



E3G

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TRANSFORMATIVE CHANGE THROUGH INNOVATION

AN ANALYSIS OF THE ROLE OF INNOVATION
IN FIVE TRANSITION REGIONS

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A letter from **Meret Brotbek**
Acting Director DACH, EIT Climate-KIC

From the UN's Sustainable Development Goals to the Paris Agreement, there is an impressive global consensus that a systemic approach and collective climate action is needed. According to the IPCC special report published in October 2018, global warming of more than 1.5°C will lead to significant destruction of our environment, decreased life quality and immense costs for our economies – affecting every human being on earth. The bad news is that Europe and the world are not even on track to reach a 2°C target. The good news is: Staying below 1.5°C is still an achievable goal.

At EIT Climate-KIC, as Europe's largest public-private partnership focused on climate innovation, more than 350 world-class partner organisations across business, academia, the public sector and NGOs are committed to the shared vision of taking a systemic approach across technology, infrastructure, business models, finance, behaviours, skills, citizen engagement, and policy to turn innovation into climate action. The ambition is to deploy the innovation that is needed for the deep decarbonisation that will put Europe and the world on the path towards a net zero-carbon economy well before 2050.

Climate innovation in transition regions

One of the areas with a significant potential to reduce carbon emissions is the energy sector, including the transition away from coal. It is, and will be even more so in the future, a powerful mean of effectively responding to the complexity of the climate change challenge. The transition of coal regions, however, is not only an environmental topic. Citizens fear job losses and weakened regional economies. Therefore, we see it as one of our missions to show how systemic innovation can enhance a fast and just transition of coal regions. One crucial step to guarantee a just transition is to listen and learn. This report analyses five former and current coal regions and contributes to a deeper understanding of transitions and the role of innovation within these.

How to read this report

EIT Climate-KIC is pleased to make this report available to all who are interested in the transition of coal regions and climate innovation; to all who share the strong belief that collaboration and knowledge exchange is critical in the common effort to tackle climate change. Therefore, this publication shall be understood as a starting point for discussion and as an invitation to collaborate with EIT Climate-KIC and our partner community.

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EXECUTIVE SUMMARY

Staying within 1.5 degrees will require rapid economy-wide decarbonisation through a transition process that is unprecedented, both in its scale and its speed. The purpose of this paper is to explore past and ongoing transitions in coal regions and the role innovation plays in such processes.

It reviews the existing literature on transitions in five coal regions, all of which are at a different stage of the transition process. From concluded in the case of South Limburg (NL), to ongoing in Alberta (Canada), Ústecký kraj (CZ), Upper Nitra (SK) to barely begun in South-West Oltenia (RO).

In each case, we present the national and regional context, the role of champions and veto players, innovation and social support schemes, public and private finance as well as an assessment of the overall timeline and effectiveness of the process.

The transitions studied are all driven by declining economic viability of the coal sector, with climate policies having played an indirect role through, for example, the introduction of carbon-pricing and support schemes for renewables. The only exception to this is the historic case of the Province of Limburg as climate policies were non-existent at the time.

Existing transition strategies are developed with a dominant role played by incumbent actors in all cases, while new actors play little to no role. In most cases, the transition is kicked-off by local or regional authorities with civil society playing an important role in triggering a debate. In the Czech Republic, for example, the coal mining regions approached the national government for help in restructuring the regional economy.

As coal mining regions tend to be economically weak with low innovation capabilities and politically well-connected incumbent players, efforts to increase innovation capabilities are primarily a political undertaking and driven by public initiatives and investments, rarely the private sector. Measures include the development of higher education institutes, support for R&D and entrepreneurship, provision of venture capital and establishment of funds supporting innovation as well as carbon-pricing in the case of Alberta.

Those transition strategies which foresee an explicit phase-out of coal, put social support schemes in a central role. In these cases, re-employment and re-skilling of the existing work force is more important than attracting a new workforce to the region.

Those transition strategies that prioritise economic diversification but do not foresee an explicit phase-out of coal, focus on enhancing regional employment opportunities.

EU structural and cohesion funds play a central role in financing transitions in European coal regions, especially in Central and Eastern Europe with little private investment. So far, private finance plays a very limited role in financing transition measures. We found no case where tangible financial commitments from the incumbent energy companies existed.

The findings from the case studies are summarized in Table 1 in the annex. They suggest that in order to accelerate ongoing transition processes, it will be essential to ensure targeted spending of public funding, including EU sources, as well as a greater mobilisation of private green finance to support the development of innovations in clean energy and industry and their deployment at scale. These efforts should be closely linked to social programmes that seek to develop corresponding skill sets of existing mining workers as well as ensure the attraction of new workers.

INTRODUCTION

The release in early October of a special report by the IPCC on the impacts of global warming above 1.5 degrees has spelled out the staggering costs of overshooting this target. The report also underlined that staying below 1.5 degrees is still possible but that precious little time is left to achieve it. Most importantly it showed that this will require a deep, economy wide transformation going well beyond the energy sector to cover transport, buildings, food and farming and manufacturing.

Innovation, stimulated by earlier green energy and climate policies which created new markets, economies of scale and ambitious learning curves, has already led to the costs of photo-voltaic, wind power, efficiency and battery storage to drop at such spectacular rates that they have become cheaper than already installed coal power in some places. It has shown that deep decarbonisation is possible and that markets respond when regulators set out ambitious clear goals and support structures.

These early successes are now posing a two-fold challenge that needs to be addressed for further deep decarbonisation efforts to successfully progress.

First, moving from an energy system with approximately 20-30% renewables to a 100% renewable system requires a managed phase-out process of fossil energy systems which is widely expected to happen through a process of Just Transition for affected regions and workers. While examples exist in certain countries and sectors with transition processes, at a European and global level this process has only just really begun.

Second, decarbonising the entire economy, including sectors like transport, buildings, farming and manufacturing within a timeframe necessary to achieve Paris goals, will require the rapid and widespread introduction of further disruptive innovations, above and beyond those already shaking up the energy sector. In order to ensure political majorities for such a process of change and to avoid its social impacts being instrumentalised by incumbents and their political allies, this process not only needs to be accompanied by a much broader process of Just Transition, it should also be able to draw on earlier, successful Just Transition processes.

The concept of a Just Transition was originally developed in the Trade Union movement in order to reconcile the conflicting positions of different parts of the movement in the

climate debate. The concept has since been endorsed and used by a rapidly increasing number of stakeholders, including local and federal governments, civil society, industry, and affected communities. In 2016, the International Labour Organization set out “Guidelines on a Just Transition towards environmentally-sustainable economies for all”.¹ It is further recognized in the UNFCCC process and the Paris Agreement as a key challenge for local transitions and the restructuring of real economy sectors.²

Initially, the Just Transition concept was used to frame the challenge to transform economies from fossil-based energy and production systems to decentralized, renewable ones. However, the implementation of the Paris Agreement requires a deep decarbonisation of all real economy sectors, implying structural changes across all sectors and the need to plan for transition. Achieving decarbonisation of the global economy by 2050 at the latest requires a steeply accelerating pace of climate action and it is important that Just Transition is seen as a supporting mechanism of climate action. While inaction might benefit incumbent industries in the short-term, it has negative, potentially devastating impacts on other stakeholder groups such as workers in the renewable industry or vulnerable communities affected by the impacts of climate change locally and globally. Ultimately, Just Transition is an integrated approach to sustainable development which brings together social progress, environmental protection, and economic success into a framework of democratic governance. Effective Just Transition strategies require local, bottom-up participation of all affected stakeholders and commitment by governments to guarantee legitimacy and provide planning security.

The purpose of this paper is to explore past and ongoing transitions in coal regions and the role innovation and innovation promoting agencies played in such processes by looking at five coal regions and drawing some conclusions for successful future interventions. The paper examines the literature on this topic for the five cases. To verify findings, expert interviews with local stakeholders have been conducted. Four of the cases studied are in the EU and all at a different stage of the transition process, from completed in the case of South Limburg in the Netherlands to being at the very beginning in the case of Romania. In addition to these four EU case studies we review one case study from outside the EU, which is Alberta, Canada to put things in a global perspective. Importantly, while we would not call these transitions Just Transitions, as most of them still need to prove their long-term effectiveness, some of the cases may contain elements of a Just Transition and provide useful lessons.

The first section of this report analyses the cases one by one, introducing the national and regional context, looking at champions and veto players, the role of innovation measures and social support schemes as well as access to finance and public investment. If applicable, a preliminary assessment of the effectiveness of the transition is made. Each case study ends with concluding remarks. In the second part of

¹ International Labour Organization (2016) **Guidelines for a Just Transition Towards Environmentally Sustainable Economies and Societies for All**

² UNFCCC (2015) **Paris Agreement**

the report, we do a comparison of the coal regions to better understand transition processes and the role that innovation plays for transformative change.

REGIONAL CASE STUDIES

South Limburg, Netherlands

National and regional context

Limburg is the southernmost province of the Netherlands and borders Belgium and Germany. The province makes up 6.6% of the Dutch population with 1.1 million inhabitants and represents 5.5% of the national GDP. Its per capita regional GDP is below the national level and in the lower end compared to other provinces. Unemployment in the province is at 5.7%, which is below the national as well as EU average. In Limburg, healthcare, trade, industry and business services are important sectors. The south of Limburg has a focus on life science around Maastricht and process industry around Geleen.³ In the most recent Regional Innovation Scoreboard 2017, which assesses the innovation performance of European regions, Limburg was ranked an ‘innovation leader’, outperforming the EU average on many innovation indicators.⁴ In 2014, Limburg spent €680 million on research and development (R&D), which is below the average Dutch provincial R&D expenditures of €1.1 billion.⁵

Limburg is the first European region that successfully phased-out its hard coal mining industry. The south of the province used to be a major coal mining region and was considered crucial to Dutch national energy security as coal was the main source of energy supply for Dutch households and companies. A plan for a gradual coal mining phase-out was announced in December 1965 by the federal government and the last mine closed in December 1974. At the time of the announcement, eleven pits existed with 53,000 people directly employed in the coal mines (46,000 miners, 7,000 office workers and managers) and 30,000 people considered indirectly dependent on coal mines, representing more than 35% of all jobs in the region at the time.⁶

The phase-out of coal mining was driven by declining economic competitiveness of coal. Dutch mining became less profitable and competitive in the European market due to an oversupply of steel and coal, falling world prices in 1958 and 1959, and increasing depths of extraction by the 1950s.⁷ The availability of natural gas, which was considered

³ European Commission (2018) [Limburg](#)

⁴ European Commission (2017) [Regional Innovation Scoreboard 2017](#)

⁵ European Commission (2018) [Limburg](#)

⁶ Kasper, H. (2012) [The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction](#)

⁷ Kasper, H. (2012) [The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction](#)

a better alternative to coal, facilitated the transition. In 1959 Europe's largest natural gas field was discovered in the north of the Netherlands. However, it needs to be emphasized that the federal government took an anticipatory approach and the phase-out plan was based on a long-term view on future market conditions and formulated accordingly.⁸

The restructuring process of South Limburg entailed various stages. A first strategy was developed by the government in 1965 with the goal to limit coal production through the closure of some of the mines, support measures for the mines still operating during this process as well as foster the industrial restructuring of South Limburg. The second policy document in 1969 presented a flexible plan for the closure of all the mines by the end of 1975. A third strategy in 1977 gave more freedom to the government of the Province of Limburg to develop its own regional policy. As an economic recession in the 1970s and a consequent rise in unemployment called into question the effectiveness and sustainability of previous restructuring measures, this strategy focused on creating durable and stable new economic infrastructure, with long term-benefits for the entire region.⁹

Champions and veto players

The phase-out was designed to be a collective process but mine management and unions were given a strong voice. Broad support for the transition plan can be largely attributed to the fact that most actors saw natural gas as a credible alternative to coal.¹⁰

The national government initiated and led the restructuring process. The then Minister for Economic Affairs Den Uyl decided to end coal extraction and develop a new industry based on gas.¹¹ Importantly, the government was owner of the Dutch State Mines, which began generating losses from coal extraction in 1962. The government of the Province of Limburg was in favour of closing the mines and began to lead the transition from 1978 onwards.

The Dutch State Mines (De Staatsmijnen) founded in 1902 as the Dutch state-owned mining company was an active player in the transition alongside the government. The company owned three pits and accounted for 60% of coal production.¹² In 1964, the Dutch State Mines proactively opted for ending coal extraction as it became economically inefficient. This decision was facilitated by the fact that it had alternative business options, such as a promising chemical business and acting as state's trustee in

⁸ Wuppertal Institut (2018) **Phasing-out Coal, Reinventing European Regions**

⁹ Kasper, H. (2012) **The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction**

¹⁰ Gales, B., and R. Hölsgens (2017) **Coal Transition in the Netherlands**

¹¹ Wuppertal Institut (2018) **Phasing-out Coal, Reinventing European Regions**

¹² Kasper, H. (2012) **The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction**

natural gas.¹³ Ultimately, its strategy was successful as the company transformed into the chemical major DSM. In contrast, private mines were against ending extraction. They owned eight pits and accounted for 40% of coal production but in comparison to the Dutch State Mines they did not generate losses.¹⁴

Organized labour was engaged early in the process and did not strongly fight closures. They recognized the inevitability of scaling back of coal production due to the external market conditions and decided to focus on how to make the most of the situation as labour had to gain from an earlier, subsidised exit before profits of coal owners would vanish.¹⁵ Their core demand was ‘no closure without new employment’, which was supported by the Minister of Economic Affairs and even became a central pillar of the restructuring process.¹⁶ There is no evidence that academia and civil society organisations as well as start-ups and regional development agencies had a visible role in the transition process.

Innovation measures

Innovation only became a central part of policy measures with the third policy strategy adopted in 1977. It had a focus on stimulating innovations in successful firms and on developing the knowledge infrastructure of the region through founding universities and attracting international institutions. The strategy identified four sub-regions within South Limburg and their focus of economic activity. Maastricht (not directly in the mining area) was charged with developing international institutes and higher education. Initially named Rijksuniversiteit Limburg, the University of Maastricht was founded in 1976 as part of the government’s restructuring efforts in the region.¹⁷ In addition, the head office of the Open University of the Netherlands, a government-funded institution for distance learning at university level, was established in Heerlen in 1981 as part of the restructuring measures.¹⁸

The Limburg Investment and Development Fund (LIOF) was established in 1975 and acted as an investor for companies that showed potential but needed (venture) capital and thus only supported companies that were innovative and had the potential for growth.¹⁹

¹³ Gales, B., and R. Hölsgens (2017) **Coal Transition in the Netherlands**

¹⁴ Kasper, H. (2012) **The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction**

¹⁵ Gales, B., and R. Hölsgens (2017) **Coal Transition in the Netherlands**

¹⁶ Gales, B., and R. Hölsgens (2017) **Coal Transition in the Netherlands**

¹⁷ Maastricht University (2018) **History**

¹⁸ Open Universiteit (2018) **And Then There Was a New University**

¹⁹ Kasper, H. (2012) **The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction**

Social support schemes

Government efforts focused on creating new jobs and ensuring that the existing workforce was trained accordingly. The first policy strategy in 1965 made the closure of a mine dependent on the existence of an opportunity for miners to obtain new jobs or another way of earning money.²⁰ It established measures to attract new companies to the area and create new jobs. Among others, they included subsidies on the price of buying land by existing and new industrial firms or by service firms that promote new employment, guarantees for loans to companies when a (new) company met the criteria of the restructuring of the area and its equity was a reasonable part of total assets, the establishment of offices for national public services and the DAF automobile factory producing passenger cars. The government further made arrangements with privately owned mining companies, requiring these companies to invest the resources present at the moment of closure in principle in new industrial activities in the Netherlands, preferably in South Limburg. It also ensured that information, advice and education on jobs, schooling and employment finding was provided.²¹

The second policy document enhanced government support to miners searching for jobs. To this aim, a socially responsible dismissal system was developed in which employment finding and schooling were offered, especially for the older miners. In addition, an employment-finding agency was founded for each mine that was closed. Re-training was particularly important as the former miners were only trained to work in the mines and their knowledge was hardly applicable to other industries. Most of them were retrained for jobs in the metal, textile, chemical and woodwork industries.²² Financial compensation packages were given to miners according to criteria of the European Coal and Steel Union. The private mining companies received exit subsidies.²³

Access to finance and public investment

The federal government set up two funds to support the creation of jobs: SIOL (arrangement to promote the industrial reconversion of Limburg) and IPR (arrangement to subsidize investment). Approximately 147 million Dutch guilders (€67 million according to current currency rate) were spent from these two funds to create 14,600 new jobs between 1965 and 1972.²⁴ In 1975, the federal government further

²⁰ Kasper, H. (2012) **The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction**

²¹ Kasper, H. (2012) **The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction**

²² Kasper, H. (2012) **The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction**

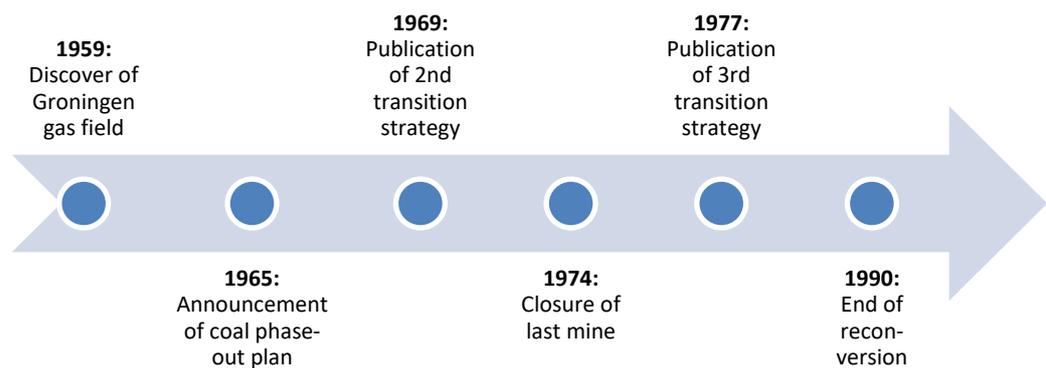
²³ See Gales, B., and R. Hölsgens (2017) **Coal Transition in the Netherlands** for an extensive overview of transition measures

²⁴ Kasper, H. (2012) **The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction**

created the Limburg Investment and Development Fund (LIOF) to support economic transformation and attract new companies.²⁵

The European Coal and Steel Community (ECSC) partly financed the reconversion since 1964. It operated with loans, but retraining was financed up to 50% and did not have to be redeemed. Reports suggest different numbers for the amount of support that was transferred from the ECSC to Limburg. A case study by Gales and Hölsgens finds that the European flow was €9.5 million for training in the period 1970-1972, but also €43 million for the same period.²⁶ In the late 1980s, EU structural funds became available and began to constitute a main source of finance for the region. Although restructuring of the region ended in 1990, as a former mining area, South Limburg was still eligible for funding from the EU. Again, Gales and Hölsgens find different numbers, ranging from €127 million in the period of 1989-1999 (co-finance, 26% of total, with €260 million financed by regional authorities and others) and €325 million in the period of 1994-1999.²⁷ The role of private finance remains unclear.

Timeline of the transition



Assessment of the effectiveness of the transition strategy

A Wuppertal Institut report concludes that the phase-out plan of Limburg was successful due to several of its specific design features: The phase-out was negotiated in a collective process, stakeholders shared the understanding that natural gas was a superior alternative to coal, and the process was carefully managed over a period of 25 years despite setbacks.²⁸

²⁵ Kasper, H. (2012) **The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction**

²⁶ Gales, B., and R. Hölsgens (2017) **Coal Transition in the Netherlands**

²⁷ Gales, B., and R. Hölsgens (2017) **Coal Transition in the Netherlands**

²⁸ Wuppertal Institut (2018) **Phasing-out Coal, Reinventing European Regions**

The programs of reconversion ended in 1990. By that time, South Limburg had an unemployment level equal to the Dutch average and a new economy had emerged with high value added sectors in the old mining region.²⁹ The successful establishment of new sectors in the region can be attributed to the creation of favourable framework conditions, such as knowledge infrastructure, support for industrial network creation and the clustering of the specific strengths of sub-regions.

In addition, the government programmes achieved a well-managed transition for the workforce in Limburg. Between 1965 and 1969, around 32,000 miners exited coal mining. Half of them found employment inside DSM or outside the company, one third received a pension arrangement, and one fifth of the total were retrained. Others went back to their home countries or found employment in a social workshop.³⁰ In fact, many miners found new jobs quickly, resulting in the need to hire approximately 4,700 new miners in the same period.³¹ From 1970 to 1974, another 19,000 lost their employment in the mining industry but again half were able to find employment either inside or outside of DSM.³² The process resulted in earlier closure of the mines than planned. When reconversion was evaluated officially in 1990, the phase-out eliminated 75,000 jobs. Of those 25,000 had not been compensated. The government programs created 17,100 lasting jobs.³³

Conclusion

The transition of South Limburg away from being a major coal producing region was driven by worsening market conditions for coal and the discovery of natural gas as an alternative energy source. Climate concerns did not influence the transition. During the early stages of the transition the federal government led the restructuring process, while the provincial government took over at a later stage. The case of the Dutch State Mines company illustrates how an established business anticipated and adapted to the transition. They opted for a coal phase-out early on and successfully transformed into the chemical company DSM. In contrast, new actors were not visible in the transition process.

Political efforts to foster innovation in the region became more pronounced during later stages of the transition process in the 1980s, while the keeping and creation of jobs had the highest priority during the early years. Political measures were aimed at enhancing the innovation and technology capacity of the region and focused on establishing international institutes and higher education in the area, such as the University of Maastricht as well as supporting new businesses. The case illustrates the

²⁹ Kasper, H. (2012) **The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction**

³⁰ See Gales, B., and R. Hölsgens (2017) **Coal Transition in the Netherlands** p.7 for overview of destination of former miners

³¹ Kasper, H. (2012) **The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction**

³² Gales, B., and R. Hölsgens (2017) **Coal Transition in the Netherlands**

³³ Gales, B., and R. Hölsgens (2017) **Coal Transition in the Netherlands**

important role of financial support from the European level as funding from the European Coal and Steel Community for retraining measures and later EU structural funds were a major source of finance.

Alberta, Canada

The national and regional context

The western Canadian province of Alberta is the largest producer of coal-fired electricity in Canada with 6,300 MW of installed coal power capacity in 2016.³⁴ It has 4.1 million inhabitants, representing 12% of the Canadian population.³⁵ Alberta leads Canadian provinces in economic growth with an average annual GDP growth of 3.2% between 1995-2015. Energy, finance and real estate, construction, business and commercial services make up large parts of the province's GDP.³⁶ With an unemployment rate of 6.5% Alberta remains below Canadian average of 8%.³⁷ It is the province with the third largest expenditure on R&D.³⁸

Alberta's mine sites produce primarily lignite. The province has additionally a massive oil and gas resource potential. About 87% of the electricity in Alberta is produced from fossil fuels, of which 47% are produced from coal and 40% from natural gas. The remaining 13% are generated from renewables.³⁹ Since the late 1990s the proportion of coal-fired electricity has been declining in favour of natural gas-fired electricity.

The current Canadian government takes a progressive stance on climate policy. In 2016, it pledged to phase-out coal by 2030. To this aim, the federal government started a Just Transition process and committed to work with provincial governments and organized labour to address social implications of phase-out. Canada is also a co-founding member of the international Powering Past Coal Alliance.⁴⁰

In November 2015, Alberta adopted its own coal phase-out plan. The Climate Leadership Plan (CLP) introduces the phase-out of emissions from coal power by 2030, an economy-wide carbon price and a renewable energy target.⁴¹ Twelve out of Alberta's 18 conventional coal plants will retire by 2030 because of a 2012 federal regulation under the Canadian Environmental Protection Act (CEPA) that sets strict

³⁴ AESO (2017) [Annual Market Statistics Report](#)

³⁵ Statistics Canada (2018) [Census Profile, 2016 Census](#)

³⁶ Government of Alberta (2018) [Economic Results](#)

³⁷ Government of Alberta (2011) [Highlights of the Alberta Economy 2011](#)

³⁸ Statistics Canada (2018) [Spending on Research and Development, 2016](#)

³⁹ National Energy Board (2018) [Provincial and Territorial Energy Profiles - Alberta](#)

⁴⁰ [Powering Past Coal Alliance](#)

⁴¹ Government of Alberta (2018) [Climate Leadership Plan](#)

emission standards for coal plants.⁴² The CLP addresses the remaining 6 coal units and their associated coal mines that do not fall under the federal legislation CEPA. This will mean the loss of approximately 3,000 direct jobs.⁴³

The transition is driven by a combination of factors. Most importantly, the economic competitiveness of the coal sector is in decline and natural gas has become a more cost-effective alternative to coal in Alberta. In addition to market forces, the provincial government aims to reduce greenhouse gas (GHG) emissions. Compared to the oil and gas sectors which make up 17% of Alberta's GDP, the electricity industry with 1% of GDP is only a minor employer and, thus, easier to target.⁴⁴ Moreover, the structure of Canadian federalism incentivized Alberta to set its own terms of the coal phase-out as provinces enjoy jurisdiction over environmental policies as long as they achieve equivalent or better outcomes to federal policy.⁴⁵ Lastly, a report by the International Institute for Sustainable Development (IISD) interprets the Climate Leadership Plan as a strategic effort to get domestic and international stakeholders to allow export pipelines for oil and gas to be built as Alberta's high contribution to Canada's GHG emissions compared to its population share created reputational issues for Alberta and its efforts to get export pipelines approved.⁴⁶

Champions and veto players

The Government of Alberta brought together diverse stakeholders to strongly support the plan. The centre-left New Democratic Party (NDP), that initiated and leads the transition process, came into power in April 2015 with a platform of climate action and social justice after Alberta had been governed for 44 years by the centre-right Progressive Conservative Party. The change in government created a space for dialogue at a level not previously possible, however, the previous government had also made announcements to address emissions from coal.

Municipalities opposed the provincial government's announcement to end emissions from coal-fired power. Many municipalities are highly dependent on coal power as a provider of high-paying jobs and a source of property tax revenue and some towns have few alternative sources of revenue or industrial activity. However, their involvement in the coal phase-out negotiations was limited.⁴⁷

Alberta has three power companies that own coal assets: ATCO Power, Capital Power and TransAlta. They did not publicly oppose Alberta's plans to end power generation from coal. As incumbent power companies in the province and the likely builders of the

⁴² IISD (2018) [The End of Coal: Alberta's Coal Phase-out](#)

⁴³ IISD (2018) [The End of Coal: Alberta's Coal Phase-out](#)

⁴⁴ IISD (2018) [The End of Coal: Alberta's Coal Phase-out](#)

⁴⁵ IISD (2018) [The End of Coal: Alberta's Coal Phase-out](#)

⁴⁶ IISD (2018) [The End of Coal: Alberta's Coal Phase-out](#)

⁴⁷ IISD (2018) [The End of Coal: Alberta's Coal Phase-out](#)

next fleet of electricity generation, they enjoyed political leverage in negotiating the phase-out. The Government of Alberta addressed these power companies first and negotiated so-called Off-Coal Agreements with them. The mining industry opposed the CLP but was not part of the Off-Coal Agreements. US-based Westmoreland Coal Company is the biggest owner of coal mining assets in Alberta. A phase-out of emissions from coal plants will mean a de facto closure of its thermal coal mines and the company has little future utility compared to the power companies.⁴⁸

The Alberta Federation of Labour (AFL) which represents many of the unions in the power industry supports the CLP.⁴⁹ They played a key role in securing a transition settlement for coal workers and communities. Organized labour formed the Coal Transition Coalition which published a report outlining recommendations for a Just Transition for Alberta's coal workers.⁵⁰ Moreover, in 2016, the AFL formed a coalition with environmental groups such as the Pembina Institute and BlueGreen Canada to advocate for the transition of coal workers to renewable electricity and other 'green' jobs.⁵¹

Research institutes, such as the Pembina Institute, support the transition process by making arguments for coal plant closure available and publishing reports that provide third-party validation.⁵² The University of Alberta was not involved in the development of the Climate Leadership Plan. Alberta's Regional Economic Development Alliances (REDAs) were part of the consultations of the Climate Leadership Plan. There is no strong evidence for start-ups and new business supporting the transition.

Innovation measures

Innovation and clean technology play an important role in Alberta's transition strategy and compose one of the six action areas outlined in the Climate Leadership Plan. In order to create conducive framework conditions and foster innovation for the CLP, the Government of Alberta established the Climate Change Innovation and Technology Framework (CCITF).⁵³ The framework is based on the recommendations of the Climate Technology Task Force which developed these through consultations with stakeholders from, for instance, academia, industry and environmental organizations. It serves as the overarching guide for the Government of Alberta's investments in innovation and clean technology coming from the pricing of carbon emissions.

Moreover, the provincial government supports R&D. In 2017, as a joint initiative of the federal government and the Government of Alberta, the Alberta Carbon Conversion

⁴⁸ IISD (2018) [The End of Coal: Alberta's Coal Phase-out](#)

⁴⁹ IISD (2018) [The End of Coal: Alberta's Coal Phase-out](#)

⁵⁰ Coal Transition Coalition (2018) [Getting it Right: A Just Transition Strategy for Alberta's Coal Workers](#)

⁵¹ IISD (2018) [The End of Coal: Alberta's Coal Phase-out](#)

⁵² [Pembina Institute](#)

⁵³ Government of Alberta (2017) [Climate Change Innovation and Technology Framework 2017](#)

Technology Centre was announced. The facility will provide a venue to enable cooperation between governments, technology developers and research scientists from industry and academic institutions to collaborate on innovative carbon-use technologies at large industrial scale and test the conversion of carbon dioxide into marketable products.⁵⁴

Finally, the carbon price has already proven to be an effective instrument to stimulate innovation. All but one of the coal-fired power producers have announced their conversions to natural gas as early as 2022 instead of 2030, which is made feasible by natural gas as a readily available resource.⁵⁵

Social support schemes

Social support schemes established by the provincial government focus on re-employment and re-skilling of the existing workforce and providing financial support to coal workers and communities. The programmes do not make a distinction between workers affected by federal or provincial phase-out legislation. They are based on recommendations of the Advisory Panel on Coal Communities that was established in September 2016.⁵⁶ To secure continued employment, the Off-Coal Agreements between the Government of Alberta and the power companies require them to fulfil existing and future legal obligations to affected employees, maintain their headquarters in Alberta, keeping a nominal number of employees in Alberta, and continuing to invest in Alberta's electricity system and in their surrounding communities.⁵⁷

In order to support re-skilling of workers, the Government of Alberta offers a tuition voucher to pursue post-secondary education, onsite career counselling services and onsite transition to employment services. Furthermore, projects are developed to help Indigenous people gain the skills required to participate in the workforce.⁵⁸

Financial support programmes for affected workers include bridging to re-employment and retirement as well as relocation assistance.⁵⁹ Next to financial support for affected workers, the government also provides compensation to the power companies. The Off-Coal Agreements entail a compensation scheme amounting to CAD 1.36 billion cumulative to be paid out in yearly instalments until 2030.

The provincial government places emphasis on addressing affected communities. Communities and municipalities could apply to the Coal Community Transition Fund for

⁵⁴ Government of Alberta (2017) **Climate Change Innovation and Technology Framework 2017**

⁵⁵ Financial Post (2017) **Alberta Could be Coal-free Years ahead of Deadline as ATCO Plans Transition to Natural Gas by 2020**

⁵⁶ Advisory Panel on Coal Communities (2017) **Supporting Workers and Communities: Recommendations to the Government of Alberta**

⁵⁷ IISD (2018) **The End of Coal: Alberta's Coal Phase-out**

⁵⁸ Government of Alberta (2018) **Support for Workers Affected by Coal Phase Out**

⁵⁹ Government of Alberta (2018) **Support for Workers Affected by Coal Phase Out**

grant funding for initiatives that support economic diversification and development over two years. Grant recipients were announced in March 2018 and initiatives included activities like tourism development, agribusiness economy development and feasibility studies.⁶⁰

Access to finance and public investment

In the 2018 budget of the Climate Leadership Plan the Government of Alberta committed to provide CAD 183 million to fund innovation and technology.⁶¹ Moreover, the Government of Alberta set up the Energy Innovation Fund that will invest CAD 1.4 billion over seven years for innovation projects. The fund will be financed by revenues from the carbon tax that was established by the CLP.⁶²

In order to support affected communities, municipalities and workers, the provincial government established the Coal Community Transition Fund (CAD 5 million) and the Coal Workforce Transition Fund (CAD 40 million) based on recommendations from the Advisory Panel on Coal Communities.⁶³ According to the Canadian Centre for Policy Alternatives, a total of CAD 195 million is allocated to help coal communities (and Indigenous communities) transition.⁶⁴ The majority of funding will come from the provincial government budget with a portion coming from the carbon tax revenues. In contrast, the private sector made no tangible financial commitments.

In 2017, the Federal Environment and Climate Change Minister announced that the federal government would support the coal workers and communities in Alberta.⁶⁵

⁶⁰ Government of Alberta (2018) **Helping Coal Communities Diversify**

⁶¹ Government of Alberta (2018) **Climate Leadership Plan: Implementation Plan 2018-19**

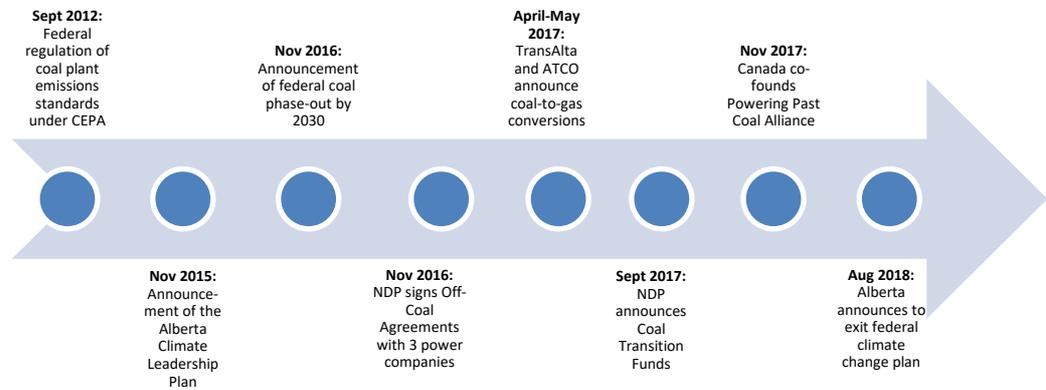
⁶² Government of Alberta (2018) **Climate Leadership Plan**

⁶³ Government of Alberta (2017) **New Transition Supports for Alberta Coal Workers**; Government of Alberta (2018) **Coal Community Transition Fund**

⁶⁴ Canadian Centre for Policy Alternatives (2018) **Making Decarbonization Work for Workers**

⁶⁵ Canadian Labour Congress (2017) **Unions Applaud Canada's Commitment to a Just Transition for Coal Workers**

Timeline of the transition⁶⁶



Preliminary assessment of the effectiveness of the transition strategy

Alberta is the only province in Canada that has taken tangible steps toward a Just Transition policy package. Many elements of the transition process suggest that it will be successful over the long-term. For example, the Climate Leadership Plan was designed in a participatory process that integrated key stakeholders through various consultation formats, increasing buy-in and ownership of the plan. Moreover, it places emphasis on supporting not only affected workers but also affected communities. Although social support measures were introduced with delay after announcing the coal phase-out, workers and labour unions appear to have received the funding programs well.⁶⁷ The CLP now provides a stable political framework and creates a vision for the region that serves as a basis for future measures.

The Canadian Centre for Policy Alternatives argues that the transition framework is 'short-sighted' as it focuses only on transitioning coal communities but not the oil and gas communities.⁶⁸ Employment in the oil and gas sector is far larger than in the coal sector and so are the emissions resulting from the former. It remains to be seen whether the Climate Leadership Plan will trigger a transition away from all fossil fuels towards a zero-carbon future for the province.

⁶⁶ See also IISD (2018) **The End of Coal: Alberta's Coal Phase-out** for a timeline of factors involved in the coal phase-out in Alberta

⁶⁷ IISD (2018) **The End of Coal: Alberta's Coal Phase-out**

⁶⁸ Canadian Centre for Policy Alternatives (2018) **Making Decarbonization Work for Workers**

Conclusion

In 2015, the Government of Alberta adopted the Climate Leadership Plan driven by high economic pressure on coal and the availability of natural gas as a cost-effective alternative of coal. Climate and health concerns further facilitated the adoption of the strategy. The federal government has taken a progressive stance on climate policy, illustrating the importance of guidance from the national level for successful transition processes. The Climate Leadership Plan provides the province with a ‘made-in-Alberta solution’ to the reduction of greenhouse gases.

Although incumbent actors played a major role in determining the transition strategy, new actors, such as research institutes, also influenced its direction. Their role is becoming more important as programmes have been created to support innovation and clean technology. For instance, the Government of Alberta established the Climate Change Innovation and Technology Framework (CCITF) to foster innovations for the CLP. Various funding programmes under the CCITF provide promising opportunities for less established actors to get involved and support Alberta’s transition with innovative ideas.

With large oil and gas resources, fossil fuels continue to play a major role in Alberta’s economy. After a federal court halted construction on the much-contested Trans Mountain pipeline expansion in August 2018, Alberta announced to drop out of the national climate change plan, while confirming commitment to its own plan.⁶⁹

Ústecký kraj, Czech Republic

The national and regional context

Ústecký kraj is the main lignite mining region of the Czech Republic. It is located in north western Bohemia, sharing a boarder with Germany. With 826,000 inhabitants it makes up 7.7% of the Czech population. The region contributes 6% to the Czech GDP and has a strong industry sector, which contributes 44% to regional GDP and 27% of employment in the region. Aside from lignite mining and electricity generation, the regional industry focuses on low-value activities, such as the production of automobile parts, mineral and metal as well as machinery and chemicals. With 8% Ústecký kraj is the Czech region with the highest unemployment rate.⁷⁰ The region is characterized by low innovative capacity and suffers from a lack of opportunity for higher education. According to the 2017 Regional Innovation Scoreboard, the region is ranked as a ‘moderate-innovator’ with an innovation performance below the EU average.⁷¹

⁶⁹ Global News (2018) [Canada’s Climate Change Plan – Alberta is out, so is it Dead on the Table?](#)

⁷⁰ Heinrich-Böll-Stiftung/E3G/DUH (2018) [Europäische Braunkohleregionen im Wandel: Herausforderungen in Deutschland und Tschechien](#) (in German)

⁷¹ European Commission (2017) [Regional Innovation Scoreboard 2017](#)

Technology and innovation capability of the Czech Republic is among the strongest in Central and Eastern Europe. However, there is a lack of government legislation to promote low-carbon innovation and create a stable policy framework to draw in investors.⁷²

The Czech Republic is among the European countries with very high reliance on domestic coal to meet its energy needs (51.5% in 2014, mostly lignite) but it is also facing a decline of the coal-mining industry.⁷³ With 6 opencast mines Ústecký kraj produced around 52.3 million tons of lignite in 2015.⁷⁴ The mines and adjacent coal power plants provide 7,000 relatively well-paid direct jobs, which make up 3.8% of jobs in the region.⁷⁵

The Czech Republic does not have an official phase-out date for coal but the need for a transition is increasingly recognized. The national energy strategy envisages a decreased role for fossil fuels and reduction of jobs in the lignite sector over the coming decades. It assumes halving of employment in mining from 20,000 to 10,000 between 2015 and 2035 and employment in coal power plants is projected to sink from 5,000 to 2,000 in the same period.⁷⁶ There are already phase-out plans for several coal plants. The state-owned energy company ČEZ plans to phase-out 3,000 MW of the existing 4,600 MW by 2035.⁷⁷ The political debate was long dominated by a controversy on the extension of lignite mines in Czech Republic and the limits in place following a 1991 decree by the federal government could represent a de fact phase-out of lignite mining in Northern Bohemia.

In January 2017, the then social-democratic government adopted a strategy for the economic restructuring of the country's main mining regions, after they asked for support in developing their economies. The three coal regions, Ústecký, Moravskoslezský and Karlovarský kraj, are also the country's poorest regions. Thus, the transition is not driven by climate concerns but by increasing economic pressure on the coal sectors and the need to diversify the regional economies. The strategy, named RE:START, is a top-down programme with the goal to diversify the regional economy, improve the training of the workforce and increase the share of high-value added industry. The implementation of RE:START is based on annually updated action plans. So far, two action plans have been adopted in 2017 and 2018. The strategy is used by national and regional governments as well as local actors to prepare the transition,

⁷² E3G (2017) **Climate & Energy Snapshot: Czech Republic**

⁷³ E3G (2017) **Climate & Energy Snapshot: Czech Republic**

⁷⁴ Heinrich-Böll-Stiftung/E3G/DUH (2018) **Europäische Braunkohleregionen im Wandel: Herausforderungen in Deutschland und Tschechien** (in German)

⁷⁵ Heinrich-Böll-Stiftung/E3G/DUH (2018) **Europäische Braunkohleregionen im Wandel: Herausforderungen in Deutschland und Tschechien** (in German)

⁷⁶ Czech Ministry of Industry and Trade (2014) **Doplňující analytický materiál k návrhu aktualizace Státní energetické koncepce** (in Czech)

⁷⁷ Heinrich-Böll-Stiftung/E3G/DUH (2018) **Europäische Braunkohleregionen im Wandel: Herausforderungen in Deutschland und Tschechien** (in German)

however, the strategy does not come with a normative view about whether coal mining should continue in the regions or not.⁷⁸

Champions and veto players

RE:START was adopted by the previous social-democratic government and the current government continues its implementation. Most of the regional governments have favoured the expansion of mining limits. Similarly, Czech energy companies have traditionally been lobbying to keep their coal power plants operational for as long as possible and to have limits of their mining areas expanded. The strongest actor in the energy sector, ČEZ, is largely state-owned and operates 72% of country's generation capacity. ČEZ is reorienting its business model away from coal.⁷⁹ Next to ČEZ, which is active in mining and electricity, Sev.en Energy is a major mining company in Ústecký kraj.

Trade unions representing coal miners have a strong influence on climate and energy policy and are strongly opposed to any measure that might impact coal.⁸⁰ Low-carbon business groups are relatively well organized in the Czech Republic and there exist a number of expert platforms for dialogue on renewables and energy efficiency but their influence is limited.⁸¹ Environmental NGOs are against any extension of the lignite mines and have mobilized protests in the past, however, they have little influence within the political system.

Start-ups and universities do not position themselves in the debate about coal phase-out, but the latter prepare programmes such as new study opportunities to help the transition from coal and heavy industry. There is no strong evidence for a role of the regional development agency in catalysing a transition away from coal.

Innovation measures

RE:START recognizes innovation and technology as central elements of the transition. Among its pillars are business and innovation, research and development with higher benefits for economy, and a well-educated workforce. Moreover, the 2017 action plan consists of 65 different actions, focusing primarily on growing businesses and their innovation potential, strong support of R&D activities, development of university education and its quality.⁸²

⁷⁸ Just Transition (n.d.) **Strategy for Coal Mining Regions in Czechia Brings Hope**

⁷⁹ E3G (2017) **Climate & Energy Snapshot: Czech Republic**

⁸⁰ E3G (2017) **Climate & Energy Snapshot: Czech Republic**

⁸¹ E3G (2017) **Climate & Energy Snapshot: Czech Republic**

⁸² Office of the Government Commissioner for MSR, ÚR and KVR (n.d.) **Strategy of Economic Restructuring of Usti, Moravian-Silesian and Karlovy Vary Regions**

There are various initiatives and newly founded institutes in the region that might play a role in catalysing the region's transition. The Palivový Kombinát Ústí, the state company in charge of remedying the destruction caused by mining during the communist era helps with the ecological restoration of the region. Lately, the company started getting involved in more complex projects, for example working together with research universities on creating large heat-pumps using mining water (pumped-storage hydroelectricity) in the location of a former coal mine.⁸³ The region's University of Jan Evangelista Purkyně in Ústí nad Labem (UJEP) has a relatively diverse range of fields of study and its research activities focus on materials and technologies for the environment, as well as on the role of city and region in addressing current societal and economic challenges. The private Unipetrol Centre of Research & Education carries out research and development for, among others, renewable and environmental technologies.⁸⁴ Finally, the Innovation Centre of the Ústí Region was established by the Ústí Region, UJEP and the Regional Chamber of Commerce of the Ústí Region in 2015 and aims to encourage innovations, entrepreneurship and the transfer of knowledge between corporations and research.⁸⁵

Municipalities also have an interest in finding innovative solutions for the economic restructuring of the region. For instance, the mayor of Horní Jiřetín in the Ústecký kraj region attempts to restore occupations that were once traditional in the town and invited architecture students to create a plan for locations of various small businesses.⁸⁶

Social support schemes

RE:START does not focus specifically on miners as regular retirement is expected to be high due to the age structure. Instead, it centres on reemploying people who have been unemployed for a long time, keeping young people in the region and creating alternative job opportunities in other sectors. As such, the pillar "Human resources" of the strategy framework aims to increase the number of inhabitants able to work in industry, services and public service.

Access to finance and public investment

EU structural and cohesion funds are one of the most important sources for public investments in the Czech Republic. From 2007-2013 they made up 34.3% of all public investment and their share is even higher in Ústecký kraj as the region is a major recipient of the EU funds.⁸⁷ For the period 2014-2020, the country was allocated €23

⁸³ Just Transition (n.d.) **Strategy for Coal Mining Regions in Czechia Brings Hope**

⁸⁴ **Unipetrol Centre for Research and Education**

⁸⁵ **Innovation Centre of the Usti Region**

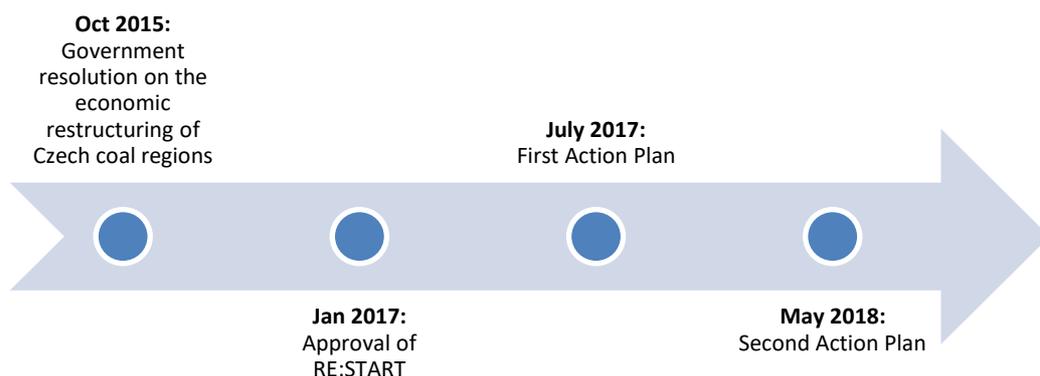
⁸⁶ Just Transition (n.d.) **Strategy for Coal Mining Regions in Czechia Brings Hope**

⁸⁷ Heinrich-Böll-Stiftung/E3G/DUH (2018) **Europäische Braunkohleregionen im Wandel: Herausforderungen in Deutschland und Tschechien** (in German)

billion of European Structural Investment Funds, with €1.9 billion planned investments in energy efficiency and €53 million in renewables.⁸⁸ Due to previous instances of misuse of EU funds through corruption the Regional Operation Programme for the period 2014-2020 is managed at the national level instead of each region managing its own programme.⁸⁹ In fact, regional development funding is highly centralized in the Czech Republic and managed as a top-down process, reducing the opportunities for bottom-up initiatives for regional development.

RE:START attempts to make access to funding easier for regions. The strategy allocates CZK42 billion (€1.5 billion) over the first three years to development activities in the three coal mining regions. Of that, CZK 8.4 billion came from European structural and investment funds, CZK 2.4 billion from privatisation, CZK 18.1 billion represented a national budget increase and CZK 13 billion represented already allocated money in the ministry budgets.⁹⁰

Timeline of the transition



Preliminary assessment of the effectiveness of the transition strategy

RE:START has the potential to move Czech coal regions forward through a structured plan. It could potentially provide a frame for coordination between decision-makers and local communities and help to attract targeted investment and partners for projects. It is considered a step in the right direction by stakeholders, including trade

⁸⁸ E3G (2017) **Climate & Energy Snapshot: Czech Republic**

⁸⁹ Heinrich-Böll-Stiftung/E3G/DUH (2018) **Europäische Braunkohleregionen im Wandel: Herausforderungen in Deutschland und Tschechien** (in German)

⁹⁰ Just Transition (n.d.) **Strategy for Coal Mining Regions in Czechia Brings Hope**

unions and environmental non-governmental organisations (ENGOS).⁹¹ The program still must overcome many challenges in order to deliver the desired results. Uncertainties remain as to whether subsequent governments will continue supporting the strategy, whether funding from Prague will in fact reach regions and whether enough project proposals will be developed to diversify the local economies.⁹²

Conclusion

Although the Czech Republic does not have an official phase-out date, the need for a lignite region transition is increasingly recognized due to a lack of competitiveness of the coal sector. The Czech lignite mining regions are the country's poorest regions, which has resulted in regional and central governments starting a process to restructure the economies of these regions. To this aim, in 2017, RE:START was developed as a strategy for the economic diversification of these regions. Thus, economic and not climate concerns are driving the transition.

Ústecký kraj is home to a broad range of innovative actors, such as the University of Jan Evangelista Purkyně in Ústí nad Labem (UJEP) or the Innovation Centre of the Ústí Region that may play a future role in catalysing the transition away from lignite production. RE:START and its emphasis on enhancing the innovative potential of the region may provide a strategic framework for their involvement.

Next to the national budget, EU structural and cohesion funds play a major role in financing the transition as they are one of the most important sources for public investments in the Czech Republic.

Upper Nitra, Slovakia

The national and regional context

Upper Nitra (Horná Nitra) is Slovakia's main lignite mining region. It is located between Central and Western Slovakia and composed of the districts of Prievidza and Partizánske in the administrative region of Trenčín. Trenčín has 592,400 inhabitants, representing 9% of the country total, of which 184,000 live in the Upper Nitra area.⁹³ The industrial sector provides almost 50% of the jobs in the Trenčín region, while education, trade and services also hold significant shares. Unemployment has been declining due to the arrival of new multinational investors in the region and was 4% in

⁹¹ Heinrich-Böll-Stiftung/E3G/DUH (2018) **Europäische Braunkohleregionen im Wandel: Herausforderungen in Deutschland und Tschechien** (in German)

⁹² Just Transition (n.d.) **Strategy for Coal Mining Regions in Czechia Brings Hope**

⁹³ Donnari, E. et al. (2018) **Socio-Economic Transformation in Coal Transition Regions: Analysis and Proposed Approach: Pilot Case in Upper Nitra, Slovakia**

2017, which is below the national average of 7%, as well as the European average.⁹⁴ The wider Zápádne Slovensko Region to which Trenčín belongs was rated as a 'moderate innovator' in the latest Regional Innovation Scoreboard of the European Commission.⁹⁵ Slovakia ranks at the lower end of the EU in terms of innovation and technology capability and investment in R&D is low.⁹⁶

The Upper Nitra region represents most of the lignite mining with two out of three still-working lignite mines left in Slovakia as well as a significant portion of coal firing. Mining Company HBP (Mines of Horna Nitra Prievidza) is the only coal mining company in the country and controls all three lignite mines. HBP mines have produced 170 million tons of lignite between 1945 and 2007, with highest annual yields being around 4 million tons. Production had been decreasing steadily since then to around 1.8 million tons in 2017.⁹⁷ On the national level, hard coal is imported, since domestic lignite is of low quality and expensive. Coal firing makes up 20% of total primary energy supply and 11% of Slovakia's heat production.⁹⁸ Lignite alone constitutes only 1.7% of national heat production.⁹⁹

The number of jobs provided by the coal sector is small. Estimates of the number of employees vary between 3,500 by HBP itself, coming mostly from the region and of which 1,700 would be direct mining jobs, to an estimate of 700-1,000 jobs by Greenpeace.¹⁰⁰ The number of employees in HBP has been continuously decreasing and open positions for mining jobs are not easily occupied.¹⁰¹

A possible phase out of lignite mining and burning has been under discussion for several years at the national level in Slovakia and is driven by the declining economic competitiveness of coal. In December 2017, Environment Minister László Sólymos declared 2023 as the target year for Slovakia's coal phase-out in both the mining and power sectors but this has not been formulated as national policy.¹⁰² Lignite mining and co-firing has been subsidised since 2005 through a feed-in tariff, which is under a state aid investigation by the European Commission since 2016. In November 2018, the Slovak government announced an end the subsidy in 2023.¹⁰³ However, this does not necessarily imply an end of coal firing or mining.

⁹⁴ Donnari, E. et al. (2018) **Socio-Economic Transformation in Coal Transition Regions: Analysis and Proposed Approach: Pilot Case in Upper Nitra, Slovakia**

⁹⁵ European Commission (2017) **Regional Innovation Scoreboard 2017**

⁹⁶ E3G (2018) **Climate & Energy Snapshot: Slovakia**

⁹⁷ HBP (2018) **Annual Report 2017**

⁹⁸ IEA (2018) **Energy Policies of IEA Countries: Slovak Republic 2018 Review**

⁹⁹ Greenpeace CEE (2018) Slovakia's Horna Nitra Region as a Successful Pilot Case for the Coal Regions in Transition Platform (*unpublished briefing*)

¹⁰⁰ Greenpeace CEE (2018) Slovakia's Horna Nitra Region as a Successful Pilot Case for the Coal Regions in Transition Platform (*unpublished briefing*)

¹⁰¹ Donnari, E. et al. (2018) **Socio-Economic Transformation in Coal Transition Regions: Analysis and Proposed Approach: Pilot Case in Upper Nitra, Slovakia**

¹⁰² Europe Beyond Coal (2018) **Overview: National Coal Phase-out Announcements in Europe**

¹⁰³ Reuters (2018) **Slovakia to Pull Plug on Coal Subsidies from 2023**

In January 2017, the Mayor of Prievidza in cooperation with the Association of Towns and Municipalities of Upper Nitra invited local stakeholders to begin developing an Action Plan for the post-coal development of the Upper Nitra region.¹⁰⁴ Preparation of the Action Plan has been taken to the national level and a working group was created to this aim. The Action Plan is expected to be finalized by the beginning of 2019 with assistance from Price Waterhouse Coopers (PwC) and approved by the federal government in April 2019.

The Trenčín region is a pilot region of the European Union's Coal Regions in Transition Platform, which was founded by the European Commission at the end of 2017 to assist regions looking for alternative ways to develop to coal. In support of the EU Coal Regions in Transition Platform the Commission's Joint Research Centre (JRC) carried out an analysis and proposed applying the smart specialisation methodology for the socio-economic development of the region.¹⁰⁵ Smart specialisation (S3) is an EU policy approach to promote regional economic transformation towards smart, sustainable and inclusive growth.

Champions and veto players

Most political stakeholders have acknowledged that a gradual coal phase-out would be viable within 5-7 years. The creation of the Coal Regions in Transition Platform has brought new life into these discussions, in particular by creating expectations for new investments. Before the official decision to terminate the lignite feed-in-tariff, several Slovak government ministers had already come out in favour of an earlier phase out of the subsidy. Similarly, a close-down of lignite mines in Upper Nitra is considered an option by some ministers if guided by a clear action plan. At the same time, the Slovak government has close ties to the coal industry.

At the regional level, the current progressive opposition mayor of Prievidza has initiated the Action Plan but faced a discrediting campaign during the last election. HBP openly supported a government party candidate that opposed the coal phase-out. This candidate did not win the election, illustrating that there is regional support for the coal phase-out.

HBP was privatised in 1996 with the then-director playing an important role in the process and to this day holding over 40% of the company shares.¹⁰⁶ In 2016, the company submitted a proposal for a new underground mine in Upper Nitra for which the environmental impact assessment is still ongoing.¹⁰⁷ This mining field would

¹⁰⁴ Prievidza (2018) **Upper Nitra Action Plan**

¹⁰⁵ Donnari, E. et al. (2018) **Socio-Economic Transformation in Coal Transition Regions: Analysis and Proposed Approach: Pilot Case in Upper Nitra, Slovakia**

¹⁰⁶ Greenpeace CEE (2018) Slovakia's Horna Nitra Region as a Successful Pilot Case for the Coal Regions in Transition Platform (*unpublished briefing*)

¹⁰⁷ Just Transition (n.d.) **What You Should Know about the Slovakian Coal Phaseout Announced in Paris**

prolong coal mining in Slovakia until 2034. However, the HBP Chairman has also gone on record that a closure of the mines within 5-7 years could be possible.

Lignite mined in Upper Nitra is used in the CFPP Nováky power plant. The Slovak Energy Company, responsible for running the Nováky power plant has announced that the power plant would require dozens of millions in investment in modernisation in the next 5 years which it does not have and does not plan to invest.

Slovak unions dominate civil society voices. They are generally defensive about environmental regulation and low-carbon competition affecting their industries.¹⁰⁸ Mining unions in Upper Nitra have recently submitted a petition to preserve mining jobs in the region, however, reports by Slovak national media suggest that these signatures were brought about by corrupt and extortion-based practices employed by HBP against its own employees.¹⁰⁹

Members of civil society organisations (CSOs) participated in the development of the Action Plan at the local level. In the working group at the national level they are granted observer status. In general, Slovak CSOs are rather weak and few work on climate change. Small domestic CSOs working on environmental topics have particular difficulties in maintaining their financial independence, obtaining access to political decision-making and increasing their visibility and popularity.¹¹⁰

The regional development agency takes part in developing the Action Plan, but it does not assume a visible role. There is no strong evidence for start-ups or academia such as the University of Trenčín supporting the transition away from coal.

Innovation measures

Innovation is mentioned in the Action Plan. However, as the plan is in a very initial stage, it is not yet supported by concrete actions or institutions. In March and April 2018 there was a call for projects from the government of Upper Nitra to support the Action Plan. 82 projects with a value of €1.2 billion were collected, with seven projects focusing on innovation. The quality and readiness of some of these projects is questionable and the call was considered controversial by stakeholders.

A report by JRC recommends applying smart specialisation (S3) as an instrument for economic restructuring of the Upper Nitra region. It expects that this will create opportunities for developing and implementing innovation and clean technology undertakings. For instance, the report highlights that the further development of the tourism sector can be an important part of the sectoral diversification of the Upper Nitra region.¹¹¹

¹⁰⁸ E3G (2018) **Climate & Energy Snapshot: Slovakia**

¹⁰⁹ Just Transition (n.d.) **Slovakia: HBP suspected of using dubious practices to gain support for coal mining jobs**

¹¹⁰ E3G (2018) **Climate & Energy Snapshot: Slovakia**

¹¹¹ Donnari, E. et al. (2018) **Socio-Economic Transformation in Coal Transition Regions: Analysis and Proposed Approach: Pilot Case in Upper Nitra, Slovakia**

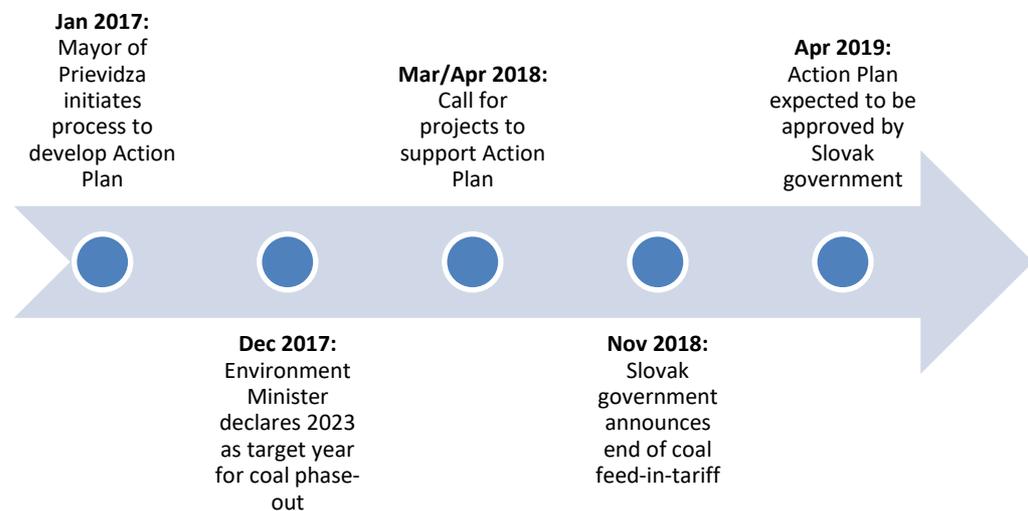
Social support schemes

As the Action Plan is not yet finalized, no social support schemes have been implemented. The Action Plan does not address affected workers and communities specifically, but rather the economic restructuring of the region.

Access to finance and public investment

EU funds play a significant role in Slovakia with around 75% of public investments in Slovakia being based on EU funds.¹¹² The most important vehicles for this funding are the European Structural and Investment Funds, i.e. the European Regional Development Fund and the Cohesion Fund. The majority of this financing is directed at regional policy, while a significant share is also allocated to agriculture and rural development. For the period 2014-2020 Slovakia was allocated a total of €20.1 billion of European Structural Investment Funds. Of these €1.35 billion are planned investments in energy efficiency and renewables.¹¹³ Slovakia has received a grant from the Directorate-General for Regional and Urban Policy (DG REGIO) for technical support for the Action Plan preparation amounting to €350,000. EU funds will play an important role in supporting the transition in Upper Nitra. So far, there is no budget allocated for the Action Plan.

Timeline of transition



¹¹² European Commission (2014) [EU Budget Slovakia](#)

¹¹³ E3G (2018) [Climate & Energy Snapshot: Slovakia](#)

Preliminary assessment of the effectiveness of the transition strategy

It is too early to draw conclusions on the effectiveness of the Action Plan for Upper Nitra.

Conclusion

The transition of the Upper Nitra region has only recently begun with the development of an Action Plan. As Upper Nitra is an economically weak region, the transition is driven by high economic pressure on coal and resulting efforts for economic diversification, whilst climate concerns play an inferior role. The transition is pushed by local actors, such as the mayor of Prievidza, who was recently confirmed in office, illustrating that support for ending coal activities in the region is high. However, the counter-candidacy by a pro-coal candidate who was supported by the mining company HBP also shows that transition processes are fragile and depend on political leadership. Guidance from the federal government remains limited as it cooperates closely with the coal mining company HBP and makes contradictory statements on a potential date for a coal-phase out.

An analysis carried out by the European Commission's JRC in support of the EU Coal Regions in Transition Platform proposes to approach the socio-economic development of the region by applying the smart specialisation methodology. In the future, this may open up opportunities for new actors such as start-ups to get engaged in the transition process as well as for the development of projects enhancing the innovation and technology capacity of the region. Next to national budgets, EU structural funds will have to play an important role in these processes. Trenčín's engagement as a pilot region of the Coal Regions in Transition Platform can be expected to catalyse change.

South-West Oltenia, Romania

The national and regional context

South-West Oltenia (Sud-Vest Oltenia) is Romania's main lignite region located in the southwest of the country with approximately 1 million inhabitants. With a regional GDP of €12.5bn in 2016, it represents 7.3% of the national GDP. The most important sectors of the economy are energy production, industry, agriculture and tourism. The unemployment rate has decreased since 2015, reaching 7.7% in 2017, which is above the national average of 4.9%. According to the 2017 Regional Innovation Scoreboard, South-West Oltenia is a 'modest innovator'.¹¹⁴ R&D intensity in Romania remains one

¹¹⁴ European Commission (2018) [South West Oltenia](#)

of the lowest in the EU and has not increased since 2007.¹¹⁵ The country also ranks last in the European Innovation Scoreboard.¹¹⁶ Energy research is not a priority and the energy strategy's stated goal of turning Romania into a manufacturing centre for the energy transition is not backed up by required policies.¹¹⁷ Romania is an attractive outsourcing destination for international IT companies, but struggles to produce disruptive start-ups.

South-West Oltenia is the country's largest lignite basin with a production of 24Mt and 4,505 MW of coal-fired power plant capacity.¹¹⁸ 13,140 coal-related direct jobs, with 10,600 in mining and 2,540 in power plants, are located in the region.

There is no phase-out of lignite under discussion at the regional or national level. For this reason, the following analysis focuses more on the national level than on the regional situation. The coal sector is heavily subsidised by the state, even though it has increasingly become a burden to the state's finances. The energy strategy confirms an important role for fossil fuels and foresees only a slight decrease in coal use.¹¹⁹ Coal accounts for a quarter of the energy produced in Romania and is considered crucial for ensuring the stability of the energy system. Romanian lignite mining is one of the most inefficient in the EU, and the average age of coal plants is 37 years.

Interestingly, the phase-out of hard coal in Romania is almost completed. Jiu Valley is the country's main hard coal mining region. Hard coal mining has declined from 50,000 mine workers in 1989 to 4,700 today as the result of a 1997-2006 World Bank project which was aimed at closing unprofitable hard coal mines.¹²⁰ Despite support from the World Bank, no long-term economic or social programmes accompanied the transition. According to European Council Decisions, all hard coal underground activity should conclude by December 2018.¹²¹ Jiu Valley has become a pilot region under the EU's Coal Regions in Transition Platform.

Champions and veto players

The Romanian government supports coal and tries to extend coal lifespans for as long as possible, especially as both lignite and hard coal industries are overseen by largely state-owned companies. Romania's biggest party, the social-democratic PSD, dominates Romanian politics and is currently governing in a coalition with the liberal ALDE. The PSD is a strong supporter of fossil fuels because it has important electoral bases in fossil fuel counties. Secretaries of state for energy have close ties to the coal

¹¹⁵ European Commission (2017) **Romania 2017**

¹¹⁶ European Commission (2018) **European Innovation Scoreboard 2018**

¹¹⁷ Ministry of Energy (n.d.) **Romanian Energy Strategy 2016-2020, with an Outlook to 2030**

¹¹⁸ Alves Dias, P. et al. (2018) **EU Coal Regions: Opportunities and Challenges Ahead**

¹¹⁹ Ministry of Energy (n.d.) **Romanian Energy Strategy 2016-2020, with an Outlook to 2030**

¹²⁰ CEE Bankwatch Network (2018) **The Great Coal Jobs Fraud**; World Bank (2007) **Implementation Completion and Results Report**

¹²¹ European Council (2010) **Council Decision 2010/787/EU**

sector and all high-level officials in the Energy Ministry (including the Minister) have repeatedly expressed open support for the continued use of fossil fuels.¹²² Energy policy is mainly made by energy companies, administrative officials and unions, whereas parties tend not to get involved. Frustration about coal companies in the regions affected by mining activities grows, but overall support for coal is still high.¹²³

The fossil fuel sector is almost entirely state-controlled. Oltenia Energy Complex (CEO) is the main lignite coal producer in the country and produces 80% of coal-based electricity in Romania.¹²⁴ It is also the third largest employer in Romania, with 13,280 employees in 2017, but is in decline (down from 45,000 employees in 1994, and made a loss of €200 million in 2015 alone).¹²⁵ The Energy Ministry owns a 77% share of the company.¹²⁶ CEO pressures the Romanian government to issue governmental decisions to expropriate land and homes to enable further expansion of mines. State-owned Hunedoara Energy Complex (CEH), which operates two thermal power plants and the remaining four hard coal mines in Jiu Valley, has been loss-making since 2013 and entered temporarily into formal insolvency proceedings under Romanian law, which are suspended since January 2016. Recently, an investigation by the European Commission found that CEH received around €60 million of incompatible State aid from Romania through four publicly financed loans. Romania now needs to recover the illegal aid plus interest.¹²⁷

Trade union leaders refuse to accept the decline of their industry despite massive redundancies, and do not engage in discussions about Just Transition.

Regional development agencies have an active role in helping the transition as they are the managing authorities for EU regional development funds and have initiated smart specialisation strategies.

Energy efficiency and renewable energy stakeholders have weak organisational capacity and aren't well networked with potential allies (e.g. NGOs, academic institutions). They have little to no regular contact with government officials. Similarly, there is limited institutionalized role for NGOs in the decision-making process and Romania has one of the EU's lowest NGO participation rates. The Romanian branches of the NGOs Greenpeace and CEE Bankwatch intend on moving conversations on a Just Transition of Romania and specifically Gorj County in Oltenia forward, and they organized a roundtable event in 2017 during which the present actors agreed that the county needs economic alternatives to coal.¹²⁸

¹²² Energy Transition (2018) **No Plans to Phase Out Coal in Romania, Despite Diverse Energy Mix**

¹²³ CEE Bankwatch Network (n.d.) **A Village Disappearing**

¹²⁴ CEE Bankwatch Network (n.d.) **Eight Steps for a Just Transition**

¹²⁵ CEE Bankwatch Network (2018) **The Great Coal Jobs Fraud**

¹²⁶ CEE Bankwatch Network (2018) **The Great Coal Jobs Fraud**

¹²⁷ European Commission (2018) **State Aid: Romania Needs to Recover around €60 Million of Incompatible Aid from Energy Producer CE Hunedoara**

¹²⁸ CEE Bankwatch Network (2017) **Making the Coal Phase Out Fair for Workers – Unions, Companies, and Environmentalists Discuss Just Transition in Romania**; CEE Bankwatch Network (n.d.) **Eight Steps for a Just Transition**

Academia, such as universities and research institutes, as well as start-ups or new businesses do not seem to play a role or have a position on Just Transition. Especially in Romanian coal regions, this can be attributed to the fact that these regions tend to be economically underdeveloped, lacking workforce and infrastructure.

Innovation measures

Neither the national nor regional governments have put in place a Just Transition strategy, however, there are promising developments in the field of innovation. In 2014, the government developed its National Strategy for Research, Development and Innovation for 2014-2020.¹²⁹ Because of the increasing importance of supporting innovation in Romanian regional policies, South-West Oltenia has adopted a 2014-2020 Regional Development Strategy. It focuses on promoting the competitiveness of the regional economy in industry, agriculture and the digital economy sectors. Moreover, to promote development in Oltenia, the Regional Development Agency elaborated the Regional Strategy for Innovation and Smart Specialization in 2015.¹³⁰

In addition, the Romanian government has created programmes to support entrepreneurship, but they do not have a regional focus. Based on national funding, 'Start-up Nation' awarded 10,000 start-ups with financial support to develop their businesses. Incentives such as lower tax rates are available for economically weak regions like Oltenia. 'Start-up Plus' offers training and funding to build-up start-ups based on EU funds targeting human capital development. However, these initiatives do not have an explicit focus on green businesses. Within 'Start-up Plus' applicants with a green business model receive a higher amount of funding.

Furthermore, some universities address topics around the transition. For example, the Technical University of Civil Engineering in Bucharest offers a master's programme in energy efficiency of building systems.¹³¹

It is notable that Romania has an exceptionally high potential for additional renewable energy capacities, which provides an opportunity for Romania to become a regionally important producer and user of clean technologies. Potentials overlap with current high-carbon regions.¹³² Especially the South has good additional cost-competitive solar PV potential (up to 17GW), and the country has one of the most competitive wind potentials in Europe (14-50 GW). Romania already hosts Europe's largest onshore wind park with 600MW. Today renewables account for 25% of gross final energy consumption and have a 43% share in the electricity mix. The investment boom was facilitated by the Green Certificate Scheme introduced in 2008. The strong growth was unexpected, and the scheme was cut back in 2013 and ended in 2016, creating major investment uncertainties.

¹²⁹ Romanian Government (2014) **National Strategy for Research, Development and Innovation 2014-2020**

¹³⁰ European Commission (2015) **Regional Innovation Strategy for Smart Specialization for South-West Region Romania**

¹³¹ Technical University of Civil Engineering Bucharest (n.d.) **Master Energy Efficiency of Building Systems**

¹³² Alves Dias, P. et al. (2018) **EU Coal Regions: Opportunities and Challenges Ahead**

Social support schemes

As Romania has not yet implemented a transition strategy for its coal regions, social support schemes are lacking.

Access to finance and public investment

EU funds play an important role in Romania and will continue to do so in implementing a potential Just Transition strategy. More than 60% of public investments in Romania could be covered by EU funds in the 2014-2020 period. Romania is receiving €22.4 billion in EU cohesion policy funding for the 2014-2020 period, and €30.9 billion in EU funding in total.¹³³ Out of this, €1.5 billion is invested in sustainable energy, and €3.7 billion in low-carbon transport.¹³⁴

Timeline of the transition

As no tangible steps have been taken in Romania towards developing a Just Transition strategy for its coal regions, no timeline will be included.

Preliminary assessment of the effectiveness of the transition strategy

As Romania has not yet implemented a transition strategy for its coal regions, it is too early for a preliminary assessment of its effectiveness.

Conclusion

There is no phase-out plan or long-term Just Transition strategy under discussion either in South-West Oltenia or at the national level, even though the coal sector faces significant deficiencies. Instead, coal is heavily subsidised by the state and the current government strongly supports coal.

Romania has an exceptionally high potential for additional renewable energy capacities, which overlaps with high-carbon regions and provides an opportunity for Romania to become a regionally important producer and user of clean technologies. Given an unstable policy framework and a lack of incentives after the abolishment of RES subsidies in 2016, the achievement of this goal is currently unlikely. Several Romanian institutions and programmes might play a future role in fostering low-carbon innovation and technology. Jiu Valley's engagement in the EU's Coal Regions in Transition Platform as a pilot region might support the development of a regional transition strategy and make local initiatives more relevant. As EU funds make up more

¹³³ European Commission (2014) **Summary of the Partnership Agreement for Romania, 2014-2020**; European Commission (2016) **European Structural and Investment Funds Factsheet Romania**

¹³⁴ European Commission (2017) **Energy Union Factsheet Romania**

than half of public investments in Romania, they will very likely play an important role in financing a Just Transition plan.

COMPARATIVE ANALYSIS OF CASES

The following section will compare the five cases studied across several variables in order to better understand the various facets of transition processes and the role that innovation plays for transformative change. It will look at the stage and drivers of the transition, key stakeholders, innovation measures, support schemes, and the role of public and private funds. A summary of the findings from the comparative analysis can be found below in *Table 1*.

All cases are at a different stage of the transition process. While the transition of South Limburg was considered completed in 1990, most cases analysed are in an initial phase of the transition process. Alberta put forward a comprehensive transition strategy in 2015 and has already established corresponding funds and programmes. The Czech Republic adopted its strategy for the economic restructuring of the country's mining regions in 2017 and has developed two action plans. In Slovakia, stakeholders began developing an Action Plan for the post-coal development of Upper Nitra in 2017. The final Action Plan is planned to be ready at the beginning of 2019 and to be approved by the federal government in April 2019. In contrast, in Romania civil society is driving early discussions on Just Transition but a systemic coal phase-out or a transition strategy are not under discussion at the government level despite high economic pressure on the coal sector.

The transitions studied are all driven by declining economic viability of the coal sector, whilst climate concerns play only an indirect role. Moreover, economic diversification and the availability of natural resources are crucial aspects in various cases. As coal mining regions are often economically weak, high economic pressure on coal resulted in political efforts to diversify the regional economies in South Limburg, Ústecký kraj and Upper Nitra. Climate targets did not directly trigger the transition. They played an important role indirectly by changing the economic fundamentals of coal, for example through the introduction of carbon-pricing and support schemes for renewables. The closing of mines was part of the transition strategy in South Limburg but a coal phase-out is not part of RE:START or the Action Plan for Upper Nitra. Similarly, Alberta's Climate Leadership Plan is driven by declining economic competitiveness of coal, but it is also motivated by the aim to eliminate emissions and air pollution from coal production and related negative health impacts. Therefore, the phase-out of coal emissions is a central goal of the transition strategy.

In addition, in South Limburg and Alberta, the transition was facilitated by the availability of natural gas as a cost-effective alternative resource to coal. Similarly, Romania has large natural gas offshore reserves in the Black Sea. Yet, it is unclear if this

may support a transition soon as coal continues to play an important role in the country's energy strategy.

Importantly, future transitions will not be driven by market developments alone but by the necessity to reach climate targets. This will put pressure on politics to shape this change and establish frameworks to guide these transitions.

The case studies show that transition strategies are developed with incumbent actors in all cases, while new actors play little to no role. In most cases, the transition is kicked-off by local or regional authorities. In the Czech Republic, the coal mining regions approached the national government for help in restructuring the regional economy. In Upper Nitra, the Action Plan was initiated and developed by local stakeholders and then taken to the national level. In Alberta, the provincial government developed and implements the transition strategy, however, the national government provides guidance through federal legislation. In South Limburg, the national government initiated and implemented the transition strategy, but the government of the Province took over at a later stage of the transition. The cases illustrate that clear signals and support from the national government are helpful for a successful transition process.

Mining and power companies play a major role in enabling or halting transition and have a lot of political leverage, either by being state-owned or by having close ties to the government. For instance, the Government of Alberta addressed the three major power companies through Off-Coal Agreements first and provided compensation as it recognized their important role in future electricity production after switching from coal to gas. In South Limburg, the Dutch State Mines successfully adapted to the new circumstances and transformed into chemical company DSM. Ultimately, potentials of intra- and entrepreneurship depend on local conditions.

Organized labour is often a key actor, aiming to protect old or secure new employment opportunities. For example, in South Limburg, trade unions campaigned using the slogan 'No closure without new employment' which became a central pillar of the restructuring process. However, trade unions are not necessarily veto players in the process. In South Limburg, they recognized the inevitability of scaling back of coal production due to market conditions. Similarly, the Alberta Federation of Labour (AFL) supports the Climate Leadership Plan.

New actors are less visible in transition processes. Civil society organizations often initiate discussions on transitioning away from coal as can be currently seen in Romania. However, particularly in many Central and Eastern European countries, civil society struggles with adequate organizational capacity and a lack of access to decision-makers, making it difficult to influence the process. Academia supports transition processes in some cases. In Alberta, research institutes make arguments for coal plant closure available and provide third-party validation through reports. In the Czech Republic, universities prepare study programmes to help the transition away from coal and heavy industry.

In most cases there is no strong evidence for the role of regional development agencies. They can be expected to play an important role in Romania in supporting the transition

as they are the managing authorities for EU regional development funds and initiated smart specialisation strategies for Romanian regions. Similarly, start-ups or new businesses do not play a visible role in the cases studied, even though potential actors could be identified, such as the Innovation Centre of the Ústi Region. This can be attributed to the fact that coal regions tend to be economically underdeveloped, lack workforce, costumers and infrastructure and thus provide unattractive grounds to found new businesses.

It should be emphasized that the regional context matters for the influence of different stakeholder groups. However, the limited engagement of new actors in supporting the transition suggests that their role can be enhanced. They might become particularly relevant in regions where the government lacks the will to initiate a transition.

Regarding the role of innovation in transition regions, public measures with the aim to foster innovation prevail because regional innovation and technology capability is often low. As coal mining regions tend to be economically weak with low innovation capabilities and capacities, efforts to increase capabilities are primarily a political undertaking and driven by public investments, rarely the private sector. In most cases, stakeholders recognize innovation and technology as essential pillars of the transition, but concrete implementation measures vary widely. All the transition strategies aim to create conducive framework conditions to support innovation and technology development. For example, Alberta established the Climate Change Innovation and Technology Framework to foster innovations for its Climate Leadership Plan and guide investments. Other measures to support innovation in the transition regions include the creation and development of higher education institutes, support for R&D and entrepreneurship, provision of venture capital and establishment of funds supporting innovation. In addition, Alberta introduced an economy-wide carbon price on transport and heating. The long-term effectiveness of these policy initiatives is key. In South Limburg the national government invested in many companies to secure employment, of which several went bankrupt during an economic recession in the 1970s. Importantly, there is no blueprint for supporting innovation in transition regions. Existing cases provide a toolbox, but solutions need to be developed at the local or regional level and depend on the specific contexts and stakeholders.

Where transition strategies foresee the phase-out of coal, social support schemes play an essential role. In these cases, re-employment and re-skilling of the existing work force is more important than attracting new workforce to the region. The creation of new jobs is a key element of some transition strategies in order to ensure re-employment. South Limburg attracted new companies, such as the automobile factory DAF, and established offices for national public services in the region. It also founded an employment-finding agency for each mine that was closed. Alberta's Off-Coal Agreements require the energy industry to maintain their headquarters in Alberta.

Furthermore, re-training offers are a central element of transition strategies. In South Limburg, 21% of the 32,000 miners exiting their job between 1965-69 were retrained,

mostly for jobs in the metal, textile, chemical, woodwork industries.¹³⁵ The Government of Alberta offers a tuition voucher to pursue post-secondary education, onsite career counselling services and onsite transition to employment services. Measures for retraining need to consider the circumstances and skillset of miners and plant workers.

In some cases, compensation is offered to affected workers. In South Limburg, 50,000 of the 75,000 jobs which were lost due to the phase-out received compensation according to criteria of the European Coal and Steel Community. Alberta's Coal Workforce Transition Fund provides income support, pension bridging and relocation assistance to transitioning coal and power workers. Alberta also established a compensation scheme targeting the three major power companies. Aside from Alberta where the government implemented the Coal Community Transition Fund and the Community and Regional Economic Development Program, communities are not a focus of social support schemes in the other cases studied.

Where transition strategies focus on economic diversification but do not target the phase-out of coal, measures focus on enhancing employment opportunities. RE:START and the action plan for Upper Nitra do not focus specifically on miners as regular retirement is expected to be high due to the age structure. Instead, they centre on reemploying people who have been unemployed for a long time, keeping young people in the region and creating alternative job opportunities.

EU structural and cohesion funds play a central role in financing transitions in European coal regions, especially in Central and Eastern Europe. In Central and Eastern Europe, EU structural and cohesion funds are a key source for public investment and will play an important role in financing transitions. However, this requires effective absorption of funds, alignment with climate goals and good governance. EU funds already provide a share of the funding for Czech RE:START. For instance, the development of higher education institutions is financed by ESIF. Slovakia received a grant from DG Regio for technical support of the development of the Action Plan. The Coal Regions in Transition Platform and the next European Multiannual Financial Framework (MFF) will provide additional opportunities. In South Limburg, the European Coal and Steel Community partly financed the reconversion, and later, EU structural funds constituted a main source of finance.

In addition, federal and regional budgets finance large parts of transition measures. In Alberta, many funds (e.g. Energy Innovation Fund) are financed by revenues from the carbon tax. So far, private finance plays a very limited role in financing transition measures. In no cases are there tangible financial commitments from the incumbent energy companies. Attracting private investments could, however, be a game changer, including through leveraging of EU funding, such as InvestEU in the next MFF.

¹³⁵ See Gales, B., and R. Hölsgens (2017) **Coal Transition in the Netherlands** for overview of destination of former miners as well as Kasper, H. (2012) **The Aftermath of the Closure of the Dutch Coal Mines in South Limburg: Regional Economic and Social Construction**

ANNEX

Table 1: Summary of findings from the case studies

	South Limburg (NL)	Alberta (Canada)	Ústecký kraj (CZ)	Upper Nitra (SK)	South-West Oltenia (RO)
Stage of the transition	Transition started in 1965 and concluded in 1990	Climate Leadership Plan (CLP) adopted in 2015, establishment of corresponding funds and measures	Strategy for economic restructuring of Czech coal mining regions (RE:START) adopted in 2017	Action Plan for Upper Nitra expected to be approved by national gov't in early 2019	No transition strategy; civil society drives early discussions on Just Transition
Drivers of the transition	Economic pressure on coal sector, availability of natural gas	Economic pressure on coal, availability of natural gas, GHG reductions and health impacts	Economic pressure on coal, lack of income alternatives	Economic pressure on coal, lack of income alternatives	No transition but economic pressure on coal, availability of natural gas and high potential for renewable energy
Key stakeholders	National gov't, Limburg gov't, Dutch State Mines, organized labour	Federal gov't, Gov't of Alberta (NDP), power companies, Alberta Federation of Labour, research institutes, Regional Economic Development Alliances	National gov't, regional gov't, energy companies, trade unions, environmental NGOs, universities	National gov't, regional and local gov't (e.g. Mayor of Prievidza), coal mining company HBP, trade unions, civil society organisations	National gov't, energy companies, trade unions, regional development agencies, environmental NGOs

Innovation measures	Support for businesses, development of regional knowledge infrastructure	Climate Change Innovation and Technology Framework, support for R&D, introduction of emissions trading system for GHG emissions from the industry and power sectors, carbon levy on heating and transportation fuels	Pillars of RE:START are business and innovation, research and development, education of the workforce; promising innovation actors in the region (e.g. Innovation Centre of the Ústí Region)	Action Plan is in initial stage	No Just Transition strategy
Social support schemes	Attraction of new companies for job creation, development of socially responsible dismissal system, creation of reemployment agencies, re-training, financial compensation for miners, exit subsidies for companies	Off-Coal Agreements with power companies to secure employment, re-skilling support measures and financial support programmes for miners and communities, compensation for power companies	No specific focus on miners but on creation of alternative job opportunities, reemployment of long-time unemployed	Action Plan in initial stage	No Just Transition strategy
Access to finance and public investment	Establishment of funds to support economic transformation, financial support from European Coal and Steel Community for re-training, EU structural funds	Energy Innovation Fund, Coal Community Transition Fund, Coal Workforce Transition Fund (all based on provincial gov't budget and carbon tax revenues), financial support from federal gov't announced	EU structural and cohesion funds important sources for public investments (34.3% of all public investment in 2007-2013); EU Coal Regions in Transition Platform and next European Multiannual Financial Framework (MFF) might provide additional funding opportunities	EU structural and cohesion funds important sources for public investments (75% of all public investments), grant from DG REGIO for technical support for Action Plan preparation, EU Coal Platform and next MFF might provide additional funding opportunities	EU structural and cohesion funds important sources for public investments (60% of public investment in 2014-2020), EU Coal Platform and next MFF might provide additional funding opportunities

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E3G is an independent climate change think tank operating to accelerate the global transition to a low carbon economy. E3G builds cross-sectoral coalitions to achieve carefully defined outcomes, chosen for their capacity to leverage change. E3G works closely with like-minded partners in government, politics, business, civil society, science, the media, public interest foundations and elsewhere. In 2017, E3G was ranked the fifth most influential environmental think tank in the world, for the second year running by the Global Go To Think Tank Index.

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