist regime the free-market model has been introduced which meant that the coal sector’s restructuring was inevitable. The main goals of this transition were to achieve profitability and ensure competitiveness on the global market.

However, the process failed due to the following reasons:
- The implementation of market rules and long term strategies failed due to rapid changes in government and policies
- The trade unions’ only policy was to keep the status quo instead of considering real alternatives
- Lack of sufficient initiatives for retraining the labour force
- Lack of initiatives to revitalising the areas highly affected by the coal sector restructuring

Historical background

Coal mining has a long history in Poland and it was one of the main engine of technological progress for several decades. It also had a huge effect on economic, social and demographic changes including urbanization, development of the education system, the formation of workers’ movements and the development of modern social security system.

At the beginning of the 20th century hard coal became the main mining sector in Poland and in the early 1930s coal production was accounted for 4% of Polish GDP. During the communist regime, the new model of a centrally-planned economy was introduced in every sector. In the Eastern Bloc Poland was assigned by the USSR to play the role of the coal supplier in the region. Mining became a model sector of the socialist economy which resulted in various benefits for miners and their families, giving them prestige and political importance.


After the end of communist period the previously existing structures collapsed and the restructuring of the coal industry began:
- Nearly half of the mines were closed during the first decade of restructuring. Out of the 70 mines which existed in 1991, 30 were closed and only one opened. However, in many cases the closure meant an acquisition or merger with other mines in reality. The real benefit was the resulting cost reduction and increased productivity.
- Employment fell from almost 388,000 to 155,000 workers within a decade
- Sales of hard coal declined from 147 to 106 million tons
- In spite of the restructuring the profitability of the hard coal sector remained negative and sector debt quadrupled at the end of the decade
The share of the mining sector in the economy during the same period fell from 4.1% to 2.6%.
Compared to the primary energy supply, coal played an even more important role in electricity production. Between 1990 and 2000 it delivered 95-96% of the electric power.
The major decline in production and employment in the coal mining sector, as well as the closing of a large share of the mines, did not reduce the essential role of coal in the energy mix for both primary energy supply and electricity production.

<table>
<thead>
<tr>
<th>Title of the document</th>
<th>Nature of the document</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>Program for restructuring the hard coal sector</td>
</tr>
<tr>
<td>1993-1994</td>
<td>Program for staving off bankruptcy in the hard coal sector</td>
</tr>
<tr>
<td>1994-1995</td>
<td>Restructuring the hard coal sector. Program for the accomplishment of phase II in 1994-1995</td>
</tr>
<tr>
<td>1996-1998</td>
<td>The hard coal mining sector – public and sector policy for 1996-2000. Program for adapting hard coal mining to the market economy and international competition</td>
</tr>
<tr>
<td>1998-2002</td>
<td>Reform of the hard coal mining sector in Poland in 1998-2002</td>
</tr>
</tbody>
</table>
Table 1. Programs for restructuring the hard coal mining sector in Poland – a summary, Source: Makiela (2002), Paszcza (2010), Przybyłka (2013)

**Policies and instruments for the restructuring process**

The economic transition of Poland in the 1990s was managed by several governments and during the decade many instruments were introduced. The national and international programs focused on improving the competitiveness of small and medium-sized companies, even though there were many problems and dysfunctionalities with the execution.

The limited capacities of the managing administration for the dispersion of financial support (especially of the EU funds) and the improper targeting of beneficiaries led to the preservation of the status quo rather than realising the intended structural change.

<table>
<thead>
<tr>
<th>Support Compensation or grandfathering (backward-looking)</th>
<th>Structural adjustment assistance (forward-looking, narrow)</th>
<th>Adaptive support (forward-looking, broad)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No support -</td>
<td>-</td>
<td>Consumers/ households</td>
</tr>
<tr>
<td>Allowance for school accessories for miners’ children. One-time travel subsidy for miners and their families</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Workers</td>
<td>Leave for miners for early retirement. Welfare allowances for miners who take voluntary redundancy. Golden handshakes. Right to one free retraining course.</td>
<td>-</td>
</tr>
<tr>
<td>Communities</td>
<td>“Mining communes” could, in return for presenting a program of local economic activation: retraining in new a) retain an additional share of personal income tax, b) obtain preferential credits for investment in labour market restructuring, c) obtain exemption from selected</td>
<td>Provision of equipment at public administration units responsible for educational aids and tools. Creation of special economic activity zones (creation or modernisation of necessary infrastructure)</td>
</tr>
</tbody>
</table>
obligatory payments to
the state budget

<table>
<thead>
<tr>
<th>Corporations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt relief or the postponement of debt repayments for companies in the mining sector.</td>
</tr>
<tr>
<td>Refunding of pension premiums for companies employing former miners.</td>
</tr>
<tr>
<td>Preferential credits and loans for companies employing former miners.</td>
</tr>
<tr>
<td>Since 1998, mining companies have been able to establish stock-offering companies or limited liability companies with other companies or mining communes, to encourage local labour activation. They could also renounce rights to any part of property in favour of mining communities</td>
</tr>
</tbody>
</table>

Table 2. Transition strategies — Typology (Poland), Source: Fergus Green

4.2 The United Kingdom

The UK has virtually completed its move away from the production and use of coal – an astonishing transformation for an economy that once relied overwhelmingly on coal power. However, this transformation was initially fuelled by economic reasons instead of worries around climate change or any other environmental reasons. Until the middle of 2010s, for example, there was no government commitment to phase out coal in UK electricity generation. But it was already happening, and some of the most rapid change was in 2016, triggered in particular by the impact of a ‘carbon tax’ which has tipped the economics away from coal to gas fired generation. A handful of coal-fired power stations will remain on the grid for a few years to help meet peak demand, but to all intents the UK is already entering the post-coal era.

This achievement was not without undue pain to coalmining areas. Job losses were for many years managed by a combination of redundancies and transfers to surviving mines. Redundancy payments, welfare benefits and early access to pensions provided support to former miners, and careers advice and training were on offer. Most former miners reached retirement age. The biggest challenge for mining communities was the replacement of the lost jobs. The UK has a long history of efforts to regenerate areas affected by coal mine closures and there is clear evidence that this has delivered positive results in the form of new jobs. Nevertheless, there continues to be an imbalance in the labour market in the former coalfields, manifested in on-going high levels of unemployment. And where new jobs were created they were often been low-paid contrary to the mining industry.
Historical background – From prosperity to long decline

The UK coal production peaked in 1913, when 1.1 million miners produced 292 million tonnes from 3,024 mines. By the middle of the 20th century the UK was still a major coal producer but had lost most of its once substantial export markets. In 1960 the UK produced nearly 200m tonnes a year. By the beginning of the 1980s coal output was still 130m tonnes a year and the mining workforce was still well over 200,000. Thereafter, output and employment declined almost ceaselessly.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total output m.t.</th>
<th>Deep mine m.t.</th>
<th>Opencast m.t.</th>
<th>Imports m.t.</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>198</td>
<td>189</td>
<td>9</td>
<td>0</td>
<td>607,000</td>
</tr>
<tr>
<td>1965</td>
<td>192</td>
<td>183</td>
<td>9</td>
<td>0</td>
<td>455,000</td>
</tr>
<tr>
<td>1970</td>
<td>147</td>
<td>137</td>
<td>11</td>
<td>0</td>
<td>290,000</td>
</tr>
<tr>
<td>1975</td>
<td>129</td>
<td>117</td>
<td>11</td>
<td>5</td>
<td>252,000</td>
</tr>
<tr>
<td>1980</td>
<td>130</td>
<td>112</td>
<td>18</td>
<td>7</td>
<td>237,000</td>
</tr>
<tr>
<td>1986*</td>
<td>108</td>
<td>90</td>
<td>18</td>
<td>11</td>
<td>91,000</td>
</tr>
<tr>
<td>1990</td>
<td>93</td>
<td>73</td>
<td>20</td>
<td>15</td>
<td>49,000</td>
</tr>
<tr>
<td>1995</td>
<td>53</td>
<td>35</td>
<td>18</td>
<td>16</td>
<td>12,000</td>
</tr>
<tr>
<td>2000</td>
<td>31</td>
<td>17</td>
<td>14</td>
<td>23</td>
<td>11,000</td>
</tr>
<tr>
<td>2005</td>
<td>20</td>
<td>10</td>
<td>11</td>
<td>44</td>
<td>6,000</td>
</tr>
<tr>
<td>2010</td>
<td>18</td>
<td>7</td>
<td>11</td>
<td>27</td>
<td>6,000</td>
</tr>
<tr>
<td>2015</td>
<td>9</td>
<td>3</td>
<td>6</td>
<td>24</td>
<td>2,000</td>
</tr>
<tr>
<td>2016</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>6</td>
<td>1,000</td>
</tr>
</tbody>
</table>

Table 3. UK annual coal production, imports and employment, 1960-2016, *1985 data affected by strike. Sources: BEIS and author’s estimates for 2016 based on BEIS

In the UK there is a commonly held view that the run-down and closure of the UK coal industry was a political decision, prompted by the antipathy of Conservative governments towards the powerful miners’ trade union. In fact there was never an explicit UK government decision to close down the coal industry, in contrast to the situation in some other European counties. Nevertheless, it is probably fair to say that successive governments were willing to accept this outcome.

From 1995 onwards the UK coal industry was fully in private ownership so it was for private owners to decide whether or not to continue production. Their decisions were driven by the size of the market for coal, the costs of production and the competition from imports – the determinants of profitability. From the 1990s onwards, cheaper imports in particular, mainly from Russia but also the United States and Australia, helped drive down UK coal production. In recent decades too, little if any UK coal was exported – a reflection of the relatively high cost of coal from UK deep mines compared to lower-cost mainly opencast coal on the world market.
What is clear from historical trends is that until its final phase after 2010, when green initiatives began to have a significant influence on power generation, the decline in UK coal production had little to do with policies to decarbonise the UK economy.

**Sectorial coal consumption**

The decline of coal consumption in the UK over recent decades is intimately bound up with trends in electricity generation. By the beginning of the 1980s, power stations had become by far the dominant market for UK coal. Other historical uses – in rail transport and domestic heating for example – had fallen to negligible levels. Beyond the power stations, only the steel industry remained a significant coal consumer, though one that was also declining as UK steel production was decreasing.

![Figure 9. Uk coal consumption by sector Source: carbonbrief.org](https://example.com/figure9.png)

**The decline in coal-fired electricity generation**

The 1990s, in particular the first half of the decade, saw the first big reduction in coal use by power plants. This was the result of the ‘dash for gas’, as it became known, when large numbers of new gas-fired power stations displaced coal. One immediate consequence was a big reduction in UK carbon dioxide emissions (burning gas produces less CO2 than burning coal) and therefore these trends in the 1990s were sometimes portrayed as an early achievement of climate change policy. However, this interpretation is inaccurate. The 1990s dash for gas was actually triggered by the particular structure of privatisation of the UK electricity supply industry in the late 1980s. Newly-privatised electricity distributors, initially without any power stations of their own, rushed to build new gas stations, by themselves or in collaboration with partners, in order to free themselves from domination by the big newly-privatised power generators, often signing up to ‘take-or-pay’ contracts that locked out lower-cost coal-fired generators. If coal consumption and carbon emissions fell, as they did, it was primarily an accidental by-product of this corporate manoeuvring.

Thereafter, in the 2000s, power plant coal consumption broadly stabilised. For much of the decade, coal supplied around a third of all electricity generated. Renewables remained a small contributor and the output from nuclear declined as older stations
reached the end of their lives. During the 2000s most of the large coal-fired power stations were retro-fitted with equipment to reduce sulphur emissions and thereby meet EU environmental directives. The generally small, less intensively-used stations that failed to do so in effect became time-limited and gradually closed down. Yet by the end of the decade a dozen large coal-fired power stations still formed a key part of the UK electricity system and despite their considerable age there still remained no compelling engineering or economic reason for their run-down or closure. The really significant change occurred after 2010, and in particular in 2016. Power plant coal consumption plummeted – to 29m tonnes in 2015 and an estimated outturn of just 12m tonnes in 2016. On 12 May 2016, for twelve and half hours, coal made absolutely no contribution to Britain’s power supplies. This was the first time this happened since 1882, when the first public coal-fired generator opened in London. The increase in output from renewables – in the UK context wind, solar and biomass – explains part of the fall in power station coal consumption. UK investment in renewables has mostly yielded result since 2010, aided by subsidies through electricity prices. The closure of the coal-fired power stations that failed to meet EU environmental directives after 2010 also accounts for some of the fall – though coal consumption is more influenced by the generation capacity than by the number of power plants.

<table>
<thead>
<tr>
<th>Year</th>
<th>Coal</th>
<th>Oil</th>
<th>Gas</th>
<th>Nuclear</th>
<th>Renewables</th>
<th>Imports</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>31</td>
<td>2</td>
<td>39</td>
<td>21</td>
<td>3</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>2005</td>
<td>34</td>
<td>1</td>
<td>39</td>
<td>19</td>
<td>4</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>2010</td>
<td>28</td>
<td>1</td>
<td>47</td>
<td>15</td>
<td>7</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>2015</td>
<td>21</td>
<td>1</td>
<td>29</td>
<td>19</td>
<td>24</td>
<td>6</td>
<td>100</td>
</tr>
<tr>
<td>2016</td>
<td>8</td>
<td>1</td>
<td>43</td>
<td>18</td>
<td>24</td>
<td>6</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4. UK electricity supply, 2000-2016, percentages Sources: BEIS and author’s estimates for 2016 based on BEIS

However, the driving factor behind the big recent decline in power station coal use is the UK’s carbon tax (or ‘carbon price support’ as it is called formally), introduced in 2013 and subsequently escalated year-on-year. The carbon tax is levied on CO₂ emissions and provides a strong incentive to decarbonise electricity production, though in reality a significant motivation for its introduction was probably the substantial additional tax revenue at a time when the government was grappling with a large budget deficit. Nevertheless, by taxing carbon emissions, coal-fired generation became disadvantaged relative to gas-fired generation because coal has a higher carbon content and because modern gas-fired power stations have a higher ‘thermal efficiency’ (i.e. convert a higher proportion of chemical energy into electricity).

But while some UK coal-fired generation is set to survive for a few years it is nevertheless just a footnote to the big story. In the UK, coal production has all but ended, coal-fired power generation has fallen to record lows and is on the way out, and coal imports have shrunk to not much more than what is needed to keep the steel industry going.
Measures to ease the transition

Table 4. summarises the measures that were put in place to ease the transition away from coal production and consumption in the UK. What must be kept in mind here is that this collection of measures has never added up to a ‘strategy’, conceived and implemented as a coherent whole to help deliver a move away from coal. Indeed, with the exception of the initiatives targeted at electricity consumers, the measures were never designed as an adjunct to climate change policy. Rather, they have evolved through time in response to political pressure and expediency. Some of the measures, such as the availability of welfare benefits for redundant workers, are deeply embedded in the UK’s economic model. Because coal production and electricity generation have both been in private hands for more than two decades, and because the UK operates an essentially liberal market economy, the consequences for companies in the coal and electricity sectors have not been a significant political concern. Some coal producers, for example, have simply been allowed to go bankrupt. Rather, the expectation was that the companies affected will diversify away from coal. Some, in the electricity sector, were already highly diversified.

<table>
<thead>
<tr>
<th>Compensation or grandfathering (backward-looking)</th>
<th>Structural adjustment assistance (forward-looking, narrow)</th>
<th>Adaptive support (forward-looking, broad)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consumers/ households</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy intensive industries compensated for, then exempted from, selected green charges on electricity prices</td>
<td>Subsidy, now much reduced, for installation of solar panels on domestic and commercial properties</td>
<td>Advice on energy efficiency</td>
</tr>
<tr>
<td><strong>Workers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lump-sum redundancy payments for miners, varying in value through time but typically worth 6-12 months’ wages</td>
<td>Employment and training advice for ex-miners in the first 6-12 months following redundancy</td>
<td>On-going but declining government funding for the Coal Industry Social Welfare Organisation</td>
</tr>
<tr>
<td>State unemployment benefits and (in many other cases) incapacity benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other welfare benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Communities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenue Support Grant system compensates local authorities for loss of property tax revenue following closure of mines and power stations</td>
<td>Government-funded colliery site reclamation programme EU Structural Funds target mining areas</td>
<td>Government financial support for community projects from Coalfields Regeneration Trust Lottery funding for heritage and community projects</td>
</tr>
</tbody>
</table>
Assisted Area status for Funding for national mining coalmining areas under museums
UK regional policy
Infrastructure investment in former mining areas

<table>
<thead>
<tr>
<th>Corporations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal industry state-owned up to 1994 and financial losses absorbed by Exchequer</td>
</tr>
</tbody>
</table>

Table 5. Transition strategies — Typology (UK), Source: Table by Fergus Green
5. Conclusions and lessons learned from case studies

- Coherent and sustainable long-term policy is inevitable in order to successfully restructure a whole sector.

- Transition economies are not able restructure their energy supply on the short term, so the second best option for the emission reduction is the improvement of the sector’s efficiency.

- Involving a wide range of stakeholders is necessary in order to carry out a successful restructuring process. Local governments and communities are one of the key partners and their involvement is necessary to guarantee a complex revitalisation and to create tailor-made policies. Experiences show that the lack of dialogue with employees, trade unions, and other stakeholders resulted in social conflicts, unemployment and depopulation.

- It is necessary to find the proper management of employment reduction. Focusing only to quantitative goals do not help finding long term solutions for the complex problem. Different redundancy schemes support different groups of employees. The most attractive short term solutions like golden handshakes result in long-term unemployment and lack of activity as a workforce, which undermines the sustainability of the process in the longer term.

- Just transition is necessary, which is based on locally designed public policies that aim at creating the context for fair income and a decent life for all workers and communities affected by pollution reductions measures". It brings all actors to the same side of the tables. Trade unions, NGOs and the industry can work together to find what is best for regions and communities.

- Regional economic transition is possible, although options and prospects also depend on the local circumstances: e.g. the territorial concentration of mining and its relative economic weight including the related services, or the distance to regional economic centres.

- Complex regional revitalisation can increase the success, which includes issues such as transport, environment, health and social protection. Regional revitalisation is most successful from a bottom-up process.

- The cost of supporting uncompetitive industry is extremely high, thus a strategically planned transition is better than providing life support for coal regions.

- It is more cost efficient to manage the transition e.g. through retraining of workers, and support to starting new businesses than the costs of failing to

17 www.just-transition.info
implement a transition. A failure to invest sufficient resources in a just transition leaves high legacy costs for the government e.g. in the form of disability/other benefits for decades. This way the net costs for governments can quickly grow into several hundreds of thousands to the millions of euros per workers.

- No stakeholder should be allowed to escape their responsibilities in contributing financially to the transition.

- Well-utilised EU funding can generate financial resources for creating jobs/retraining and economic diversification
6. Policy options to support the energy transition and recommendations for the future EU budget

6.1 The new global political context for the energy transition

The 2015 adoption of the 2030 Agenda for Sustainable Development including the Sustainable Development Goals helped to put the energy transition into a new and holistic context. This universal agenda, which is also referred as the agenda of people, planet, prosperity, peace and partnership, for the first time in history manages to bring together social, economic, environmental, development, human rights and other aspects into a global framework. This holistic approach is also crucially relevant for the just transition of coal regions, where not only environmental, but also health, social, economic and partnership aspects need to be carefully taken into account. SDG 3 on health, SDG 7 on energy, SDG 8 on decent work and employment, SDG 11 on cities and communities and SDG 13 on climate action are all relevant in this process, while linkages to poverty (SDG1), clean water (SDG 6), industry (SDG 9) and life on land (SDG 15) are also important. All EU MSs and the EU as well need to implement this universal agenda based on the subsidiarity principle, which includes the development of the right policy framework as well as the provision of financial resources from national, and dependent on providing EU value added, from EU sources as well.

6.2 Mobilising financial resources for the just transition of coal regions through the reformed ETS

In November 2017 the Council and the European Parliament reached an agreement on the EU ETS reform, which among others outlines the creation of a modernisation fund from 2021. This fund will be financed by auctioning 2% of the total allowances to foster energy efficiency and the modernisation of the energy sector in MSs with a GDP per capita below 60% of the EU average. Most of the resources from the fund will be used to support investments in RES, energy efficiency, energy storage and modernisation of energy networks, but it will also support a just transition in carbon-dependent regions. No support from this fund shall be provided to energy generation facilities using solid fossil fuels, which explicitly rules out support for coal fired power plants. However, the agreement also allows 10 Eastern European MSs to allocate up to 60% of power sector emissions allowances for free, with their value matched by investment as before until 2030. This derogation does not include strict limits on CO2 emissions for the projects, only broader policy guidelines for diversification, upgrading, retrofitting and modernisation, and say that projects must not contribute to or improve the financial viability of highly emission-intensive electricity generation nor increase dependency on emission-intensive fossil fuels. In addition the agreement stipulates that where new power capacity is added, this must be matched by the closure of a corresponding amount of more emission-intensive capacity. However, even with these additional conditions it remains to be seen if the reformed ETS will subsidise coal plants in the future.
6.3 Currently available financial resources in the EU budget

Currently the EU’s long term budget (the Multiannual Financial Framework, MFF) for the period 2014-2020 serves to aid disadvantaged regions through two instruments. The European Globalisation Adjustment Fund (EGF) supports people losing their jobs as a result of major structural changes with an annual budget up to 150 million EUR, and it can fund up to 60% of the cost of projects designed to help workers made redundant through carrier advice, mentoring, education and retraining, entrepreneurship and business creation, etc. The EGF is used for two-year projects in cases, when more than 500 employees lose their job at a single company including suppliers and downstream producers, or where a large number of workers are laid off in a particular sector in one or more neighbouring regions. Out of the 176 submitted projects to the EGF since 2007, only one project targeted a (coal) mine (Castilla y León in Spain), which project is currently under implementation. In addition to the EGF, the European Social Fund (ESF) also provides at least 1.1 billion EUR to improving education and training systems necessary for the adaptation of skills and creation of new jobs in sectors related to energy and the environment in general.

6.4 Supporting the just transition through integrated support post 2020

As the next MFF negotiations have already started for the post 2020 period, it is now time to assess the potential of funding from the EU budget to support the just transition of coal regions. Support for long term quality employment (through retraining, finding a new job, starting a business) for redundant workers of coal mines and coal fired plants, awareness raising actions to generate public support for the transition in coal regions where coal is part of the individual and community identity, renewable energy investments to enable the energy switch and capacity building to support circular economy in the modernised local economy could all work together. Exchange of experiences and knowledge through a European platform should be established. EU funding from the MFF should complement the financial resources from the EU ETS reform while increasing coherence and avoiding overlaps.

6.5 Excluding EU support for fossil fuels

Contrary to the current EU budget, the next MFF should explicitly ban support for fossil fuel activities and infrastructure, which leads to environmental degradation, pose health threats on regional and European level and also create lock-in of economies into unsustainable fossil fuel dependence. Thus the EU should establish an exclusion list of projects that are incompatible with the Paris Agreement and Agenda 2030. Such a list should be informed by clear performance benchmarks and auditable criteria. These criteria could for example, identify the absolute emissions (upstream and downstream), lifecycle, impact on ecosystems and the level of climate related risk associated with projects\(^\text{18}\).

Phasing out these harmful subsidies would not only prevent the negative environmental, health and economic consequences of fossil fuel projects, but would also

\(^{18}\) An EU budget that supports ambitious climate action around the world - Briefing Paper & Policy Recommendations by CAN Europe, November 2017
free up valuable financial resources that could be used for delivering the policy objectives of the EU budget.

6.6 Supporting decentralised renewable energy projects from the EU budget

CEE Bankwatch Network and Energy Cities propose new ways to unlock innovative financing with the help of the next MFF and address specific barriers faced by citizens and community power projects wishing to invest in their own small scale RES projects. Their recommendations are based on two pillars. The first is the creation of an Energy Citizens Facility, or targeted financing programme involving the pooling of a set aside across several existing funds within the MFF, and creating an EU enabling framework to unlock innovative financing, including crowd-sourcing, in a geographically equitable way across the Union. Depending on design, such a model could involve a coupling of cohesion policy and the future European Fund Strategic Investments. EU intervention in the MFF would thus facilitate improved access to finance for citizens, including the vulnerable.
The second pillar involves crafting both new ex-ante conditionalities, and new incentive structures within the MFF, to encourage the identification and removal of regulatory, and administrative barriers hindering small scale RES deployment at national level. Specifically three new ex ante conditionalities are recommended:

- **A Renewable Energies Investment Environment Test**, requiring a regularly updated identification of the impact of national legislation and policies, including in MFF programming, on RES investment. The test should also assess impacts of national policies and legislation on prosumers wishing to generate, storing, or sell their own renewable energy, and be accompanied by planned policy measures to mitigate negative impacts on affected categories of investors.

- **Requirements for energy poverty action plans** containing a needs analysis of housing stock identified as at risk of energy poverty, as well as measures for how Member States propose to address this, including through the use of EU funds for grants for thermal renovation, and small scale RES to vulnerable households and communities, the setting of affordable levels of co-financing for loan schemes to low to middle income families, and fairer eligibility for households, including single family dwellings, to benefit from EU funded schemes.

- **National Climate and Energy Plans** in place, accompanied by Strategic Policy Framework. The strategic policy framework should ensure the achievement of defined milestones and criteria from National Climate and Energy Plans. The strategic policy framework should also be accompanied by national measures put in place to remove barriers for energy citizens and set national goals for an increase in the amount of citizens and communities generating their own RES by the end of the next programming period.

### 6.7 Introducing sustainability testing for research projects financed by the EU research programme

Currently the MFF provides funding for carbon capture and storage (CCS) projects within Horizon 2020. These projects aim to further develop the technology for CCS, which is the process of capturing CO2 from large point sources, such as fossil fuel power plants, transporting it to a storage site (normally an underground geological formation), where it is stored for hundreds or even thousands of years. While it needs to be acknowledged that certain industrial processes (e.g. cement production) will continue to emit CO2 even if after the energy and transport sectors have been decarbonised, and this might call for targeted solutions, it requires careful considerations, how these emissions should be absorbed. Ecosystems, especially wetlands and oceans are natural CO2 sinks, which might be more sustainable solutions for this challenge providing multiple benefits. Sustainability testing of new technologies should ensure that those potential solutions receive public funding, which meet some commonly agreed sustainability criteria.