

# Coal phase-out in South East Europe

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*Policy note*

*Energy-economic facts, funding needs in Bulgaria, Greece and Romania and EU Just Transition Funding. Do the puzzle pieces fit together?*

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# IMPRESSUM

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## 1. Introduction

Since the mid-2010s, more and more Member States of the European Union have expressed their wish to carry out a total or at least enhanced coal phase-out. A total of 72.8 GW of coal power capacity is located in countries which have announced they will phase out coal by 2030 or earlier, corresponding to 48% of the EU coal fleet (Europe Beyond Coal, 2020).

The high carbon price drove many coal power plants to generate losses in 2019. Sandbag (2019) estimated that by mid-2019 electricity generation from coal power plants in the EU had fallen by 19% compared with the previous year. The corresponding figures for Bulgaria, Greece and Romania were 8%, 16% and 13%. By the end of 2019 coal-fired electricity production in the EU was down by 23% compared with the previous year (CarbonBrief, 2019). The cause of this fall in coal fired generation was the high EUA price, which at its highest point reached around EUR 30 in 2019.

The current economic crisis triggered by the Covid pandemic has resulted in a significant change in the circumstances of large greenhouse gas emitters. The carbon price, which caused a reduction in coal-fired generation in 2019, has fallen initially but recovered recently. However, demand for energy has also decreased since the progression of the epidemic (GlobalData Energy, 2020) and the economic outlook for coal power plants stays negative. The decline in electricity demand has meant that in accordance with the merit order curve, coal and gas power plants have been producing less than before, reducing their profitability (GlobalData Energy, 2020). Over the medium term, by 2030, even without a carbon price, almost all coal power plants globally are expected to be unprofitable, as the competitiveness of renewable sources of energy is expected to increase significantly (Carbon Tracker Initiative, 2018). Under these circumstances, governments in the EU need to prepare for a coal phase-out even if this is not yet their official policy.

If the post-crisis recovery programmes provide a large impetus for investment in renewable technologies and energy efficiency, then it is unlikely that coal power plants will recover after the crisis, even if demand increases. It is of utmost importance to stay on track for decarbonisation and not make the mistake of subsidizing fossil fuel plants to help them recover from the crisis. This situation is an opportunity to turn away from a fossil-based economy early and use financial resources for the recovery to boost the energy transition, while helping those workers and regions that are hit the hardest by this change with social measures.

Despite recent developments which have signalled that the era for coal is coming to an end, some countries are reluctant to give up on coal. Because coal mines and power plants provide a large number of jobs and decision makers fear the electricity price increase which they believe will result from a coal phase-out, and also the loss of the status-quo of being a net electricity exporter, some governments are opting for providing state aid to coal power plants to keep them operating. This is a failed strategy, and governments need to plan their coal exit strategies and the implementation of a just transition, relying on EU as well as national funding, including funding made available through the Just Transition Mechanism.

In this policy note, we map energy-economic facts of a coal phase-out in Bulgaria, Greece and Romania with funding needs to enable a Just Transition in the respective mining regions and mirror them with the proposed EU's Just Transition Fund. We derive conclusions whether the Fund can provide sufficient support for a coal phase-out and a just transition. We first summarise the expected impacts of a coal phase-out in the three countries in section 2. We then assess the scope of funding, the level of funding, and conditions attached to the use of funding in section 3 from the perspective of these three South East European member states to determine whether the funding is in line with their needs.

## 2. Expected impacts of a coal phase-out in South East Europe

This section summarises the economic impacts of a coal phase-out, with a focus on economic performance (section 2.2), employment (section 2.3) and electricity price impact (section 2.4). Other impacts, in particular the impact on the electricity system, are less relevant from a just transition perspective, and are summarised in REKK, TU Wien, CSD, EPG, & FACETS (2020).

### 2.1. Coal phase-out in South East Europe

The three EU member states in the South East Europe region all rely on hard-coal and/or lignite fired electricity generation to some degree. The share of coal and lignite in domestic electricity generation is highest in Bulgaria, at close to 40%, and lowest in Romania, where around one quarter of electricity production comes from lignite fired plants.

Table 1 Role of coal and lignite in electricity generation in Bulgaria, Greece and Romania

Country	Gross domestic electricity generation (GWh) 2018			Share of hard-coal and lignite in generation (%)
	Total	of which hard-coal	of which lignite	
Bulgaria	46 815	414	17 655	38.6%
Greece	53 263	0	17 185	32.3%
Romania	64 876	247	15 398	24.1%

Source: EUROSTAT, 2019

Of Bulgaria, Greece and Romania, the only country that has taken a government decision to phase out coal to date is Greece. Greece plans to completely end the use of lignite for power generation by 2028. In the case of Greece, lignite phase-out is also coal phase-out as there are no coal power plants in the country. Lignite-fired power plants already in operation will be shut down by 2023 (Ministry of the Environment and Energy of Hellenic Republic, 2019). Only one lignite plant will be operational after 2023: Ptolemais V is under construction, is expected to go online in 2022, but it will stop using lignite in 2028. The operators plan to convert the plant to burning natural gas afterwards.

Romania has not formulated a wish to phase out coal in its NECP. The installed capacity in 2018 was around 3.3 GW and, according to the new version of the NECP, the planned capacity for 2030 is around 2 GW. In the first version of the NECP, Romania was planning to build a new lignite unit of 600 MW at the Rovinari power plant. The latest version of the NECP does not contain this plan anymore. Romania intends to replace aging coal capacities with gas power plants – considering gas as a bridge fuel – as well as with RES and nuclear energy (CEE Bankwatch Network, 2020).

Bulgaria has not adopted a government policy to phase out coal either. The share of hard-coal and lignite in electricity generation in 2018 was 38.6 %, whereas the 2030 target is 30%. The new version of the NECP states that Bulgaria intends to reach a balanced mix of different national and imported energy sources, and that it aims at making an efficient and environmentally sound use of local energy sources, mainly lignite. It also intends to include new nuclear sources in the energy mix after 2030 (Ministry of Energy of the Republic of Bulgaria & Ministry of Environment and Water of the Republic of Bulgaria, 2020). It is interesting to see that although the government has not expressed officially the will to phase out coal, the new version of the NECP envisions an almost 50% reduction of the existing coal capacity installed, from 4.3 GW to 2.52 GW in 2030.

In Table 2 we present figures on the expected phase-out of coal in the three countries based on their latest NECPs as well as on modelled results.

Table 2 Coal and lignite capacity in South East European countries

	Bulgaria	Greece	Romania
Hard-coal and lignite nominal capacity in 2018 (MW)	4 425	4 997	3 305
Modelled* hard-coal and lignite nominal capacity in 2030 (MW)	422 in all scenarios	660** in all scenarios	0-1400 depending on scenario
Planned coal and lignite capacity in 2030 according to NECP (MW)	2520	0	1980
Share of coal and lignite in domestic electricity generation in 2018	38.6%	32.3%	24.1%
Modelled* coal share in electricity generation in 2030	7.4% in all scenarios	4.4% in all scenarios	0-0.8% depending on scenario
NECP coal share in electricity generation in 2030	30%	0%	15,3%***

Source: REKK et al., 2020, CEE Bankwatch Network, 2020, Ministry of the Environment and Energy of Hellenic Republic, 2019 and Ministry of Energy of the Republic of Bulgaria & Ministry of Environment and Water of the Republic of Bulgaria, 2020

\* The modelled capacity refers to REKK et al., (2020)

\*\* The Ptolemais V power plant was exogenously included in the model; however, according to the latest information (January 2020) Ministry of environment and Energy announcement the plant which is currently scheduled to go on line in early 2022 will be converted to natural gas or some other alternate fuel

\*\*\* Data from the latest version of the Romanian NECP under public consultation in April 2020.

The modelled coal capacity and generation figures in Table 2 show that even in countries where coal phase-out is not official government policy, a significant reduction in coal-fired electricity generation is expected. These modelled results are in line with real world experience in the coal sector over the past year and a half. As described in section 1, most coal power plants in the EU were making losses in 2019 due to the high EUA price, while in 2020, despite a drop in the EUA price, coal plants are still not economically viable due to a parallel decrease in electricity demand which has led to low utilisation rates.

There has also been a significant decrease in electricity generation from coal and lignite plants in South East Europe as a result of the pandemic. Table 3 shows that the change in average coal and lignite fired generation compared with 2019 (which was already reduced compared with 2018, as discussed in section 1, due to a high EUA price) is very significant in Greece, at close to 54%, while it is also high in Romania, at 25%, and non-negligible in Bulgaria, at close to 12%.

Table 3 Coal and lignite share in total domestic electricity generation and average hourly generation

	March 2019		March 2020		Change in average generation (March 2019 to March 2020)
	share	average MW	share	average MW	
Bulgaria	41.65%	2 074	34.89%	1 832	-11.67%
Greece	35.19%	1 377	17.03%	639	-53.59%
Romania	23.14%	1 626	14.66%	1 218	-25.09%

Source: ENTSO-E Transparency Platform

Due to the low profitability of coal in the region, governments were providing state aid to coal power plants in 2019 to ensure their continued operation. Information on state subsidy levels is not fully available, but is estimated at EUR 450 million in Bulgaria, at close to EUR 900 million in Greece, and EUR 200 million in Romania, per year. This support takes different forms in the three countries, including support from power purchase agreements, preferential feed-in tariffs for cogeneration, cold reserve payments and state support for the purchase of EUAs in the form of loan guarantees. It

is likely that at least some of the support provided in this manner constitutes illegal state aid<sup>1</sup> (Energy Industry Review, 2020) and will need to be discontinued. This will leave countries which are unwilling to abandon coal in a conundrum, as the power plants they wish to rely on will not be able to remain operational. Governments will not be able to avoid a coal exit, but they will be caught unprepared if they do not confront the coal exit issue, with this lack of preparedness resulting in higher than necessary social costs.

The regions most impacted by a coal exit will include regions reliant on coal mining and/or coal fired power production. These are the following NUTS3 regions (REKK et al., 2020):

- Bulgaria: the four regions of Burgas, Stara Zagora, Pernik and Kyustendil will be impacted;
- Greece: the Municipality of Amyntaio in the sub-region of Florina (NUTS3 region Florina-Kastoria) where the Amyntaio mine and plant are located, the Municipality of Florina in the sub-region of the same name where the Meliti plant and its associated mines in Vevi and Achlada located, the Municipalities of Eordaea and Kozani in the sub-region of Kozani (NUTS3 Region Kozani-Grevena) where the Ptolemais basin mines and power plants are located (this region provided until 2019 around a third of the country's power with lignite-fired CHPs), and the Municipality of Megalopolis in the sub region of Arcadia (NUTS3 Region Argolida-Arcadia) where the Megalopolis plants and mines are located;
- Romania: the regions of Gorj and Hunedoara will be impacted primarily, although coal power plants are also present in other regions. The Gorj region has almost ten times more coal mining and electricity generation capacity than the Hunedoara region and will thus be the primary target of just transition measures.

## 2.2. Contribution of the coal sectors to economic performance

Data shows that coal mining makes only a small contribution in all three countries to national gross domestic product. The share of coal production in GDP was 0.15%, 0.03% and 0.03% in Bulgaria, Greece and Romania, respectively, in 2019, calculated as the difference between the value of coal production at world prices and their total costs of production (The World Bank, 2020). Statistical information on the contribution of coal fired power generation to regional economies is not available for all countries. However, it is clear that the main economic role of coal is not in its direct contribution to national income, but in its role as an employer, its role in electricity generation, and its indirect impact on local economies through upstream and downstream sectors.

Other sectors may be linked to coal mines and electricity producers in several ways:

- sectors which are upstream providers of technologies and inputs
- transport sectors providing freight and passenger services,
- downstream industries reliant on the produced coal, electricity or by-products (e.g. waste heat or ash),
- or services in sectors where demand is financed from salaries of coal workers.

Of the above, transition is likely to be most difficult in industries reliant on coal, freight services as well as upstream sectors.

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<sup>1</sup> In February 2020, the Commission approved a state aid of the Romanian Government that grants a temporary loan to the energy producer Complexul Energetic Oltenia, mostly to cover its EUA debts of 2019. According to the Commission's decision, after six months, the loan needs to either be repaid in full or the company needs to start restructuring or to close its doors. This decision is in line with the trends presented above: support to coal will be decreased gradually making evident that coal-based electricity generation is not economically viable on its own.

Upstream sectors are sectors providing the necessary technology for the power plants and mines, including parts and services for maintenance. These sectors require a highly qualified workforce, and it is likely that if support to companies is provided for ensuring a transition, then this can be successful.

In most cases coal needs to be transported to power plants, even if over short distances. Heavy bulk goods such as coal or steel are transported by rail. Due to large volumes, this can result in significant revenues for rail freight operators, despite low distances, and the switch to localised and renewable energy results in losses to these companies. Of course, this can vary to a great extent from country to country. For example, in Greece lignite transport is not significant.

It is likely that once the power plants stop operating the mines supplying them will need to close due to high returns to scale, which will mean that households which rely on coal for heating as well as industrial plants which use coal for their production processes will either need to use imported coal or change their heating or production technologies. The direct reliance on coal and lignite as an input fuel into industrial production is not very high in either country, at 5 to 10%, with the lowest share in Romania and the highest share in Greece. (IEA, 2020) Other downstream sectors may use waste heat from the power plants or waste materials (e.g. ash) and will also be impacted.

As described in section 2.3, a total of around 86 000 jobs can be lost in the three countries. The salaries these workers receive help support other sectors in the local economy; the closing of coal mines and power plants can lead to overall regional decline if the coal sector makes up a large share of regional economies. As seen in other countries, such as in former UK coal and industrial regions, and in the US rust belt, the impact of an economic downturn may be felt for several decades. GDP figures available for the regions show that the impacted regions generally have lower than average GDP, indicating that economic challenges are already present, and that therefore increased attention needs to be paid to the economic development of these regions. (Alves Dias, Kanellopoulos, Medarac, Kapetaki, Miranda-Barbosa, Shortall, Czako, Telsnig, Vazquez-Hernandez, Laca Arántegui, Nijs, Gonzalez Aparicio, et al., 2018)

The mapping of impacted sectors and actors needs to be carried out for each region, preferably at the NUTS3 level, but also considering interregional spillover effects on workers and sectors.

### 2.3. Employment

Employment in coal mines and power plants, in upstream and downstream sectors, and in sectors where significant demand is generated by coal sector workers is expected to fall as a result of a coal phase-out over the short term. The medium to long term impacts are largely dependent on the success of regional development policies.

Table 4 shows the number and the share of jobs related to coal in Bulgaria, Greece and Romania in 2015.

Table 4 Share and number of jobs related to coal (2015)

	Number of jobs in coal mines	Number of jobs in coal power plants	Number of total jobs related to coal
Bulgaria	11 800	6 035	17 835
Greece	4 900	1 600	6 500
Romania	15 000	3 600	18 600

Source: Alves Dias et al., 2018 and national data for Bulgarian lignite power plants



Different sources contain different estimates of the jobs at risk in the three countries. According to Alves Dias et al., 2018, in Bulgaria, 2 293 direct jobs related to hard-coal and lignite power plants will be at risk by 2030, in Greece, 1 218 jobs and 2 998 jobs in Romania. This amounts to 6 509 direct jobs in total in the three countries. Another estimate (REKK et al., 2020 and national data from Bulgaria) shows similar numbers for expected direct job losses connected to power plants, with a somewhat higher number for Greece. In Table 5 expected effects of coal phase-out on jobs related to coal and lignite mining and also on jobs indirectly connected to the coal sector are presented.

Table 5 Expected job losses in coal regions in Bulgaria, Greece and Romania (workers under 55 years of age)

	Direct, power plant	Direct, mine	Indirect*	Total
Bulgaria	4500	11 763	29 120	45 383
Greece	1 975	3 626	7 010	12 611
Romania	2 761	6 315	19 332	28 408
Total	7 091	21 704	55 462	86 402

Source: REKK et al., 2020 and national data for Bulgarian lignite power plants

\* It has to be noted that the indirect job multiplier can be very different from study to study, meaning results are relatively uncertain.

Medium term employment impacts are likely to differ very significantly across countries. While Bulgaria and Romania had unemployment rates of 4.2% and 3.9%,<sup>2</sup> respectively, in 2019, significantly below the EU average of 6.7%, the unemployment rate in Greece was at 17.3% (EUROSTAT, 2020b). Due to the high unemployment levels in Greece, it is likely that very significant effort will be needed to absorb workers made redundant in the coal sector. Long term support will be needed in all three countries in the form of unemployment benefits, early retirement, or support for reskilling and job matching as well as for economic development of impacted regions.

Table 6 Unemployment rates in the most impacted NUTS2 regions, 2019

Country	NUTS3	Corresponding NUTS2	NUTS2 unemployment rate
Bulgaria	Burgas, Stara Zagora	Yugoiztochen	4%
	Pernik and Kyustendil	Yugozapaden	2.3%
Greece	Florina, Kozani-Grevena	Dytiki Makedonia	24.5%
	Argolida-Arcadia	Peloponnisos	12%
Romania	Gorj	Sud-Vest Oltenia	5.3%
	Hunedoara	Vest	3.4%

Source: EUROSTAT, 2020c

## 2.4. Electricity prices

According to data from the first semester of 2019, household electricity prices were largely under the EU average of EUR 215.9 per MWh in the three countries we focus on. In Bulgaria, Greece and Romania the price was EUR 99.7, 165 and 135.8 per MWh, respectively. The same data for Germany was EUR 308.8 per MWh, for Austria EUR 203.4 per MWh and for Hungary EUR 112 per MWh (EUROSTAT, 2020a).

Electricity prices are also under the EU average of EUR 125.1 per MWh for non-household end users. Electricity prices in the first semester of 2019 were EUR 88.7, 105.9 and 97.2 per MWh in Bulgaria,

<sup>2</sup> These numbers might change with the new situation that results from the Covid pandemic: unemployment rates will probably increase due to local difficulties but also due to workforce coming home from abroad.

Greece and Romania. Non-household end users had to pay EUR 155.7 per MWh in Germany, EUR 107.6 per MWh in Austria and EUR 97 per MWh in Hungary (EUROSTAT, 2020a).

The low household and industry end user prices do not reflect wholesale and day ahead market prices, which are high in the region in general. Wholesale baseload prices were EUR 46.6, 59.5 and 47.0 per MWh in Bulgaria, Greece and Romania, respectively, in the fourth quarter of 2019; higher than the EU average of EUR 43.9. (European Commission, 2020c) Day-ahead prices were particularly high in Romania, but also in Bulgaria. The average unweighted day-ahead price in Bulgaria, Greece and Romania was EUR 92.86, 63.82 and 239.00 per MWh, respectively, in 2019. (ENTSO-E, 2020) This compares with e.g. EUR 45.86 in Germany, 40.94 in Austria and 52.28 in Hungary. In fact, Bulgaria and Romania were among the four areas with the highest wholesale prices in 2019, together with North Italy and Poland. The low end user prices therefore reflect an active government effort to keep prices low, especially for households.

According to new modelling work, early coal exit is expected to result in a temporary albeit significant increase in wholesale electricity prices (REKK et al., 2020). This increase in the price of electricity is likely to impact end user prices, affecting affordability of electricity in a region with already significant energy poverty. Policies need to be implemented to tackle this effect as a just transition should aim to avoid a rise in energy poverty.

According to REKK, TU Wien, CSD, EPG, & FACETS (2020), the wholesale price of electricity is expected to increase by 12-23 EUR/MWh if an earlier phase-out is carried out. This rise is temporary, and depends on the pace of the phase-out as well as the country in question. It is expected to disappear after four or five years if significant energy efficiency measures are put in place. Demand side management and energy efficiency measures can also help lower the price increase and keep it around 3-12 EUR/MWh. Analysis shows that RES deployment also helps lower the impact of early phase-out on electricity prices.

Table 7 Wholesale prices under a reference scenario and early phase-out, EUR/MWh

Country	Scenario	2020	2025	2030
Bulgaria	Reference	58.31	66.17	73.52
	Phase-out 8 years earlier	58.31	78.34	73.87
Greece	Reference	65.68	66.17	72.65
	Phase-out 8 years earlier	65.68	78.31	72.99
Romania	Reference	60.19	65.37	66.55
	Phase-out 8 years earlier	60.19	70.31	68.70

Source: REKK et al., 2020

### 3. The Just Transition fund from a South East European perspective

In this section we present the Just Transition Fund from the perspective of the three South East European countries Bulgaria, Greece and Romania. We assess the extent to which the scope of funding is in line with funding needs (section 3.1), the extent to which the scale of funding is appropriate (section 3.2), and whether the conditions on the use of funding are currently fulfilled by the three countries (section 3.3).

#### 3.1 Scope of funding of the Just Transition Fund

The idea of leaving no one behind throughout the transition to a low-carbon economy is an important element of the European Commission’s Green Deal: to this end, the proposal for a Just Transition Mechanism was presented by the European Commission on 14<sup>th</sup> January 2020 as part of the Sustainable Europe Investment Plan (European Commission, 2020d), and a proposal for

regulation for a Just Transition Fund was made in February 2020 (European Commission, 2020b). An amendment to the proposal on the Just Transition Fund was made by the Commission in May as part of the Green Recovery Package in response to the economic crisis triggered by the coronavirus pandemic.

The Just Transition Mechanism will include financing from the EU budget, including from the Just Transition Fund and European Regional Development Fund (ERDF), co-financing from the Member States and contributions from InvestEU and the EIB. It is based on 3 pillars:

1. The Just Transition Fund – the focus of our analysis,
2. The just transition scheme under InvestEU,
3. The European Investment Bank's loan facility,

Under the first pillar of the Just Transition Mechanism, the Just Transition Fund, the Member States, after identifying territories eligible for funding, have to present territorial just transition plans but also commit to matching funds from the Just Transition Fund with funding from the European Regional Development Fund and the European Social Fund Plus, and, in addition, dedicate national resources for just transition.

Just transition requires the implementation of an integrated approach to developing regions which are negatively impacted by the phasing out of coal. This needs to rely on support for three types of interventions: (i) industrial policy/economic transition/recovery which should include support for the development of new business models and support for diversification of economic activities within the region, (ii) wide-reaching and creative labour re-adjustment programmes, including education and reskilling, and (iii) robust social protection or 'safety nets'. (Geels et al., 2019)

The Just Transition Fund is able to support the first two types of interventions through investments in SMEs and creation of firms, investment in research and innovation, digitisation, and upskilling and reskilling of workers, job-search assistance to jobseekers and active inclusion of jobseekers. The Just Transition Fund is also available for limited investment in the low carbon and circular economy, as well as for investment in restoration activities linked to coal such as investments in regeneration and decontamination of sites, land restoration and repurposing projects. However, funding from the Just Transition Fund is not available for the following interventions, which may be costly for affected regions and member states, but are necessary to ensure a just transition:

- Funding of early retirement or pension bridging grants. There will be a significant number of people that will not have the possibility to be retrained, either because of their age, and because skills needed for new jobs are too different from the skills they already have, or because job opportunities that are compatible with their skills are geographically too far. Early retirement and pension bridging measures will be necessary but will have a high cost for the Member States concerned. It is in the interest of member states implementing a coal transition to influence the legislative proposal so that it can provide these types of benefits.
- Social net for the duration of retraining and job search: There may be many former coal workers who are not yet close to pension age for whom retraining and job search activities may last a long time. Making sure that social nets are in place to offer support to these people is the task of member states. In some member states, where the role of coal in the economy is significant, or where unemployment is high, the additional costs to member states of providing social support to those made redundant may be high. The Just Transition Fund could also offer financing for member states to provide unemployment benefits in such cases.

- In each country, the poorest will be hit worst by the hike in electricity prices stemming from coal phase-out. An option for helping the most vulnerable through an electricity price compensation scheme could be considered. As the price increase from phasing out coal is expected to be temporary, and can be alleviated by energy efficiency and renewable energy investment, this support should be strictly temporary.

Some of the types of interventions which need to be funded to achieve a just transition (i.e. industrial transition and labour readjustment) can also be funded from other EU sources. In particular, the ERDF and Cohesion Fund can fund regional development and the ESF can cover labour readjustment. The new Recovery and Resilience Facility of EUR 560 billion, proposed by the European Commission in response to the economic crisis caused by the coronavirus pandemic, can support for investments and reforms in relation to the green transition, including the energy transition, while the InvestEU is available to mobilise private investment in regional development.

### 3.2 Level of funding of the Just Transition Fund

The three pillars of the Just Transition Mechanism as presented in section 3.1 are the following:

1. The Just Transition Fund consists of around EUR 40 billion (originally proposed as a EUR 7.5 billion fund but later increased in size as part of the Green Recovery Package). Of this amount the originally proposed EUR 11.3 billion is available to be spent throughout the 7-year budgetary period, while an additional EUR 32.8 billion is allocated in close to even tranches and front-loaded for the first 4 years between 2021 and 2024;
2. The just transition scheme under InvestEU is aimed at crowding in private investment;
3. The European Investment Bank's loan facility is targeted at the public sector and provides a partial EU budget guarantee. (European Commission, 2020e)

Some support will be given to revenue generating projects (e.g. renewable energy, support to enterprises for purchasing equipment, infrastructure where usage fees can be collected, etc.) where loans and other forms of non-grant support from the InvestEU can cover a significant share of financing needs. However, there will be types of interventions which require that non-refundable grants are provided, and where the Just Transition Fund should therefore be the main funding instrument.

Prior to the proposals made by the Commission as part of the Green Recovery Package, Bruegel commissioned an analysis (Cameron, Claeys, Midoes, & Tagliapietra, 2020a) concerning how well designed the Just Transition Fund is. According to IRENA, as quoted in Cameron et al. (2020b), the number of jobs that might be lost in the energy sector due to energy transition could reach 1.6 million between 2021 and 2027 in the EU. In contrast, Alves Dias et al., 2018 states that the total number of people employed in the EU in coal mines is 184 800, with an additional 52 700 people employed in power plants, meaning that in total this sector accounts for 237 500 jobs. They estimated that a first wave of power plant retirements in the period 2020-2025, will lead to the loss of 15 000 direct jobs in power plants, with a second decommissioning wave between 2025 and 2030 adding a further 18 000 job losses. In total, 160 000 jobs are expected to be lost in power plants and coal mines by 2030.

Between 2007 and 2016, EUR 4 219 per worker were spent helping workers adapt to the changing trade patterns due to globalisation (Sapir & Claeys, 2018). REKK, TU Wien, CSD, EPG, & FACETS (2020) estimated costs for reskilling of workers at EUR 8 000, and assumed that in some cases an additional cost of job matching and/or SME support would also be required to ensure that jobs in the regions are created as well as matched. In addition, some workers would go into early retirement instead of

another job, which has higher costs than reskilling (REKK et al., 2020). By a rough calculation, if the higher value of 1.6 million workers is assumed, and assuming costs per worker are between EUR 4 129-8 000, the originally proposed sum of EUR 7.5 billion made available by the Just Transition Fund at the EU level would have barely been enough to fulfil the need to ensure that workers can adapt to a changed job market.

If, however, the lower estimate made by Alves Dias et al., 2018 of 160 000 jobs lost is assumed, the originally proposed level of funding would have been sufficient with significant funding left over for other types of interventions. This bottom-up estimate based on employment data in mines and power plants is likely to be more accurate than the estimate made by IRENA. In this case, assuming an estimated cost of EUR 4 129 - 8 000 per worker, around 0.7-1.3 billion would need to be spent on workers, leaving significant funding for regional development, including for the industrial transition of upstream and downstream sectors, and investment in infrastructure and the energy transition.

According to the Just Transition Fund proposal, the level of funding is determined in a way that the regions which are most reliant on fossil fuels and consequently are or will be the most severely hit by the transition receive more support. Criteria used in the allocation of funding are greenhouse-gas emissions of industrial facilities in NUTS level 2 regions (weighting 49%), employment in mining of coal and lignite (weighting 25%), employment in industry in the NUTS level 2 regions (weighting 25%), production of peat (weighting 0,95%), and production of oil shale (weighting 0,05%).

This implies that allocations are made to regions irrespective of whether there is a government policy to phase out coal. This raises questions of fairness: Greece has the most ambitious National Energy and Climate Plan of the three countries examined and it is planning to phase out coal by 2028 (Ministry of the Environment and Energy of Hellenic Republic, 2019), in contrast to several other EU member states, including Bulgaria and Romania. However, in light of the economics of coal, it is likely that phase-outs will happen irrespective of government policy, and that therefore Bulgaria and Romania will also need funding.

To ensure that the level of development of different Member States is kept in mind, but fairness is not forgotten, GNI of the period 2015-2017 is also taken into consideration, but there is a minimum of EUR 32 per inhabitant aid intensity and an upper limit of EUR 8 billion per Member State. According to European Commission, 2020a this allocation method would result in a situation where Member States with a gross national income (GNI) per capita under 90% of EU average would receive approximately 66% of the resources available in the Just Transition Fund. This rule is advantageous to the three South East European member states, as all have GNIs significantly below the EU average, and the GNI correction depends also on the magnitude of the difference between Member State data and EU average data.

While the aim of the Commission's proposal is to support coal and industrial regions in transition, it is clear that not all coal regions can benefit. In the table below we present the regions which are eligible for funding based on the rules identified by the Commission, as well as two regions which have been identified by partners as requiring support, but which have not been listed as eligible by the Commission in its country-specific recommendations in Bulgaria.

Table 8 Coal regions eligible for funding and coal regions where funding is not available

Country	Regions eligible for funding	Regions not eligible for funding
Bulgaria	Maritsa, Bobov Dol	Burgas, Pernik
Greece	Kozani, Kastoria, Florina (Western Macedonia), Megalopolis, Heraklion, Lasithi, Rethimno, Chania (Crete) and Aegean Islands (Lesvos, Samos, Chios, Rhodes, Mykonos)	none
Romania	Hunedoara, Gorj, Dolj, Galați, Prahova and Mureș	none

### 3.3. Conditions on the use of funding

The proposed regulation on the Just Transition Fund does not contain any strong language related to climate and energy policy conditions which need to be satisfied for Member States to be able to access funding. The foremost requirement is the development of a territorial just transition plan for those regions where the Just Transition Fund is to be used. However, since the plan itself is subject to approval by the Commission, and requirements related to its content are clearly set out, this in fact results in conditions on the use of funding.

Article 6 of the proposed regulation on the Just Transition Fund states that the territorial just transition plan needs to be consistent with the National Energy and Climate Plan of the Member State concerned. This implies, that countries which have not explicitly decided on a coal exit (or other measures related to decarbonisation, e.g. to heavy industry) will not be able to use these funds for implementing a just transition in their regions. As a result, countries which have not made an explicit decision to phase out coal (but are likely to need to phase out coal anyway due to market realities) may leave their coal regions without support. This will negatively impact Bulgaria and Romania, as they have not committed to phasing out coal.

The Just Transition Fund is not just meant to benefit coal regions, although it is likely that within the electricity sector coal regions will be the main beneficiaries. There are two main types of territories which the focus of the Just Transition Fund according to the Commission's proposal is on: (1) territories most negatively affected by the transition of fossil fuel production and use based on economic and social impacts, especially in terms of job losses, and (2) the transformation needs of the production processes of industrial facilities with the highest greenhouse gas intensity.

### 3.4. Country plans for a just transition

In the National Energy and Climate Plan of Bulgaria in general, very little information is contained on a just transition. The cost of a just transition is estimated at BGN 7.8 bn (EUR 4 bn) but the socio-economic impact and the interventions which would need to be funded to respond to these impacts are not described. The transition of coal regions is mentioned a few times, but without a commitment to phase out coal. The types of industrial territories which will be impacted by the transition are not identified. Instead, the industry sector is addressed through a focus mainly on energy efficiency and renewable energy measures, energy audits and innovation, the idea of an industrial transition, which will require a just transition focus on regions with heavy industry, is not raised. (Ministry of Energy of the Republic of Bulgaria & Ministry of Environment and Water of the Republic of Bulgaria, 2020).

In the NECP of Romania the concept of a just transition appears only twice. Although counties with carbon intensive industries are mentioned in relation to a just transition, there is no strategy to reduce emissions in these counties, and there is no socio-economic analysis. The Romanian NECP is

also similar to the Bulgarian NECP in that it takes a traditional energy policy view of the industrial sector and does not address the socio-economic impacts associated with the energy and industrial transition. (CEE Bankwatch Network, 2020).

It is clear that in these two countries, in order to be able to prepare territorial just transition plans to access funding, there is a need to significantly expand the existing analysis in relation to a just transition. There is also a need to commit to the transition, as the regulatory proposal stipulates that the funding needs to be used to address impacts “linked to the transformation or closure of greenhouse gas-intensive activities in those territories”.

The Greek NECP takes a clear position on the phasing out of lignite. A detailed analysis of regional socio-economic impacts of the phase-out is currently missing from the NECP, but a Just Development Transition Master Plan „will be presented in mid-2020, to serve as a roadmap for the post-lignite era”, according to the NECP. (Ministry of the Environment and Energy of Hellenic Republic, 2019)

An additional important condition set out by the regulation is that the just transition plans need to be developed in partnership. This partnership needs to include, as a minimum, urban and other public authorities, economic and social partners, as well as relevant bodies representing civil society, environmental partners, and bodies responsible for promoting social inclusion, fundamental rights, rights of persons with disabilities, gender equality and non-discrimination.

## 4. Conclusions

To date, only Greece has expressed the wish to entirely phase out coal, but modelling results show that even in countries where coal phase-out is not an official government policy, a significant reduction in the use of coal for electricity production is expected due to a high carbon price and decreasing cost of renewable technologies. Phasing out coal, whether this is government policy or not, will bring significant challenges. Preparedness is important because negative socio-economic impacts can be reduced with careful planning.

The phasing out of coal will impact economic output, employment and electricity prices. Job losses and economic impacts will be local in nature. Jobs in coal mines, coal-fired power plants and other sectors linked to these – such as upstream sectors, downstream sectors or freight transport – will be lost. According to new estimates, around 86 000 jobs directly and indirectly connected to the coal sector are expected to be lost in Bulgaria, Greece and Romania due the phase-out. Medium-term economic impacts will vary significantly from country to country and will depend on the measures implemented to promote regional development as well as differences in starting points.

Recent modelling results show that early coal exit is expected to result in a temporary albeit significant increase in wholesale electricity prices. Therefore, policies aimed at reducing the price increase need to be implemented to ensure a just transition; these include energy efficiency measures, demand side management and the deployment of RES, which can all help lower wholesale prices. It is possible that the impact of the coronavirus pandemic on electricity demand will mean that the coal phase-out will have a lower impact on electricity prices than previously modelled.

When it comes to the scope of funding, our analysis finds that funding cannot cover all relevant expenditure, e.g. compensation to consumers for high energy prices, budgetary expenses linked to early retirement, or unemployment benefit for the duration of job search. These options should also be considered when finalizing the regulation on the JTF.

To be eligible for funding from the JTF, Member States have to prepare territorial just transition plans. These plans have to be in line with the respective NECPs; taken strictly, if the national plans do

not contain a commitment to at least a partial coal phase-out, countries concerned might not be able to access these funds for implementing a just transition in affected regions. In this case Bulgaria and Romania are less prepared than Greece, with only passing mentions of the concept of a just transition in their NECPs, and may leave their coal regions without support from the JTF.



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