디지털그린경제 전환정책 사례 비교연구

학위논문

2023 년 5 월

국무조정실

김 광 제

- 목 차 -

국외훈련 개요

1. 훈련국: 영국

2. 훈련기관명: 버밍엄대학교

(The University of Birmingham)

3. 훈련분야: 경제

4. 훈련기간: 22 개월 (2021.9 월 ~ 2023.7 월)

훈련기관 개요

1. 훈련기관명: University of Birmingham

2. 훈련과정: MA Global Public Policy with Integrated Placement

3. 소재지: 영국 버밍엄

4. 주소: Edgbaston Birmingham, B15 2TT, GB

5. 전화번호: +44 0121 414 3344

6. 홈페이지: www.birmingham.ac.uk

7. 학교 연혁: 1900 년 설립된 공립대학으로 △학부생 23 천명과 대학원생 13 천명(2020 년 기준) △연간 수입은 7.4 억 파운드이고 지출은 6.7 억 파운드(2020 년 기준) △英 총리 Neville Chamberlain 과 Stanley Baldwin 및 노벨상 수상자 11 명 배출 △영국 연구중심대학의 모임인 Russell Group 과 연구중심대학 국제 네트워크인 Universitas 21 의 창립 멤버

8. 과정 소개: MA Global Public Policy with Integrated Placement과정은 다양한 실증 방법론을 기반으로 정책비교연구에 중점을 두고 있으며, 정부기관, NGO, 기업 등 다양한 기관과의 연계를 통해 정책영역 전반의 실증연구를 할 수 있고 다양한 인종, 국적 및 타국 공직자 출신 학생들과의 교류를 통하여 세계 각국의 정책에 대한 비교연구 가능

훈련결과보고서 요약

성 명	김광제	소 속	국무조정실
훈 련 국	영국	훈련기간	2021.9.14 ~ 2023.7.13
훈련기관	버밍엄대학교	보고서매수	103매
훈련과제	디지털그린경제 전환방안 연구		
보고서제목	디지털그린경제 전환정책 사례 비교연구		
내용요약	○ 디지털그린경제로의 전환은 전례없는 급속한 경제구조적 변화를 유발, 이러한 전환에 있어 가장 큰 논쟁 중 하나는 모든 산업의 디지털화와 저탄소산업으로의 구조조정이 경제성장, 소득분배, 노동시장 등 경제 전반에 어떤 영향을 미칠 것인가임 ○ 역사적으로 경제구조 패러다임에 큰 변화가 있을 때마다 산업구조, 노동시장 및 소득분배에 상당한 충격을 초래		

	- 디지털그린경제로의 전환이 노동시장에 어떠한 영향을 미치는지가 매우 민감한 사회문제로 대두 ○ 1990년대에 미국 노동조합은 '공정한 전환(just transition)'이라는 개념을 공식화함 - 처음에는 이 개념이 단순히 환경규제로 인해 일자리를 잃은 근로자를 지원하는 수단으로 여겨졌으나, 이후 공정한 전환의 개념은 노동조합과 근로자 모두에게 사회통합적인 개념으로 확장 - 디지털그린경제로의 전환과정에서의 공정한 전환은 환경적으로나 사회경제적으로 지속가능한 미래를 준비하기 위한 사회통합적이고, 인간중심의 미래지향적인 접근방식으로 발전 - 따라서 올바른 디지털그린경제로의 전환은 새롭고 양질의 일자리, 산업 및 투자 창출을 촉진하는 인간 중심의 지속 가능한 경제를 우선시해야 함

	- 화석연료 중심의 산업 부문에서 단순히 벗어나는 것이 디지털그린경제로의 전환이 아니라 아무도 소외되지 않도록 하는 포괄적인 접근방식이어야 함 - 디지털그린경제로의 전환은 구조조정의 영향을 받는 근로자들과 지역사회가 전환 프로세스에 포함되고 적극적으로 참여할 수 있도록 관련 지원 메커니즘 설계하는 것이 필요함 ○ 전환과정에서의 사회적 갈등의 최소화를 위하여 다양한 이해관계자가 참여하는 사회적 대화는 공정한 전환을 달성하는 데 매우 중추적임 - 정부, 기업, 노동조합, 시민사회단체를 포함한 주요 이해관계자 간의 협력과 참여를 촉진함으로써 사회적 갈등을 최소화시킬 수 있는 기제임 - 이해관계자의 참여를 통하여 전환과정에서 영향을 받는 근로자 보호와 피해 지역사회의 재생을

	촉진할 것임 - 본질적으로 사회적 대화는 디지털그린경제로의 전환에 다양한 이해관계자의 참여를 요구하며, 아무도 소외되지 않고 전환과정에서 실직 등의 부정적 영향을 받는 근로자와 지역사회가 혜택을 받을 수 있는 기회를 갖도록 보장할 것임 ○ 이러한 디지털그린경제로의 공정하고 바람직한 전환방안을 모색하기 위하여, 우리는 영국, 독일 등 유럽선진국들의 다양한 전환사례를 살펴볼 필요가 있음 - 가장 적합하고 유효한 정책사례는 많은 선진국들이 이미 실현했거나 또는 상당한 성과를 보이고 있는 전환정책, 특히 이미 유럽에서 상당부분 진행되어 유의미한 비교분석을 수행할 수 있는 탈석탄 전환정책 비교분석 연구를 통해서 현재 우리가 직면한 디지털그린경제로의 전환과정에서 발생할 수 있는 문제를 효과적으로 대응할 수 있도록 하는

	유의미한 통찰력과 정책적 교훈을 얻을 수 있을 것임 ○ 역사적으로 석탄은 많은 유럽 국가에서 에너지 부문의 중심으로서 근본적인 역할을 해왔으며 수십 년에 걸쳐 광업 및 석탄발전설비과 같은 석탄 산업에 대한 상당한 투자라는 풍부한 유산을 남김 - 그러나, 현재 유럽 국가들은 파리협정의 탄소중립 목표와 그린딜, 기후법에 따라 2030년까지 석탄을 단계적으로 폐지하기 위해 노력하고 있음 - 특히 벨기에와 오스트리아는 이미 탈석탄을 완료했고, 영국은 최초 계획보다 1년 앞당겨진 2024년에 탈석탄을 마무리할 예정임 - 한편, 독일은 2020년에 탈석탄법을 통과시키고 유럽에서 가장 늦은 시한인 2038년까지 석탄 사용을 종료하는 것을 목표로 하고 있음

	- 한국은 2030년까지 20개의 노후 석탄화력발전소를 폐기할 계획이지만 41개의 석탄화력발전소는 그 이후에도 계속 운영될 예정임 ○ 탈석탄 전환정책에 대해 서로 다른 접근 방식을 취하고 있는 영국과 독일, 그리고 한국 세 국가의 탈석탄 경로를 비교분석 시행 - 영국과 독일 및 한국은 모두 석탄 생산 및 소비의 풍부한 역사를 가지고 있으며 난방 및 전력 생산을 위해 석탄에 크게 의존해 왔음 - 영국, 독일, 한국 세 국가의 탈석탄전환과정을 비교분석함으로써 디지털그린경제로의 전환방안 모색에 있어서 매우 유효한 시사점을 제공할 수 있을 것 ○ Kingdon의 다중 스트림 프레임워크(MSF)를 활용하여 영국, 독일 및 한국의 정책문제 스트림, 정책 대안 스트림 및 정치 스트림의 진화를

	조사하여 탈석탄이 국가적 의제로 부상하는 과정을 고찰 - 2005년 영국의 'Big Ask' 캠페인은 기후변화의 위험에 대한 대중의 경각심을 높였고 영국의 정당들이 기후위기에 대한 의지를 보여줄 수 있는 중요한 기회였으며, 이는 탈석탄 의제를 국가 정치에 통합시키는 결과를 가져옴 - 독일의 탈석탄전환은 다른 EU 국가보다 국가적 의제가 되기까지 더디게 진행되었는데, 탈석탄을 향한 진전은 이후 2011년 후쿠시마 재해로 인해 탈원전 이슈에 의해 후순위로 밀려났고, 이로 인해 독일은 탈석탄보다 원전 해체를 우선시하게 됨 - 한국은 기후위기에 대한 민감성 보다는 미세먼지 오염문제가 커지면서 탈석탄 문제가 사회적 이슈로 부상하였으나, 국내에서 아직 중요한 국가적 이슈로 떠오르지 못하고 있음

	○ 영국은 1980년대 대처내각의 경제자유화개혁을 통한 석탄보조금 중단으로 국내 석탄산업의 국제 경쟁력 상실로 이어짐 ○ 영국의 2008년 기후 변화법은 법적 구속력이 있는 탄소 예산을 통해 2050년까지 온실가스 배출량을 80%까지 줄이도록 규정 - 이 목표를 달성하기 위해 2013년 전력시장개혁(EMR)이 시행되어 탄소 포집 및 저장(CCS)을 포함하지 않는 신규 석탄 발전소 건설을 금지하는 에너지 성능 기준(EPS)을 도입 - EPS(Emission Performance Standard)의 시행은 탄소배출량을 줄이기 위한 시장기반 인센티브를 제공하고 석탄 화력발전소의 단계적 폐지를 장려 - 또한, CPF(Carbon Price Floor) 시행으로 탄소 배출권에 대한 최소 가격을 설정하여 배출량 감소에 대한 추가 인센티브를 제공

	- 이러한 전환정책은 석탄화력발전소의 수익성을 크게 감소시켜 영국에서 석탄에서 재생에너지로의 전환을 앞당김 ○ 영국이 1980년대에 석탄 생산에 대한 정부 보조금을 중단한 반면, 독일은 유럽 규정에 의해 중단된 2018년까지 석탄 산업에 대한 다양한 형태의 직간접 보조금을 유지 - 결과적으로 영국의 석탄 산업에 고용된 근로자 수는 2017년까지 600명으로 감소한 반면 독일에서는 그 수가 13,000명으로 상당히 높은 상태를 유지 ○ 더욱이 독일은 2011년 후쿠시마 원전 사고로 인해 탈원전을 추진하게 되었고, 이로 인해 탈석탄으로의 전환은 후순위로 밀려남 - 독일은 원자력 발전의 감소는 대체 발전원으로

	해결해야 하는 에너지 부족을 초래하여, 저탄소 기반의 전력 생산을 늘리기 위해 다양한 조치를 취했음에도 불구하고 성과가 없었으므로 석탄화력 발전에 계속 의존해야 했음 ○ 다른 유럽국가들보다 상당히 뒤쳐진 탈석탄으로의 전환을 위해 독일은 2018년에 성장, 구조적 변화 및 고용에 관한 위원회(the Commission on Growth, Structural Change, and Employment)를 설립 - 다양한 이해관계자로 구성된 위원회는 사회적 대화에 참여하고 모든 석탄화력발전의 2035년까지(늦어도 2038년까지) 완전한 단계적 폐지를 선언 ○ 본 연구는 자본주의의 다양성(VoC: Varieties of Capitalism) 프레임워크 - 자유시장경제(LME)와 조정된 시장경제(CME) -와 전력시장 구조-경쟁적 또는 독점적 전력시장-에 따라 탈석탄의 유형을

	4가지 유형으로 분류할 수 있는 새로운 개념적 프레임워크를 제시 - 유형 1: 조정된 시장경제(CME)의 특징으로 노조, NGO 등 여러 이해관계자가 참여하는 유형으로, 탈석탄에 대한 사회적 합의는 이해관계자 간의 정치적 조정 및 경쟁적인 전력시장에서 석탄발전소 운영자와의 계약·보상 협상의 장기화로 인해 상당한 시간이 소요됨 - 유형 2: 자유시장경제(LME)와 경쟁적인 전력 시장을 특징으로 하며, 시장가격 메커니즘을 통해 상대적으로 빠른 속도로 전환이 가능하며 이해당사자들 사이의 이해관계는 정치적으로 주도되는 것이 아니라 오히려 시장의 균형가격에 의해서 조정됨 - 유형 3: 이론적으로 자유시장경제(LME)와 독점적 전력시장이 결합된 유형이지만, 현실적으로 LME와 독점력 전력시장은 개념적으로 상충되기 때문에

	이러한 유형에 속하는 국가는 실제로 존재할 가능성이 거의 없음 - 유형 4: 이해관계자의 수가 제한적인 독점적 전력시장을 가진 조정된 시장경제(CME)를 가진 유형으로 탈석탄의 속도는 독점적 전력 공급자의 의지에 따라 빨라지거나 느려질 수 있음 - 이 프레임워크는 여러 국가가 특정 형태의 자본주의와 전력 시장 구조를 기반으로 석탄 전이 경로를 어떻게 탐색할 수 있는지에 대한 귀중한 통찰력을 제공 - 이 프레임워크를 활용하여 우리는 특정 국가의 석탄 퇴출 경로에 대해 개념적 예측을 할 수 있으므로 자본주의 유형(CME 또는 LME) 및 전력시장 구조에 따라 해당 국가의 탈석탄 전환 경로가 어떻게 전개될 지에 대한 예측가능성을 개념적으로 확보 가능

	- 다만, 자본주의 유형(VoC)과 전력시장 구조에 기반한 이 개념적 프레임워크는 LME 또는 CME 범주에 명확하게 속하지 않는 프랑스와 그리스와 같은 국가에 적용할 수 없는 한계가 있음 - 따라서, 이 프레임워크를 개선하고 발전시키기 위해서는 자본주의 경제시스템의 다양성에 대한 추가 연구가 필요함 ○ 경쟁적인 전력시장 구조와 자유시장경제(LME)로 알려진 영국의 시장 메커니즘 접근방식을 적용하는 것이 조정된 시장경제(CME)로 특징지어지는 한국의 전환 맥락에서는 상당한 도전에 직면할 수 있음 - 국내 석탄화력발전소 폐쇄로 영향을 받는 발전소 근로자는 화력발전소가 대부분 공기업이므로 상대적으로 안정적인 고용유지가 가능하지만, 소규모 하청 근로자에 대한 전환과정에서 다양한 정책적 지원방안 마련이 필요

	- 국내 화력발전소가 위치한 지역의 경제적 충격을 완화하는 것은 재생, 재개발 및 대체산업 유치와 같은 지원방안도 강구되어야 함 ○ 이해관계자 참여형 독립위원회를 구성하여 공정한 전환을 위한 사회적 대화를 통해 우리 상황에 적합한 전환정책을 사회적 갈등을 최소화하면서 수요자 중심으로 마련할 수 있을 것임

UNIVERSITY OF BIRMINGHAM

Towards a Transition: Insights from Divergent Off-Coal Transition Pathways

- A Comparative Analysis of the United Kingdom, Germany, and Korea

Kwangje Kim

Abstract

This dissertation employs a multiple streams framework to examine the agenda setting process of off-coal transition in the UK, Germany, and Korea, utilising a political economy approach to compare these countries across different policy cycles, including policy formulation, adoption, and implementation.

The analysis reveals that the UK's coal phase-out was swiftly implemented through market mechanisms, while Germany's coal exit, which relied on social consensus among various stakeholders, experienced significant delays. Notably, the shift away from coal has not yet been prioritised on the national agenda in Korea.

The dissertation introduces a conceptual framework that integrates the varieties of capitalism and electricity market structure to classify four types of off-coal transition, providing valuable insights into transition pathways in different types of capitalisms and market contexts. However, this study also underscores the limitations of the conceptual framework and emphasises the need for further research on diverse capitalist regimes.

It identifies challenges and recommendations specific to Korea, including addressing job insecurity for coal plant

workers and mitigating economic impacts on coal plant areas. A potential approach for Korea is the establishment of an independent, multi-stakeholder commission to protect affected workers and communities and facilitate fair transition policies.

The conclusion highlights the significance of prompt and resolute action, stakeholder engagement, and social consensus in achieving a just and inclusive transition to a greener future. The proposed conceptual framework of four types of off-coal transition, along with the recommendations, is suggested to contribute to effective transition efforts in any specific country's context of coal phase-out.

Keywords: Transition, Coal Phase-Out, Multiple Streams Framework, Political Economy Approach, the United Kingdom, Germany, Korea

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Chapter 1. Introduction

Historically, coal has played a fundamental role as the mainstay of the energy sector in a large number of European countries, leading to a rich legacy of substantial investments in coal industries such as mining, as well as coal-burning facilities, stretching over numerous decades.

However, European countries are now currently striving to phase out coal by 2030 in alignment with the Paris Agreement's objective of achieving carbon neutrality, as well as the Green Deal and climate laws. Notably, Belgium and Austria have already completed their phase-out of coal, and the United Kingdom has announced its intention to conclude its phase-out in 2024, one year earlier than initially planned (Europe Beyond Coal, 2022). Conversely, Germany passed the Coal Phase-out Act in 2020 and aims to terminate its coal usage by 2038, the latest deadline in Europe (BMWK, 2020).

Both the UK and Germany have a rich history of coal production and consumption, and have heavily relied on it for

heat and power creation (Brauers, Oei, and Walk, 2020). To examine the factors driving or impeding the transition away from coal, I have selected these countries, as coal production and consumption have been or still are significant contributors to their economies.

Meanwhile, Korea has yet to establish a goal to phase out coal. While the country intends to decommission 20 ageing coal-fired power plants by 2030, 41 coal-fired power plants will continue to operate beyond that year (MTIE, 2023).

This dissertation will begin by examining the socio-economic factors and challenges that have influenced the divergent coal withdrawal pathways in the UK and Germany. Subsequently, this research will analyse and compare three countries: the UK and Germany, which have taken differing approaches to coal phase-out, and Korea, which is currently in the process of reducing its coal consumption, not withdrawal. The primary objective of this study is to identify the main socio-

economic contexts, drivers, and obstacles to coal phase-out in these three countries.

The main objectives of this dissertation are as follows:

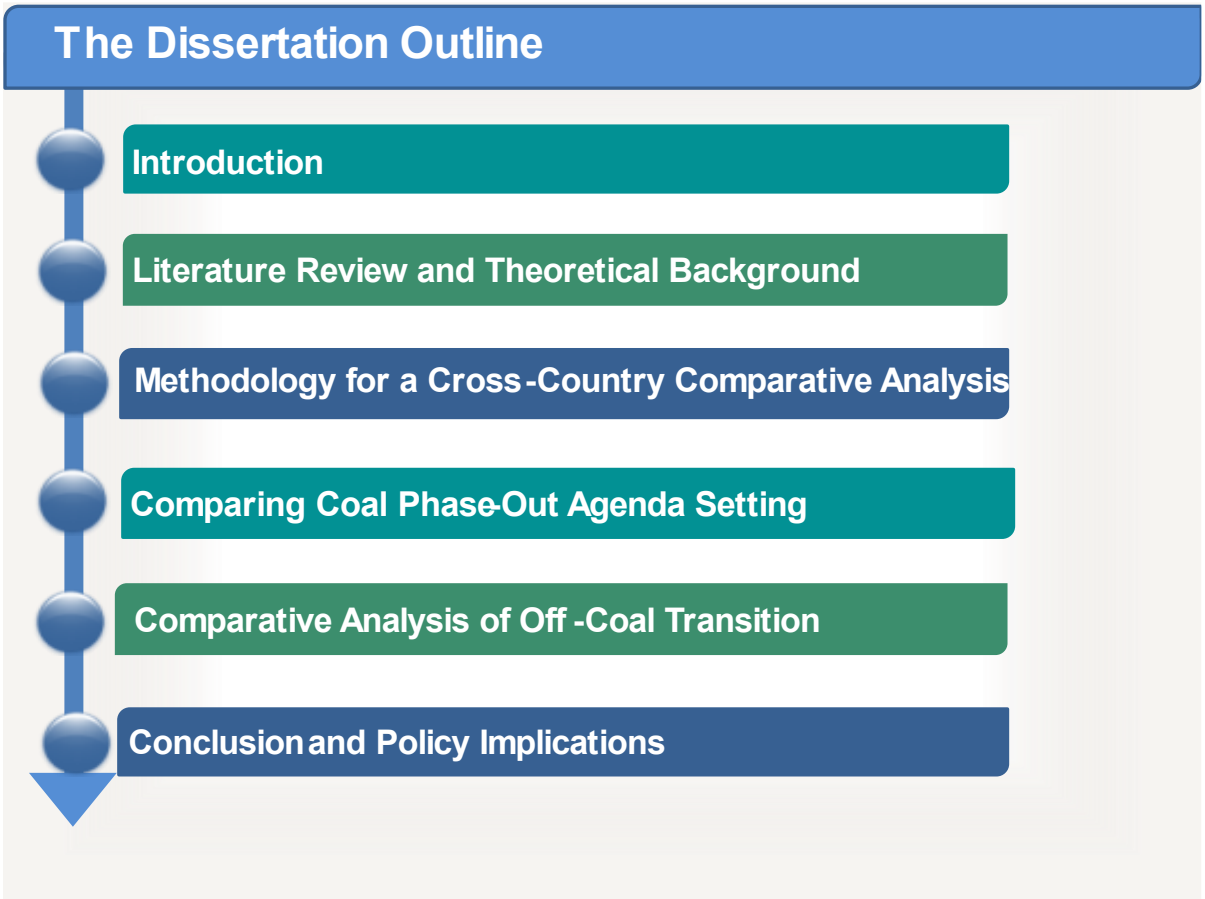
- To analyse the process by which coal phase-out emerged as a prominent policy agenda in the UK, Germany, and Korea, examining the key factors and dynamics that shaped the off-coal transition trajectories in the three countries.
- To provide policy implications for Korea's transition away from coal, particularly by drawing on a comparative analysis of the experiences of the UK, Germany, and Korea. This comparison offers valuable insights for a just and successful coal phase-out in Korea, which is a latecomer to the coal exit process. Lessons from the experiences of the UK and Germany, where the shift away from coal has been almost completed or just initiated, respectively, can inform policy recommendations for Korea's off-coal transition.

The dissertation will be organised into six main chapters. Chapter 2 will provide an in-depth review of the relevant literature and theoretical background, establishing the context for the study. In Chapter 3, the methodology for conducting a cross-country comparative analysis will be presented, outlining the research design, analysis methods, and the rationale behind the chosen approach.

Chapter 4 will focus on comparing the agenda-setting process for coal phase-out in the UK, Germany, and Korea. In Chapter 5, a comparative analysis of the off-coal transition process in each country will be conducted.

Finally, Chapter 6 will draw conclusions from the analysis and highlight the policy implications of the findings. This chapter will also offer recommendations for policymakers and future researchers seeking to navigate the complex and multifaceted process of coal exit.

Figure 1. The Dissertation Outline (source: the author of this paper)



Chapter 2. Literature Review and Theoretical Background

1. Greener Shift and Just Transition

The Paris Agreement of 2015 set up a global climate change mitigation goal to curb global temperature rise to below 2°C above pre-industrial levels, and to aim to restrict the increase to 1.5°C (IPCC, 2018). The Green Deal, announced in 2019, emphasized the transition away from coal to greener energy to reach the 2030 climate target and attain carbon neutrality by 2050 (ECA, 2022).

Furthermore, the European Union put the Climate Law into force in 2021, which mandated a compulsory target of achieving zero carbon emissions by 2050. This law also established a mid-target to decrease net CO2 emissions by at least 55% compared to 1990 levels by 2030 (ECA, 2022).

In the 1990s, American labour unions began formulating the idea of a "just transition." At first, this concept was seen as a means of providing assistance to workers who had lost their jobs due to environmental regulations (OECD, 2017). Over the years, the concept of transition has gained wider significance for both labour unions and employees. Specifically, the transition has evolved into a deliberate and forward-thinking approach towards fostering a low-carbon economy, as well as preparing for a future that is both environmentally and socio-economically sustainable (ILO, 2015). As a result, there has been a push towards creating new, decent jobs in industries that prioritise sustainability and the environment. This approach is seen as a critical step towards achieving a carbon-free future, and one that is increasingly gaining traction among labour unions and workers (OECD, 2017).

The transition to a low-carbon, green economy should be a just transition, requiring deliberate and purposeful actions through the implementation of appropriate schemes, measures, and programs (ILO, 2016). Without such intervention, workers

and communities reliant on carbon-intensive industries will face significant challenges in finding alternative sources of income. Therefore, the transformation must prioritize a human-centred, sustainable economy that promotes the creation of new, decent jobs, industries, and investments (OECD, 2017). The shift away from fossil fuel-driven industrial sectors is not solely about phasing out toxic industries; it must be a comprehensive approach that ensures no one is left behind. It is essential that affected people and communities are included and involved in the process, and that they have access to support mechanisms that facilitate their participation in the transition (ILO, 2015).

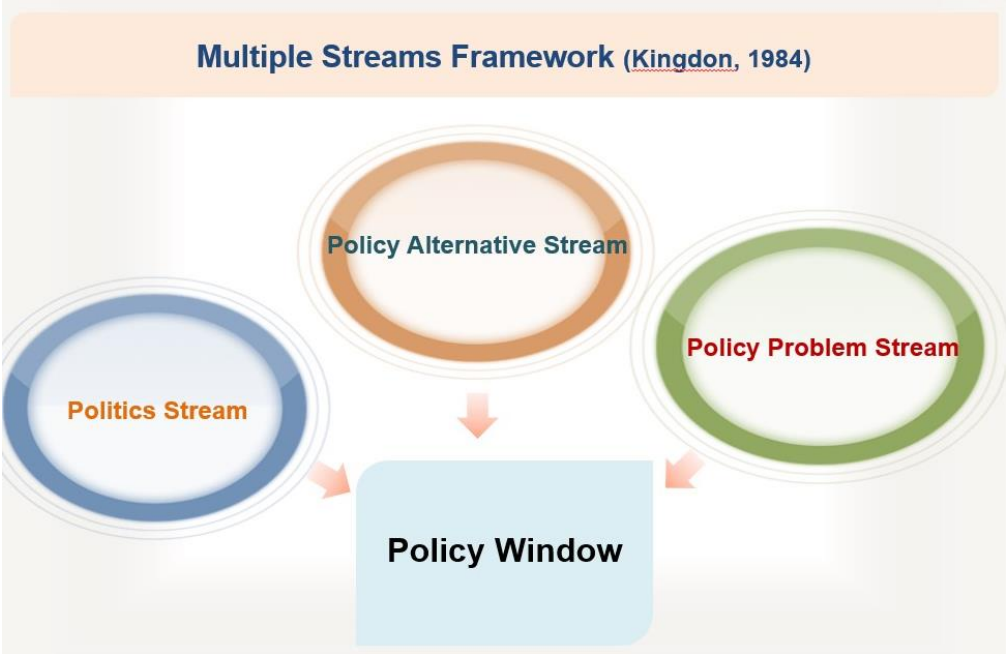
Social dialogue is very pivotal in achieving a just transition to a green economy. By fostering collaboration and engagement between key stakeholders, including governments, businesses, labour unions, and civil society organizations, social dialogue enables the development of programmes and schemes that ensure a just transition (OECD, 2017). This process promotes the protection of affected workers and the regeneration of damaged communities by

implementing consistent long-term just transition policies. Essentially, social dialogue requires the participation of various stakeholders in the transition to a greener economy, ensuring that no one is left behind and that affected workers and communities have opportunities to benefit (ILO, 2016).

2. Key Theories and Models

(1) Multiple Streams Framework

Figure 2. Multiple Streams Framework (source: visual representation of Kingdon's MSF created by the author of this paper)



Kingdon (1984) proposed the Multiple Streams Framework (MSF) to explain how the policy agenda is set in the government and political sectors. The MSF consists of three interconnected streams that create a "policy window" for setting the agenda. The first is the problem stream, where issues requiring government intervention become public problems and are brought to the attention of policymakers through protests or criticisms of existing measures and programs. The policy alternative stream involves searching for alternative policy options and proposals to address a particular problem. The political stream represents the confluence of public sentiment, the political drive and will of elected officials, and the influence of interest groups on policy-making (Kingdon, 2003).

These streams operate independently of one another until they intersect, creating a "policy window" for agenda-setting. However, opening a policy window does not guarantee the formulation and implementation of a policy. Policy Entrepreneurs play a crucial role in preparing policy alternatives during this period, and their influence and capacity can steer

the agenda-setting and policy decision-making process, leading to the development of an actual policy (De Wals, Espinoza-Moya, & Béland, 2019).

Policy entrepreneurs refer to individuals or groups who utilize diverse political and policy-related tactics, both within and outside of the government, to translate their policy ideas into actual policy formulation (Mintrom, 2019). In addition, De Wals, Espinoza-Moya, and Béland (2019) argue that policy entrepreneurs, who may be individuals or organisations both inside and outside the government, can originate from different backgrounds, including elected or appointed officials, civil society groups, interest groups, or academic organisations.

(2) Political Economy Approach

The Varieties of Capitalism (VoC) research paradigm, introduced by Hall and Soskice (2003), examines the

interdependence of key actors in political economy by exploring how trade unions, firms, and governments interact.

In a Coordinated Market Economy (CME), political influence from unions and governments plays a significant role alongside the price mechanism in shaping market policies. As a result, new policies may be delayed due to opposition from various stakeholders seeking to protect their interests. Conversely, in a Liberal Market Economy (LME), the price mechanism alone governs market adjustments, making it challenging to achieve long-term equilibrium through stakeholder intervention (Tsebelis, 2002).

It is generally agreed that the UK is a prime example of an LME, while Germany is classified as a CME. This research paradigm sheds light on the institutional systems that underpin these economies and their impact on policy implementation (Rentier, Lelieveldt, & Kramer, 2019).

Rentier, Lelieveldt, and Kramer's (2019) research highlights the contrasting roles of market-based institutions - such as private ownership and stock market - and various

stakeholders -government, labour unions, and civil society organisations - in the energy sector of the liberal market economy (LME) and coordinated market economy (CME), respectively. In LMEs like the UK, achieving social consensus through social discourse and collective bargaining can be challenging due to market mechanisms that prioritize rational market equilibrium price adjustments. In contrast, CMEs like Germany balance market efficiency with social protections by incorporating input from various stakeholders, resulting in a collaborative regulatory framework.

Meanwhile, Korea's economic system can be classified as a coordinated market economy (CME), in which the government holds a significant position, and civil society organisations and unions have relatively limited influence. This arrangement can be attributed to the country's developmental state heritage, as noted by Fleckenstein and Lee (2018).

Chapter 3. Methodology for a Cross-Country Comparative Analysis

1. Meaning of Comparative Policy Analysis

Comparative policy analysis is a systematic and objective verification process based on evidence to ensure reliable and accountable decision-making, as described by Brans, Geva-May, and Howlett (2017). It involves comparing how different countries formulate, implement, and experience specific policies (Agranoff & Radin, 1991). The field aims to understand policy-making, policy characteristics, and policy outcomes across nations (Heidenheimer, 1985). Comparative policy analysis enhances decision-making by offering a range of policy alternatives based on a comprehensive understanding of policy issues and their implications, drawing on insights and methods from different disciplines (de Wee, 2022).

2. Methodology

The research methodology employed in this study was qualitative content analysis, which was used to investigate the development of coal phase-out agendas, as well as the formulation, adoption, and implementation of off-coal transition policies in the three countries under examination. Data from multiple sources, including research publications, news articles, and government announcements, were analysed using qualitative content analysis. The analysis involved a systematic identification of recurring themes, patterns, and trends associated with the coal exit process in the data.

3. Design of a Cross-Country Comparative Analysis of Off-Coal Transition Pathways

(1) Divergent Progress of Coal Exit across the Policy Cycle

Table 1 presents a comparison of the pace of coal exit in the United Kingdom, Germany, and Korea over the policy process cycle[1].

Table 1. Comparison of coal phase-out progress in the UK, Germany, and Korea over the policy cycle (Table 1 has been created by the author of this dissertation)

Policy Cycle	①Agenda setting	②Policy formulation	③Policy adoption	④Policy implementation	⑤ Policy evaluation
UK					
Germany					
Korea					

As depicted in Table 1, the United Kingdom has made significant progress in its coal phase-out efforts, as it is currently nearing completion of its policy implementation phase (DBEI, 2021). In contrast, Germany is still in the early stages of its off-coal transition policy, although it has garnered social consensus for its plans (Oei, Brauers, & Herpich, 2020). Meanwhile, Korea has yet to fully prioritize the shift away from coal as a national

[1] Howlett and Ramesh (2003) describe the policy process as a cycle with five stages: ① agenda setting, ② policy formulation, ③ adoption, ④ implementation, and ⑤ evaluation.

agenda, despite some discussions and policy formulation/adoption being initiated (Parra et al., 2020).

As a result of the varying rates of progress among these countries, the cross-country analysis in this study will focus on the first three stages of the policy cycle, namely agenda setting, policy adoption, and policy implementation, which are applicable to all three countries. By focusing on these stages, we can better understand how each country approaches the transition and identify areas where improvements can be made.

(2) The Design of a Cross-Country Comparative Analysis

Table 2 presents the theoretical framework and research questions that underpin this study. The study will adopt a cross-country comparative approach and utilise the Multiple Stream Framework (MSF) to analyse the dynamics of policy problem

stream, policy alternative stream, and political stream in each country's coal transition.

The first stage of the policy cycle is agenda-setting, and this study seeks to shed light on the complex interplay between the three streams that led to coal exit becoming a critical priority on each country's national agenda.

Table 2. The Design of a Cross-Country Comparative Analysis (Table 2 has been created by the author of this dissertation)

Policy Cycle	**Theoretical Framework** (◆) and **Research questions** (◐) for **Comparative Analysis**	**Limitations**
① **Agenda Setting**	◆ Multiple Streams Framework (Kingdon, 2003) ◐ How have the policy problem stream, policy alternative stream, and political stream played out in comparator countries: the UK, Germany, and Korea, and what momentum (critical event or condition) has led to the opening of a policy window for off-coal transition in each country?	▲ While the MSF primarily focuses on agenda setting, it has limitations in comprehensively elucidating the subsequent stages of policy formulation, adoption, and implementation (Birkland, 2019).

Policy Cycle	**Theoretical Framework** (◆) and **Research questions** (◐) for **Comparative Analysis**	**Limitations**
② **Policy Formulation** and ③ **Adoption**	◆ Political economy approach: the Varieties of Capitalism (VoC) Framework (Hall & Soskice, 2003) ◐ How have the VoC (LME or CME) and the structure of the electricity market in comparator countries influenced the development and design of transition policies?	▲ The VoC framework has limited effectiveness in comprehending the economic systems of nations, like France, that do not fit into both LME and CME (Piore, 2016).

By examining the factors that opened the "policy window" of off-coal transition in each country, the study will provide various understandings into how this process can be influenced by different stakeholders and political events.

Next, the study will use the Varieties of Capitalism (VoC) framework to conduct a comparative analysis of how the distinctive capitalist institutions (LME or CME) and electricity market structures (competitive or monopolistic market) of the three countries have influenced the design, formation, and

adoption of coal transition policies in the second and third stages of the policy cycle: policy formulation and adoption.

(3) Data Collection

Data from reputable research publications, news and newspaper articles, official government announcements, and statistical data from the past decade were utilised for the analysis. These sources were selected based on their relevance to the research question and their credibility as reputable and reliable sources of information on the coal phase-out.

(4) Limitations

Birkland (2019) asserts that the MSF framework has certain limitations as it primarily focuses on the agenda-setting phase of the policy process and does not provide a

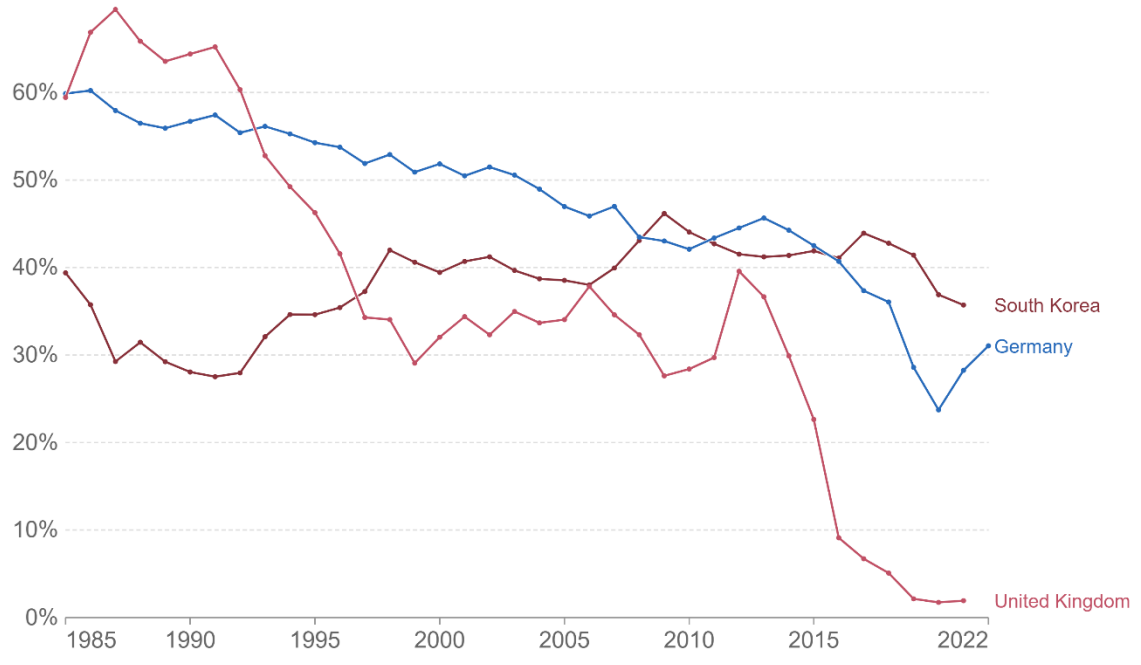
comprehensive account of the subsequent stages of policy formulation, adoption, and implementation.

Next, Piore (2016) argues that the concept of Varieties of Capitalism (VoC) is founded on the dichotomy of the liberal market economy in the United States and the coordinated market economy in Germany, which may not provide an adequate understanding of the political economies of other nations. Specifically, Piore posits that the classification of France under the US/German typology is not straightforward, which underscores the shortcomings of the VoC framework.

Chapter 4. Comparing Coal Phase-Out Agenda Setting in the UK, Germany, and Korea

Figure 3 illustrates the trends in electricity generation from coal in Germany, the United Kingdom, and Korea from 1985 to 2022. In 1985, the share of electricity generation from coal in Germany and the United Kingdom was approximately 60%, which was almost identical.

Figure 3. Changes in Share of Coal-based Electricity Production: A Comparison of the UK, Germany, and Korea from 1985 to 2022 (Source: Our World in Data)



Source: Our World in Data based on BP Statistical Review of World Energy (2022); Our World in Data based on Ember's Yearly Electricity Data (2023); Our World in Data based on Ember's European Electricity Review (2022)
OurWorldInData.org/energy • CC BY

However, since 1991, the share of coal power generation in the United Kingdom has witnessed a sharp decline, falling to only 1.5% in 2022 (Our World in Data, 2022). In contrast, Germany's transition away from coal has been slower, with coal power generation declining gradually, remaining above 40% in 2016 and reaching 29.7% in 2022 (Our World in Data, 2022).

In contrast to Germany and the United Kingdom, Korea's share of electricity production by coal has fluctuated around 40% since 1985, with a slow decline beginning in 2016. Despite this decline, the share of electricity generated by coal in Korea remains the highest among the three countries, standing at 36% in 2022.

The analysis focuses on critical criteria, such as the timeline, actors involved, policy instruments employed, and facilitating or hindering factors in the transition away from coal. This analysis sheds light on the divergent trajectories of coal phase-out in the three countries under investigation, providing a comparative analysis of how coal exit was established as a

policy agenda in the UK, Germany, and Korea. The theoretical framework of Kingdon's Multiple Streams Framework (MSF), which explains the convergence of policy problem, policy alternative, and political streams, guides the analysis.

This research presents the findings in a tabular format, which summarizes the outcomes of the MSF analysis.

- **Table 3. Comparing Policy Window Opening in the UK, Germany, and Korea** (*Table 3 has been created by the author of this dissertation, and it utilises the MSF as a source for its development.*)

Category	**United Kingdom**	**Germany**	**Korea**
Policy Problem Stream	◆ A significant shift in the UK's socio-political landscape regarding climate change awareness, which was instigated by 'Big Ask' campaign in 2005 (Brauers, Oei, and Walk, 2020)	◆ NGOs in Germany have organised protests to raise awareness of the need for a transition away from coal in the 2010s, playing a significant role in shaping the discourse (Oei et al., 2020). ◆ Despite protests and government announcements, slow	◆ Fine dust from coal power generation led to discussions about a coal exit in Korea's civil society (ME, 2016). ◆ A majority of Korean respondents (64.5%) feel personally affected by the climate crisis, according to a recent survey (Sisain and

Category	**United Kingdom**	**Germany**	**Korea**
		implementation of Germany's coal phase-out has not significantly contributed to the goal of carbon neutrality (Deutsche Welle, 2018).	Hankook Research, 2021)
Policy Alternative Stream	◆ The UK discontinued subsidies for coal production during the 1980s in contrast to Germany (Brauers, H., Oei, P., and Walk, P., 2020). ◆ More stringent EU pollution control regulations led to the retirement for ageing coal-burning power stations between 2010 and 2015, due to their high pollution and inefficiency (Isoaho & Markard, 2020).	◆ Germany has affirmed its commitment to discontinue coal subsidies every year since 2009, as declared in the G20's 2017 proclamation (Rentier, Lelieveldt, and Kramer, 2019). ◆ The decision to phase out nuclear energy after the Fukushima disaster in 2011 has made it harder for Germany to also terminate coal, creating challenges in ensuring there is enough electricity generation capacity	◆ Korea aims to phase out 20 coal power generation units by 2030 as part of its commitment to achieving carbon neutrality (MTIE, 2023). ◆ Korea Electric Power Corporation (KEPCO), de facto monopoly state-owned electricity supplier in Korea, has been criticized for its tardy transition away from coal. This strategy has led to persistent operational deficits and a substantial increase in debt.

Category	United Kingdom	Germany	Korea
	◆ The Carbon Price Floor (CPF) and Emissions Performance Standard (EPS) have curbed the construction of new coal-fired electric generating units without carbon capture and storage (Newbery, Reiner, , & Ritz, 2018).	(Johnstone et al, 2020). ◆ The Commission on Growth, Structural Change and Employment proposed a complete phase-out of all coal power production by 2035 or 2038 at the latest in 2019 (BMWi, 2019).	KEPCO's coal exit plan involves using high-cost carbon-based technologies, which have yet to be proven viable, thereby introducing significant risks for the Korean market (Ng, 2022).
Political Stream	◆ The political influence of the coal unions was greatly reduced after the bitter labour disputes in 1985 (Pollitt and Haney, 2013). ◆ The UK's competitive adoption of greener policies since 2006 weakened coal's position, as political parties have been vying to adopt	◆ In response to increasing societal pressure and growing demands for government subsidies from coal regions, the German government established the Commission on Growth, Structural Change and Employment in 2018 (Oei, Brauers, and Herpich, 2020).	◆ As a part of his 2022 presidential campaign, Yoon Seok-Yeol made a pledge to hasten coal phase-out to alleviate the severe air pollution caused by fine dust emissions. Specifically, he vowed to decrease the proportion of fossil fuel-fired power generation with high levels of fine dust emissions

Category	**United Kingdom**	**Germany**	**Korea**
	environment-first policies (Carter and Jacobs, 2014; Johnstone et al, 2020).		in the power mix from the current 60% to 40% during his term (Chosun Ilbo, 2022).
Policy Window	◆ The UK was one of the earliest countries in 2015 to commit to coal withdrawal. Although the original deadline for achieving this objective was 2025, the Government now aims to accomplish it a year earlier, by 2024.	◆ The Act on the Phase-out of Coal-fired Power Plants and the Structural Reinforcement Act was approved by Germany's Bundestag and Bundesrat in 2020 (BMWK, 2020).	◆ Notwithstanding positive indications of a shift towards a coal-free power sector, Korea lacks explicit nationwide pledges, strategies, or policy mechanisms to expedite the coal exit, and lacks a structured framework to facilitate the transition. (Parra et al, 2020)
Policy Entrepreneurs	◆ Labour unions, civil society, coal plant owners and operators, NGOs, coal and plant workers, coal communities, and	◆ Labour unions, civil society, coal plant owners and operators, NGOs, coal and plant workers, coal communities, and	◆ Labour unions, civil society, coal plant owners and operators[2], NGOs, coal and plant workers, coal communities, and

[2] In Korea, the state-owned KEPCO (Korea Electric Power Corporation) and its affiliated power plant operators hold a virtual monopoly on the electricity market (Davies, 2023), leading to a minimal role for power plant operators to act as policy entrepreneurs.

Category	**United Kingdom**	**Germany**	**Korea**
	inhabitants of affected areas	inhabitants of affected areas	inhabitants of affected areas

1. Policy Problem Stream

The 'Big Ask' campaign launched by the NGO Friends of the Earth in the United Kingdom in 2005 was a successful effort to raise public awareness of the dangers of climate change and generate broad public support for phasing out coal (Brauers, Oei, & Walk, 2020). This campaign proved to be a critical opportunity for political parties in the UK to demonstrate their commitment to environmental issues, leading to the integration of the coal phase-out agenda into national politics. The media also played a significant role in promoting the coal-free agenda, amplifying the campaign's message and mobilizing public support (Pollitt and Haney, 2013).

Conversely, the off-coal transition in Germany had a slower journey towards becoming a national agenda than in other EU countries. This is despite discussions initiated by NGOs in the

1960s aimed at preventing acid rain and environmental pollution in coal mining areas. It was not until the early 2010s that the issue gained significant momentum at a national level. However, progress towards coal phase-out was subsequently overshadowed by the Fukushima disaster in 2011, which prompted Germany to prioritize nuclear decommissioning over coal exit (Oei, Brauers, & Herpich, 2020).

Despite some initial progress towards coal phase-out, concerns were raised in 2016 by German environmental NGOs who alleged that the Government's Climate Action Plan 2050 would not be sufficient to meet the country's climate targets. The NGOs claimed that the Environment Ministry had yielded to pressure from the Ministry of Economy and the Prime Minister's Office, leading to a weakening of the plan and a delay in implementing key measures such as the coal phase-out deadline (Clean Energy Wire, 2016).

These concerns were further amplified in 2018, when coal exit became a pressing national agenda in Germany.

Environmental NGOs and civil society groups organized massive coal-exit protests, mobilizing tens of thousands of people against the delay of a shift away from coal (Euractiv, 2018).

Meanwhile, in recent years, the growing problem of fine dust pollution in Korea has raised public concern about its health impact. This has prompted the issue of coal phase-out to gain prominence in the political agenda. In fact, during the 2022 presidential election, the gradual abolition of coal was proposed as a pledge to reduce fine dust pollution (Chosun Ilbo, 2022). However, it is important to note that this pledge does not necessarily imply a complete retirement of coal in the country's energy mix.

In a survey conducted by Sisain and Hankook Research in December 2021, it was found that a majority of Korean respondents (64.5%) felt a personal connection to the climate crisis. However, when asked whether the government should prioritize addressing the climate crisis as their top concern, only

43.3% of respondents agreed (Sisain and Hankook Research, 2021). This indicates that while many Koreans may acknowledge the severity of the climate crisis at an individual level, they may not perceive it as a top priority for the government.

The urgency of the need to transition away from coal is underscored by the fact that coal is a significant source of air pollution and greenhouse gas emissions. Despite this, coal exit has not yet emerged as a prominent national issue in Korea, with civil society and the general public not fully recognizing its importance. While some environmental NGOs are calling for a coal phase-out law, the mainstream media is advocating for a gradual and gentle retirement of coal that is deemed more appropriate for the Korean context (Maeil Economic Daily, 2021). Thus, while there is some level of awareness about the need to reduce coal dependency, there is still a lack of widespread public support for more aggressive policies aimed at rapidly phasing out coal. This points to a need for greater

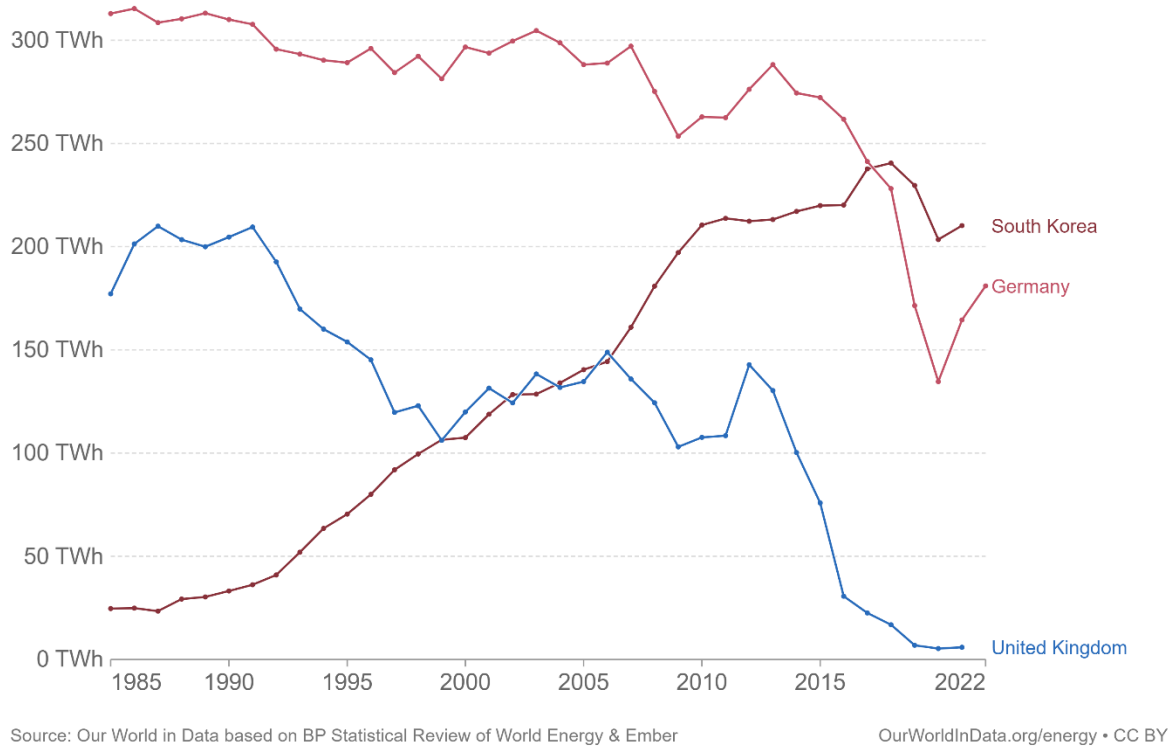
national attention and media coverage to raise awareness of the urgency and importance of coal exit in Korea.

2. Policy Alternative Stream

The sharp decline in the status of coal in the UK since the 1990s can be attributed to a combination of factors. Firstly, the end of the violent and prolonged labour dispute in 1985 led to a decline in the political influence of coal unions, and the Thatcher Cabinet accelerated the liberalisation of the energy market, resulting in increased competition in the energy sector. This liberalisation caused domestic coal production to become more uneconomical (Pollitt and Haney, 2013).

In addition, the UK's commitment to tackling climate change played a significant role in the decline of coal power generation. The Climate Change Act of 2008 established legally binding targets for reducing greenhouse gas emissions, which signalled a clear policy shift towards low-carbon energy sources (Parliament UK, 2008).

Figure 4. Changes in Coal-based Electricity Production: A Comparison of the UK, Germany, and Korea from 1985 to 2022 (Source: Our World in Data)



Furthermore, the implementation of the Carbon Price Floor (CPF) and the Emission Performance Standard (EPS) provided market-based incentives to reduce emissions and encouraged the phase-out of coal power generation (Newbery, Reiner, & Ritz, 2018). Together, as illustrated in Figure 4, these policies and market drivers fostered a more favourable environment for the transition away from coal, thus contributing to the significant decline in the status of coal in the UK.

The UK's Climate Change Act 2008 mandates reducing greenhouse gas emissions by 80% by 2050 through legally binding carbon budgets (Parliament UK, 2008). To achieve this goal, the Electricity Market Reform (EMR) was put into action in 2013, which introduced the Energy Performance Standards (EPS) to prohibit the construction of new coal-fired generating units that do not include Carbon Capture and Storage (CCS). Additionally, the Carbon Price Floor (CPF) was implemented to establish a minimum price for carbon credits, providing further incentives for emissions reductions (Newbery, Reiner, & Ritz, 2018). These policies have significantly reduced the profitability of coal-fired power plants, hastening the transition away from coal and towards renewables in the UK (Mendelevitch and Oei, 2017).

In Germany, similar to the UK, the rise of cheaper imported coal since the 1950s has diminished the profitability of domestic coal. However, the two countries followed divergent policy paths on the coal issue from the 1980s. While the UK discontinued government subsidies for coal production in the

1980s, Germany maintained various forms of direct and indirect subsidies for the coal industry until 2018 when they were suspended by European regulations (Oei, Brauers, and Herpich, 2020).

Consequently, the number of workers employed in the coal mining industry in the UK decreased to 600 by 2017, whereas in Germany, the number remained significantly higher at 13,000. This delay in transitioning away from coal has been attributed to the Government's reluctance to compromise the country's energy security and social welfare system, particularly in the coal-mining regions (Oei, Brauers, & Herpich, 2020).

Furthermore, the Fukushima nuclear power plant accident in 2011 prompted Germany to phase out nuclear power, which has created a complex and challenging process for phasing out coal (Johnstone, Stirling, & Sovacool, 2020). The reduction in nuclear power generation in Germany's overall power mix in the 2010s has made it difficult to ensure adequate power generation capacity (Kittel et al., 2020). Consequently,

Germany has had to rely more on fossil fuels, particularly natural gas and coal, to maintain energy security and avoid power shortages. This has further compounded the challenge of phasing out coal in Germany as it requires achieving a harmonious balance between three critical dimensions, known as the energy trilemma: energy security, energy equity, and environmental sustainability (Johnstone et al., 2020).

The decision to phase out nuclear power in Germany has disrupted the country's energy mix, creating challenges for the process of phasing out coal. The reduction in nuclear power generation has resulted in an energy shortfall that must be addressed by alternative sources of power generation (Kittel et al., 2020).

Despite implementing various measures to increase low-carbon-based power production, the reduction in coal-fired electricity generation has not been commensurate with the increase in renewable energy generation. Between 1990 and 2015, the amount of electricity generated from renewable

sources in Germany increased to 171 TWh. However, the use of coal only decreased by an average of 38 TWh per year during this period, indicating a disproportionate reduction in coal-fired electricity generation compared to the increase in renewable energy generation (EC, 2019).

These findings suggest that while Germany has made progress in increasing the share of low-carbon-based power production, the reduction in coal-fired electricity generation has not been sufficient.

To address the need for a coal phase-out, Germany established The Commission on Growth, Structural Change and Employment in 2018. The commission, consisting of various stakeholders, engaged in social conversations and proposed a complete phase-out of all coal power production by 2035 or 2038 at the latest in 2019 (BMWi, 2019).

Recently, the Korean government announced a plan to gradually decommission 20 coal-fired power units by 2030 as part of the 10th National Electricity Supply and Demand Plan,

which is a positive step towards transitioning to a coal-free power sector (MTIE, 2023).

However, the tardy progress in transitioning away from coal in Korea can be attributed to the de facto monopoly of the state-controlled energy supplier, Korea Electric Power Corporation (KEPCO), and its affiliated major six plant operators. KEPCO's coal exit plan has been criticised for relying on high-cost carbon-based technologies that have not yet been proven viable, posing significant risks to the Korean market (Ng, 2022).

3. Polical Stream

During the 1980s, the Thatcher Cabinet in the UK introduced measures to liberalise the energy market, aiming to reduce the political influence of powerful coal unions. This policy shift had a profound impact on the coal industry, causing its rapid decline in the following years (Brauers, Oei, & Walk, 2020). Consequently, political parties in the UK have been

engaged in a competition to embrace environmentally conscious policies since 2006. As a result, the implementation of eco-centric policies has led to an early coal exit in the country (Isoaho et al., 2020).

Next, the Commission on Growth, Structural Change, and Employment, commonly known as the Coal Commission, was established with the objective of ensuring carbon neutrality by progressively phasing out coal while supporting coal workers, businesses, and regions affected by the transition away from coal (Johnstone et al. 2020). Composed of 28 stakeholders from diverse backgrounds, including unions, non-governmental organisations, inhabitants of coal areas, and academics, the Coal Commission was responsible for drafting a final report in 2019, which was subsequently recommended to the German government. The report proposed support programmes to assist those affected by the coal exit, and represented a significant step toward achieving carbon neutrality in Germany (BMWi, 2019).

Third, during the 2022 presidential election, Yoon Seok-yeol, a presidential candidate, made a bold promise to reduce the proportion of electricity generation from fossil fuels such as LNG, oil, and coal, to two-thirds of the current level. His ultimate objective is to accelerate the phase-out of coal and to increase the use of renewable energy and nuclear power generation (Chosun Ilbo, 2022). By implementing these measures, Candidate Yoon aims to reduce fine dust pollution by more than 30%, which has always been a major problem in Korea during the spring season. To achieve this goal, Candidate Yoon proposed to increase the share of new renewable energy sources and nuclear power generation to replace the energy previously produced by fossil fuels (Chosun Ilbo, 2022).

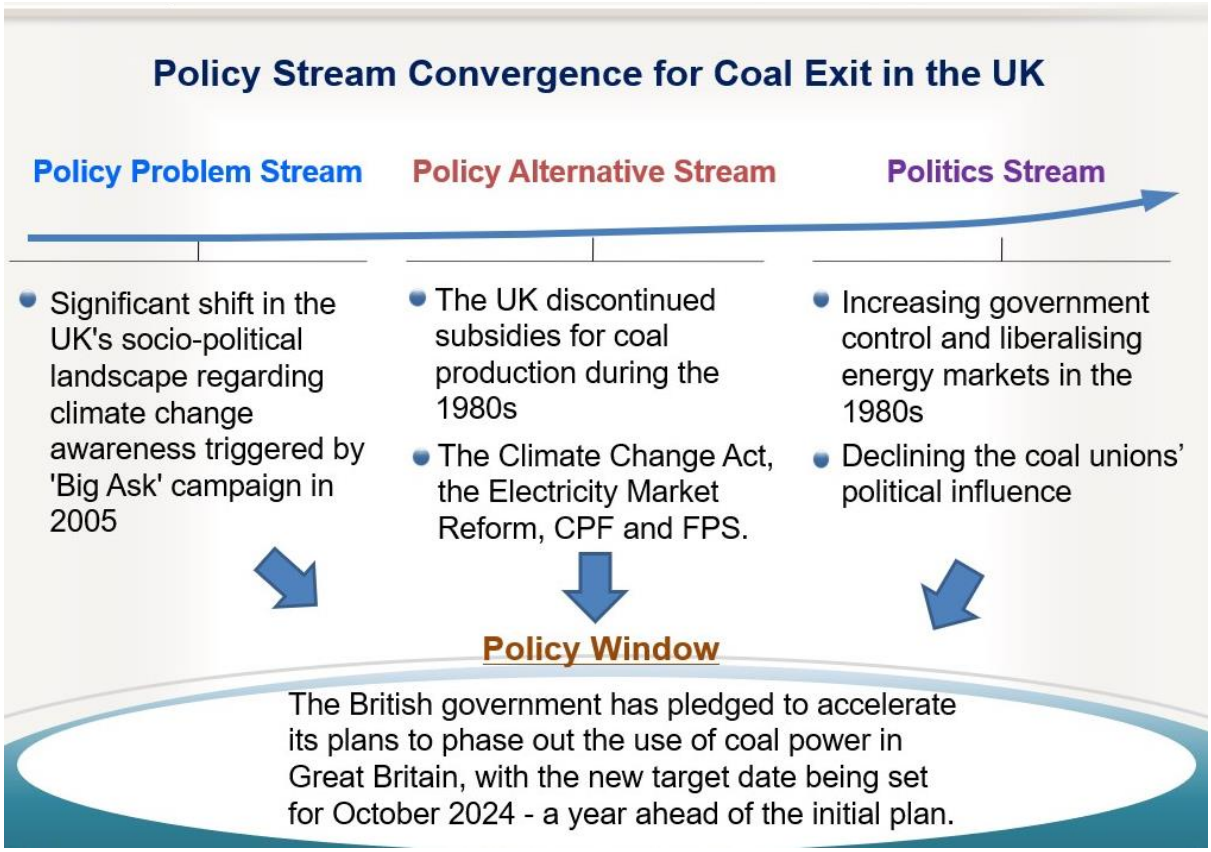
4. Policy Window

The UK made a significant policy shift in 2015 by announcing a coal phase-out by 2025, which positioned it as

one of the earliest countries to take such action (DBEI, 2021). As shown in Figure 5, this policy change was made possible by the opening of a "policy window" which was created by the convergence of policy problem streams, policy alternative streams, and political streams that have been operating since the 1980s.

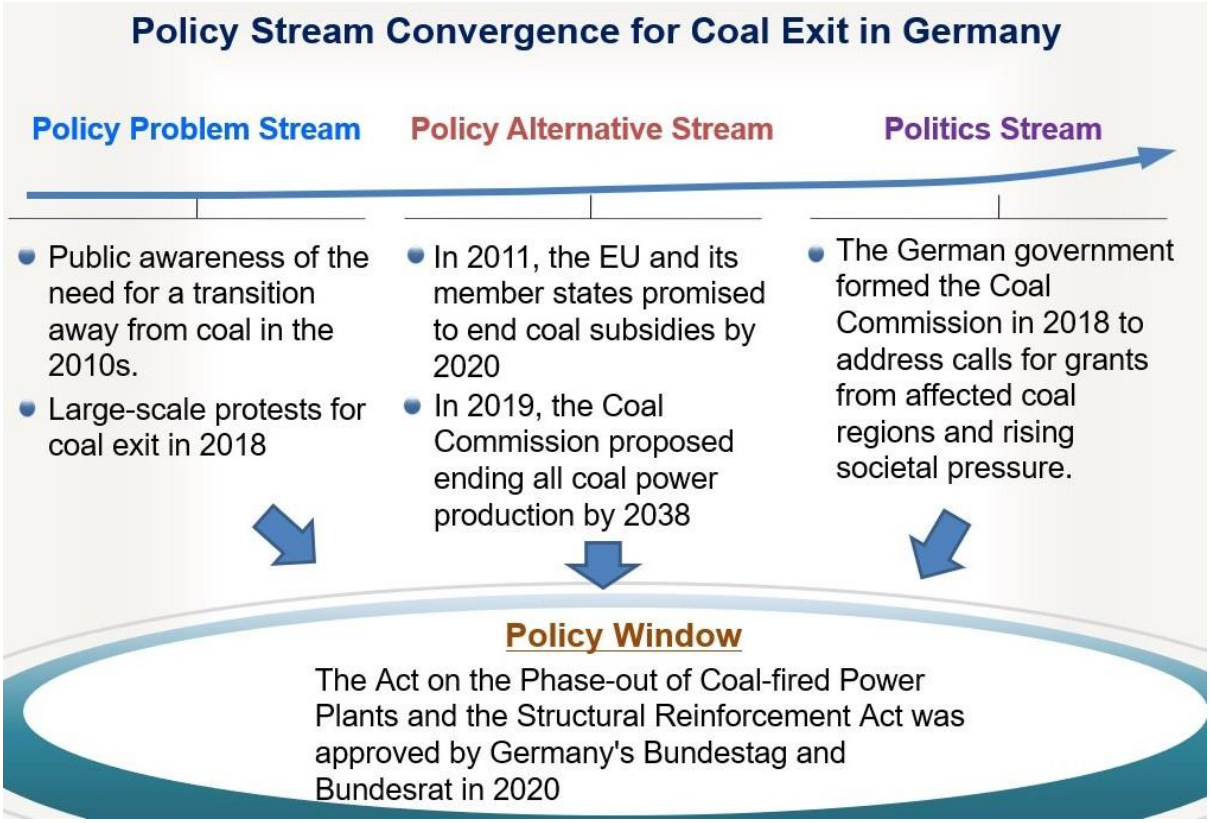
The UK's commitment to addressing climate change and reducing greenhouse gas emissions is further demonstrated by its policy mix of energy market liberalisation and the Electricity Market Reform (EMR) which was introduced in 2013. The EMR incentivised low-carbon electricity generation and encouraged the phase-out of coal-fired power plants by combining a carbon price increase for coal-fired power plants with incentives for renewable energy development (Fothergill, 2017). This policy mix has proven highly effective, and the UK has since set an even more ambitious goal to withdraw coal by 2024, a year earlier than initially planned (DBEI, 2021).

Figure 5. Convergence of Multiple Streams for Coal Phase-Out in the UK (Source: This figure was created by the author of this paper using the MSF developed by John Kingdon)



While the UK phased out its coal industry through a combination of market mechanisms and energy regulations, Germany took a different approach. Until 2018, Germany subsidised its coal industry, and coal unions still hold considerable influence (Oei et al., 2020). As a result, Germany's "policy window" opened later than Britain's, and the country still has a long way to go before completing its coal exit, as depicted in Figure 6.

Figure 6. Convergence of Multiple Streams for Coal Phase-Out in Germany (Source: This figure was created by the author of this paper using the MSF developed by John Kingdon)



Furthermore, unlike the UK, which relied on market forces to naturally extinguish its coal market through price adjustments and energy regulations, Germany extended the lifespan of its uncompetitive domestic coal industry by providing subsidies (Oei et al., 2020). As a result, the coal phase-out in Germany has been led by the Government in accordance with EU regulations (Oei, Brauers, & Herpich, 2020).

In the release of the 9th National Electricity Supply and Demand Plan in 2020, Korea declared its commitment to retiring coal power as soon as feasible. However, the Government is receiving criticism for not setting a clear deadline for the coal exit, lacking a tangible roadmap and a comprehensive strategy for phasing out coal, and not engaging in sufficient social discourse on the matter, as noted by Parra et al. (2020).

Based on the above analysis of the coal phase-out pathways of the UK and Germany, it is evident that Korea has yet to open a policy window for coal exit, unlike the two countries. This implies that the policy problem stream, the policy alternative stream, and the political stream have yet to reach maturity individually in the Korean context. As a result, these three streams have failed to generate a tipping point that could serve as a catalyst for momentous change towards retirement for coal power, as illustrated in Figure 7.

Figure 7. Convergence of Multiple Streams for Coal Phase-Out in Korea (Source: This figure was created by the author of this paper using the MSF developed by John Kingdon)

5. Policy Entrepreneurs

The political influence of civil society organisations in both Britain and Germany is significant, particularly with respect to their responses to climate change (Carter and Jacobs, 2014). As previously discussed, civil society groups, including NGOs

such as Friends of the Earth, acted as policy entrepreneurs in both countries, playing a key role in opening up the policy window for the off-coal transition. However, there are notable differences between the two nations. In the UK, civil society organisations utilised the 'Big Ask' campaign in 2005 to raise public awareness of the climate crisis, which led to the adoption of greener policies to phase out coal (Brauers, Oei, and Walk, 2020). In contrast, in Germany, nuclear phase-out was a national issue prioritized over the off-coal transition in the 2010s, so it is only recently that coal phase-out has emerged as a national agenda in civil society (Kittel et al., 2020)

Korea also boasts a lively civil society, characterized by a vibrant NGO sector that reflects a diverse range of socioeconomic interests. However, coal phase-out has not yet emerged as a major issue in Korean civil society (Donga Ilbo, 2021). Despite efforts to move away from fossil fuel energy sources, the issue of coal phase-out has not yet gained significant traction in Korean civil society.

Chapter 5. Comparative Analysis of Off-Coal Transition in the UK, Germany, and Korea

In the previous chapter, an analysis was conducted using Kingdon's Multiple Streams Framework to compare the approaches towards the coal phase-out agenda in the United Kingdom, Germany, and Korea.

This chapter aims to comprehensively review the coal phase-out policies of the three countries. Specifically, the analysis will focus on the political-economic context, transition policies, and the structure and characteristics of the electricity markets. The chapter will also examine the dynamics among key players, including governments, markets, and unions, within the political-economic context of each country, utilising the Varieties of Capitalism (VoC) framework (Hall & Soskice, 2003). Using a macro approach of political economy context, the chapter seeks to explore how political economy and electricity market's structure have influenced differences in shaping transition policies. Through an in-depth comparative

analysis of the three countries, the chapter will examine their unique approaches to transitioning away from coal.

1. Political Economy Approach

Hall and Soskice's Varieties of Capitalism (VoC) framework distinguishes two primary types of political economy: liberal market economy (LME) and coordinated market economy (CME). These two types correspond to archetypal poles on which different countries can be situated along the spectrum. In LMEs, market players exchange goods or services with each other based on price signals in a competitive market. In contrast, CMEs rely more on cooperative relationships that are based on strategic interactions and information exchange within networks.

In an LME, the price mechanism is the ultimate arbiter of market adjustment, making it challenging to achieve long-term equilibrium through social consensus and stakeholder

intervention, such as governments and trade unions (Hall and Soskice, 2003). The consensus is that the UK exhibits archetypal characteristics of an LME, whereas Germany is typically categorized as a CME.

Rentier, Lelieveldt, and Kramer's (2019) analysis reveals the dominant role of market economy-based institutions, such as private ownership and the stock market, in energy sector within the LME. In contrast, decision-making related to the energy mix in a CME is primarily influenced by government, labour unions, and civil society organizations.

The authors' study highlights the differing approaches to coal exit between the LME and CME. In LMEs like the UK, achieving social consensus through social discourse or collective bargaining can be challenging due to market mechanisms that prioritise rational market equilibrium price adjustments. The labour market in these economies is often characterized by low levels of unionization and weak employment protection. On the other hand, CMEs like Germany

and Korea balance market efficiency with social protections by incorporating input from various stakeholders, including trade unions and civil society organizations, resulting in a collaborative regulatory framework (Hall and Soskice, 2003).

In particular, Korea is classified as a Coordinated Market Economy (CME), where the government plays a dominant role and civil society and unions have comparatively less influence. This structure can be attributed to the country's legacy as a developmental state, according to Fleckenstein and Lee (2018).

Rentier, Lelieveldt, and Kramer's (2019) analysis suggests that the phase-out of coal may be delayed in the coordinated market economy (CME) compared to the liberal market economy (LME) due to the political influence of stakeholders who may have veto powers to prevent policy changes that could harm their interests. In other words, their analysis leads to the conclusion that the adoption of new policies, such as coal exit, will be slower in CMEs, such as Germany and Korea, than

in LMEs, such as the UK, due to wider stakeholder engagement.

The findings of this study support the previous chapter's MSF analysis in three countries (the UK, Germany, and Korea). The UK had the earliest policy window due to a market-based approach to coal exit, while Germany and Korea experienced delays, with Korea facing a longer delay. This delay can be attributed to greater stakeholder engagement in coordinated market economies (CMEs).

Table 4. Comparative Analysis of the Off-Coal Transition Approach in the UK, Germany, and Korea: Political Economy Contexts, Transition Policies, and Characteristics of the Electricity Market. (*Table 4 has been created by the author of this dissertation*)

Category	**UK**	**Germany**	**Korea**
Political Economy Context: Varieties of Capitalism (VoC) framework	◆ Liberal Market Economy: Market mechanisms in LMEs typically operate to effectuate rational adjustments. In a LME like the UK, achieving social consensus	◆ Coordinated Market Economy: A CME like Germany involves input from various stakeholders, including trade unions and the government, resulting in a	◆ Coordinated Market Economy: Korea is classified as a coordinated market economy (CME), featuring a dominant government, relational contracts and

Category	UK	Germany	Korea
	through collective bargaining among the government, trade unions, and civil society can be difficult due to the emphasis on rational adjustments through market mechanisms (Rentier, Lelieveldt, & Kramer, 2019).	collaborative regulatory framework that balances market efficiency with social protections. (Rentier, Lelieveldt, & Kramer, 2019).	networks, and relatively weak civil society and unions (Hall and Soskice, 2003). This economic structure can be traced back to Korea's developmental state legacy (Fleckenstein & Lee, 2018)
Transition policies	◆ In 2013, the UK introduced the Electricity Market Reform (EMR) to reduce carbon emissions from electricity generation. The primary goal of EMR is to provide electricity at competitive rates through market mechanisms while promoting investment in low-carbon energy	◆ The Coal Commission recommended a smooth transition through measures such as providing alternative jobs, involving trade unions, and offering retraining programs (Kittel et al., 2020). ◆ The Coal Phase-out Act promotes low-	◆ The Korean government implemented the Coal Industry Rationalisation Policy between 1988 and 2005, which led to the closure of most coal mines, with only five remaining in operation as of 2022. All five are planned to be closed by 2025 (Korea Coal

Category	UK	Germany	Korea
	infrastructure (DECC, 2013). ◆ The UK chose not to subsidise coal mining, and in the 1980s it ceased all subsidies. This decision had a significant impact on the domestic coal production, leading to a drastic plunge in production and employment (Brauers, H., Oei, P., and Walk, P., 2020).	carbon electricity generation and provides compensation payments and subsidies to retire coal-fired plants (Rinscheid and Wüstenhagen, 2019). In addition, the German government allocated €40 billion by 2038 under the Structural Reinforcement Act for Mining Regions to promote the regeneration and structural transformation of impacted coal regions (Kittel et al., 2020).	Corporation, 2022). ◆ The 10th National Electricity Supply and Demand Plan aims to increase the share of nuclear and renewable electricity to over 30% by 2036 while reducing coal-generated electricity to less than 15% and retire 20 coal-fired power plants by 2030 while ensuring a stable electricity supply (MTIE, 2023).
Characteristics of the Electricity Market	◆ The UK power grid is interconnected with France, Belgium, Ireland,	◆ Germany has the largest power plant capacity in Europe and exports electricity	◆ Korea Korea heavily relies on energy imports, with around 97% of its energy

Category	UK	Germany	Korea
	and the Netherlands via interconnectors (IEA, 2019). ◆ The Electricity Market Reform (EMR) was fully implemented in 2013 to achieve full liberalisation of the electricity market (IEA, 2019). ◆ Pro-competitive measures based on market mechanisms, such as the Carbon Price Floor, Contracts for Difference, and Emissions Performance Standards, were employed under the EMR (IEA, 2019).	to neighboring countries through EU's integrated power grid (IEA, 2020). ◆ Four major utilities generate over half of the country's electricity, while public and municipal utilities account for 25%(IEA, 2020). ◆ The transmission system is managed by four TSOs, and there are over 800 DSOs. Despite the dominance of the Big Four, the German retail electricity market is highly	sourced externally (KEPCO, 2023). ◆ Importing or exporting electricity to and from neighboring countries is challenging due to the isolated power grid (KEPCO, 2023). ◆ Korea's electricity industry comprises six state-owned power generation companies and a few small private power plants. KEPCO is the leading provider and effectively has a monopoly as it purchases all generated electricity (KEPCO, 2023).

Category	UK	Germany	Korea
		competitive with over 100 suppliers (IEA, 2020).	

2. Transition Policy

(1) The United Kingdom

Margaret Thatcher's administration implemented significant economic reforms in the late 1980s that included the privatisation of state-owned energy assets and the liberalisation of the energy market. This led to the withdrawal of subsidies to the coal industry and the opening of the energy market, which contributed to the rapid contraction of the coal industry. As a result of these market-oriented policies, Britain's coal consumption dropped significantly from 809 TWh in 1987 to 399 TWh in 1999, reflecting the impact of the economic reforms (Our World in Data, 2022).

In addition, to further reduce carbon emissions in electricity generation, the UK introduced the Electricity Market Reform (EMR) in 2013. The primary objective of the EMR is to ensure competitive electricity rates through market-based mechanisms while promoting investment in low-carbon energy infrastructure (DECC, 2013). This reform is aimed at achieving affordable electricity prices for consumers and encouraging sustainable energy production (IEA, 2019).

The Electricity Market Reform (EMR) provides two key benefits: First, it offers Contracts for Difference (CfD) that ensure revenue stability for low-carbon utilities over the long term, which reduces capital costs for low-carbon energy investments (House of Commons, 2018). Second, it includes the Capacity Market, which improves the reliability of power supply and minimizes the risk of blackouts by enhancing the stability of the energy grid (DECC, 2013).

The EMR mechanism comprises several components, including the Carbon Price Floor, the Emissions Performance

Standard, an annual cap on CO2 emissions from fossil fuel power plants, incentives for Electricity Demand Reduction, support for market liquidity and access to independent renewable generators, and effective transitional arrangements from the Renewables Obligation to Contracts for Difference (Littlecott, Burrows, & Skillings, 2018).

In particular, the UK's shift away from coal has been attributed to two significant components of the Electricity Market Reform: the Emission Performance Standard (EPS) and the Carbon Price Floor (CPF) (House of Commons, 2018). The EPS restricts the development of new fossil fuel power plants without carbon capture and storage (CCS), while the CPF internalizes the external costs of carbon-intensive electricity generation, like coal, by reducing the price competitiveness of carbon-emitting coal-fired power plants. These measures have played a significant role in the country's transition away from coal (Littlecott, Burrows, & Skillings, 2018).

The success of the Electricity Market Reform (EMR) implemented in 2013 is evident in the significant reduction of coal consumption in the UK, from 453 TWh in 2013 to 58 TWh in 2021, indicating the effectiveness of the policy (Our World in Data, 2022).

(2) Germany

In 2018, Germany established the Commission on Growth, Structural Change and Employment, commonly known as the Coal Commission, to develop a comprehensive strategy for gradually eliminating coal from the electricity generation sector. Alongside this objective, the Commission was tasked with outlining policy measures to protect the interests of coal mining areas and workers affected by the phase-out (Thuy, 2022). The Coal Commission was set up to engage multi-stakeholders, including coal unions, academics, coal region

residents and civil society organisations, in reaching consensus-based solutions (Oei et al., 2020).

The Commission's recommendations were adopted in 2020, when the Bundestag and Bundesrat approved the Coal Phase-out Act, also known as the Act on the Phase-out of Coal-fired Power Plants and the Structural Reinforcement Act for Mining Regions (BMWK, 2020).

Germany has set a goal to complete the phase-out of coal-fired power plants by 2035, with a deadline of 2038 at the latest. To ensure a smooth transition, the Coal Commission has recommended several measures. These include providing alternative or new jobs for coal workers, involving trade unions in the planning process, offering retraining programs to help workers transition to other occupations, and guaranteeing workers a substantial income for a period of time if alternative jobs are not available (Kittel et al., 2020).

To compensate for the premature closure of coal-burning utilities, the Government and plant owners have agreed on

compensation payments. The Coal Phase-out Act also aims to promote low-carbon electricity generation by providing additional subsidies for retiring the coal-fired plant and replacing it with a new natural gas-fired combined-cycle (NGCC) plant[3] and converting the steam boiler of coal power generators to burn other fuels, such as natural gas and waste materials (Rinscheid and Wüstenhagen, 2019).

To promote the regeneration and structural transformation of coal regions impacted by coal exit, the German government has allocated €40 billion by 2038 under the Structural Reinforcement Act for Mining Regions. This funding will support programmes focused on restoring and redeveloping former mining areas, as well as the construction of crucial infrastructure such as transportation, tourism, and telecommunications, including railways (Kittel et al., 2020)

[3] A Natural Gas Combined Cycle (NGCC) unit generates electricity using natural gas, utilising a two-stage process with a gas turbine and a steam turbine. NGCC plants are known for their low capital cost and relatively low CO2 emissions compared to coal-fired utilities (Bell, Towler & Fan, 2010).

In conclusion, Germany's approach to phasing out coal differs from the UK's market-based policy. Instead of relying on market mechanisms, Germany established the Coal Commission, which engaged with various stakeholders and conducted extensive field research on the impact of coal exit on affected areas and workers. This research informed the development of the Coal Phase-out Act and the Structural Reinforcement Act for Mining Regions, which guided the implementation of policies for transitioning off coal. Overall, Germany's multi-stakeholder approach to coal phase-out reflects a balance of socioeconomic, political, and environmental interests within a coordinated market economy.

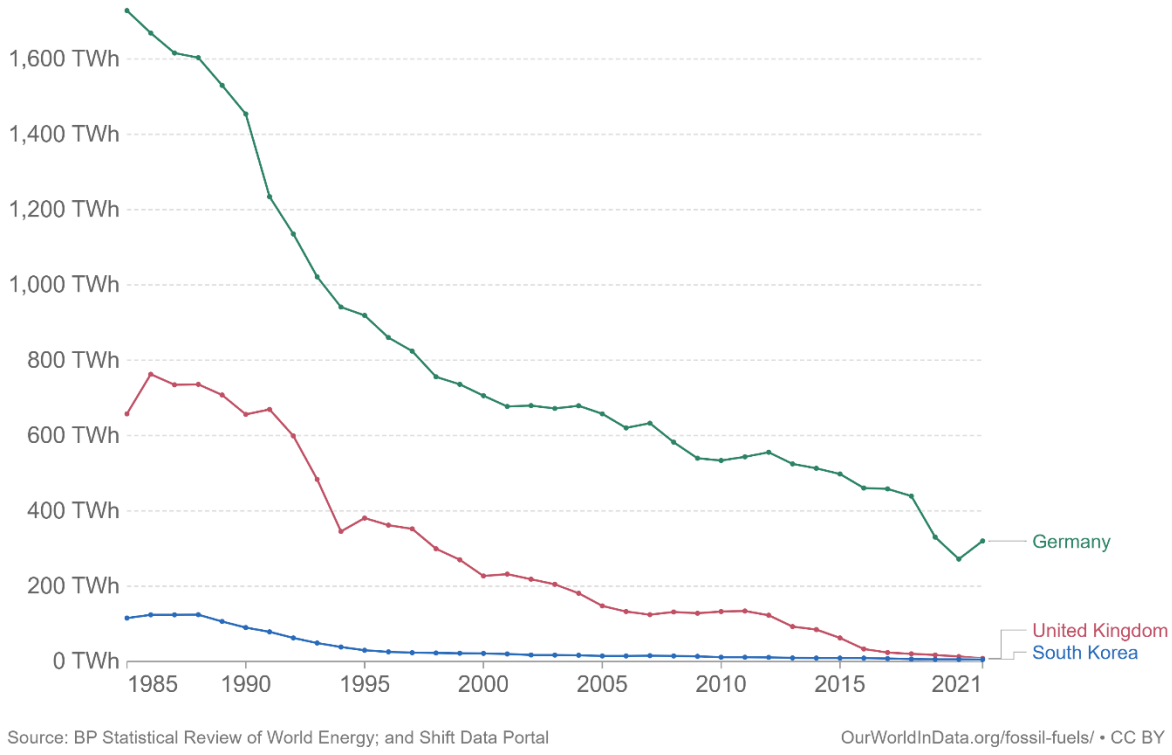
(3) Korea

Beginning in the 1980s, the cost of imported coal significantly decreased, rendering domestically produced coal uncompetitive. To facilitate the gradual and stable closure of coal mines, the Korean government implemented the Coal

Industry Rationalisation Policy between 1988 and 2005. As a result, only five coal mines remained in operation as of 2022, all of which are scheduled to be closed by 2025 (Korea Coal Corporation, 2022).

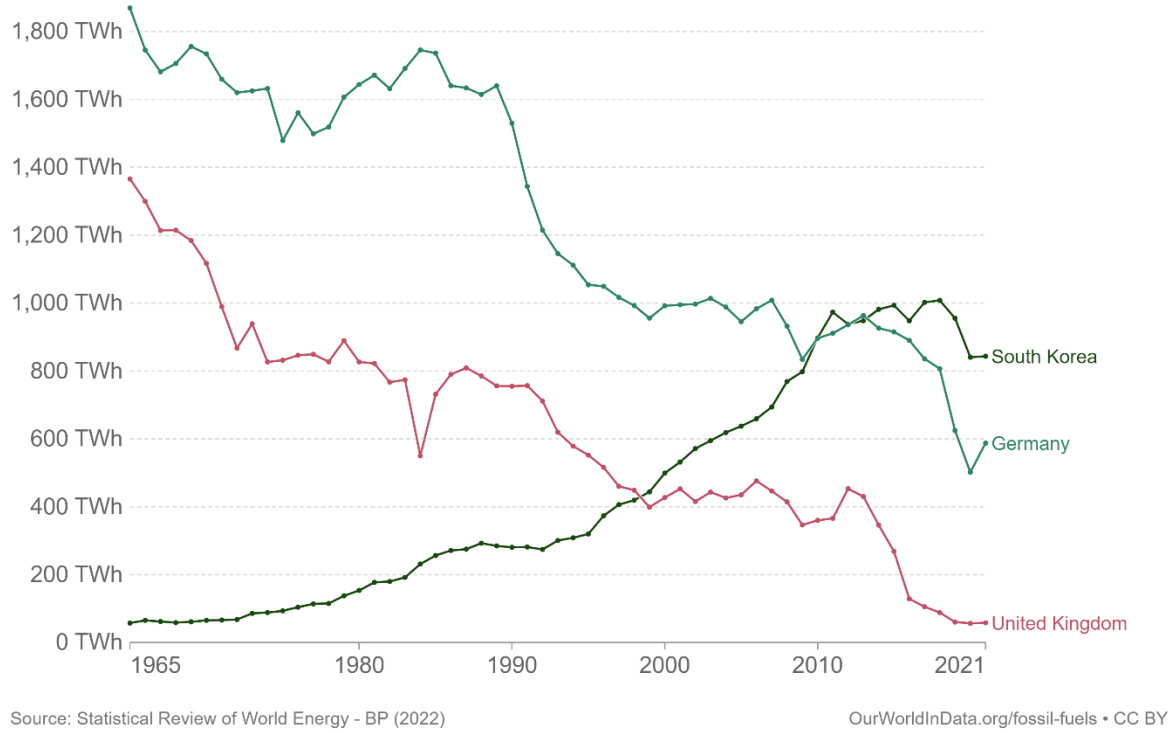
As illustrated in Figure 8, Korea produced just 5 TWh of coal in 2021, less than the UK's 8 TWh, which is on the verge of completing its coal phase-out in 2024 (Our World in Data, 2022).

Figure 8. Coal Production in the UK, Germany, and Korea from 1985 to 2021 (Source: Our World in Data)



As depicted in Figure 9, in contrast to the UK and Germany, Korea's coal consumption has been on an upward trajectory for over three decades. As discussed in the previous chapter, this is primarily because phasing out coal has not been a critical national priority. Consequently, public awareness regarding coal usage remains relatively low, resulting in inadequate control of coal consumption.

Figure 9. Coal Consumption in the UK, Germany, and Korea from 1985 to 2021 (Source: Our World in Data)



In its 10th National Electricity Supply and Demand Plan, released in January 2023, Korea announced its intention to phase out coal as soon as possible. The plan aims to increase the share of electricity generation from nuclear and renewables to over 30% and decrease the share of coal to less than 15% by 2036 (Ministry of Trade, Industry, and Energy of Korea: hereafter MTIE, 2023).

While the Government plans to retire 20 coal-fired power plants by 2030 to achieve carbon neutrality in the long term, it acknowledges that further retirements should be carefully considered to ensure the stability of electricity supply (MTIE, 2023).

The Government aims to reduce the adverse effects of coal retirement on employment by working alongside relevant ministries and local governments to explore multiple job transition options. These options may involve reallocating workers to other thermal power plants that use natural gas and renewable energy or to other utility subsidiaries that could

benefit from their accumulated knowledge and extensive experience (MTIE, 2023).

Furthermore, to compensate for the diminishing share of coal power in the overall power mix, the Government intends to expand nuclear power generation and reduce greenhouse gas emissions from existing thermal power plants by incorporating up to 50% hydrogen into natural gas power generation and 20% ammonia into coal power generation (MTIE, 2023).

As part of this plan, 20 old coal-fired generators will have been retired by 2030, after which they will be gradually repurposed to burn other types of fuels such as natural gas and pulp and wood waste. Additionally, most coal-fired generators will be replaced or converted to new natural gas combined cycle (NGCC) generators in the long term, according to the Ministry of Trade, Industry, and Energy of Korea (2023).

3. Characteristics of the Electricity Market

Table 4 (Comparative Analysis of the Off-Coal Transition Approach in the UK, Germany, and Korea) above displays that the electricity markets in the UK and Germany are operating as competitive markets. In contrast, in Korea, the electricity market remains dominated by KEPCO and its subsidiaries, which are state-owned power utilities, maintaining a monopoly over electricity generation and supply.

(1) Grid connectivity with neighbouring countries

The effective and stable power supply is contingent upon the interconnectedness of power grids with neighbouring countries. Regrettably, Korea's current power grid operates in isolation, bereft of interconnections with neighbouring countries such as China and Japan. Korea's isolated power grid poses a significant geopolitical threat to power supply stability, as it is

unable to easily import or export electricity to and from neighbouring countries (KEPCO, 2023)

On the other hand, the UK and Germany have established interconnectors that enable the interlinking of their grids with adjacent nations, permitting the exchange of electricity across borders. The UK grid is linked to the power systems of France, Belgium, Ireland, and the Netherlands via interconnectors (IEA, 2019). Germany plays a crucial role in the EU's integrated power grid and exports electricity to neighbouring countries like Austria, the Czech Republic, and Poland (BMWK, 2023).

(2) Competitive vs. Monopolistic Electricity Markets

The electricity markets in the UK, Germany, and Korea exhibit contrasting degrees of market competition.

In the UK, the Electricity Market Reform (EMR) was introduced in 2013, which is a market-based mechanism that comprises the Carbon Price Floor (CPF), Contracts for Difference (CfD), and Emissions Performance Standards (EPS). The implementation of the EMR has resulted in the UK having an almost fully competitive electricity market (IEA, 2019).

In Germany, electricity is provided by a diverse set of companies, including the Big Four utilities - E.ON, RWE, Vattenfall, and EnBW - which generate more than 50% of the country's electricity. Public utilities, including municipal utilities, account for roughly 25% of the electricity supply. Despite the dominance of the Big Four utilities, the German retail electricity market is highly competitive, with more than 100 suppliers, and the Big Four utilities have a combined market share of less than 40% (IEA, 2020).

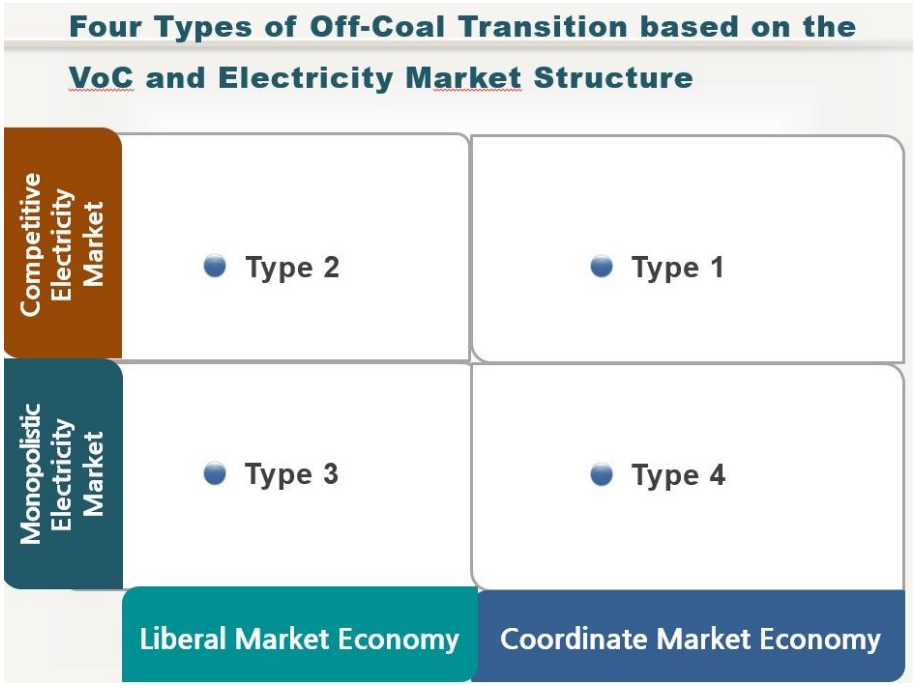
In contrast, Korea's electricity market is monopolistic, with the state-owned Korea Electric Power Corporation (KEPCO)

purchasing all of the electricity generated by its sister companies, which comprise six power generation utilities, as well as several small private power plants (KEPCO, 2023).

4. Four Types of Off-Coal Transition: A Conceptual Framework Based on Varieties of Capitalism and Electricity Market Structure

Drawing on previous cross-country analyses of the varieties of capitalism (VoC) and electricity market structures, the off-coal transition can be classified into four distinct types, as depicted in Figure 10.

Figure 10. Four distinct off-coal transition types determined by Varieties of Capitalism (VoC) and electricity market structure (source: the author of this paper)



- **Type 1 (Germany)**: Characterized by a coordinated market economy (CME) and involving multiple stakeholders such as unions and NGOs, achieving a social consensus for coal exit in this type requires significant time due to prolonged political coordination among stakeholders and negotiation of compensation contracts with coal facility owners/operators in a competitive electricity market.

- **Type 2 (The UK)**: Associated with liberal market economies (LMEs), this type involves a relatively quick shift away from coal through price mechanisms in a competitive electricity market. Interests among stakeholders are not politically driven, but rather based on rational adjustments to the market's equilibrium price.

- **Type 3**: This type theoretically involves countries with a combination of LMEs and monopoly power markets. However, in reality, LME and monopoly power markets are

conceptually contradictory, so countries belonging to this type are highly unlikely to exist in practice.

- **Type 4 (Korea)**: This represents a CME with a monopolistic power market where the number of stakeholders involved in the off-coal transition is limited. The pace of coal phase-out can be fast or slow, depending on the will of the monopoly power supplier/producer, such as the government and state-owned power monopolies.

Based on the preceding comparative analysis of the off-coal transition pathways in the UK, Germany, and Korea using the political economy approach (the varieties of capitalism or VoC) and electricity market structure, it can be concluded that the UK can be classified as Type 2, Germany as Type 1, and Korea as Type 4.

Moreover, this conceptual framework that classifies off-coal transition into four types, based on the country's capitalism

type (CME or LME) and electricity market structure, holds potential as a predictive tool for comprehending a country's coal phase-out process. This framework can offer valuable insights, contingent upon the practicability of accurately identifying a country's capitalism type and electricity market structure.

Chapter 6. Conclusion and Policy Implications

This study utilises Kingdon's Multiple Streams Framework (MSF) to investigate the evolution of the policy problem stream, policy alternatives stream, and political stream in the United Kingdom, Germany, and Korea, shedding light on how coal phase-out has gained prominence on the national agenda.

The UK exhibited an early and smooth transition away from coal through a market-based approach. In contrast, Germany's policy window opened relatively recently, and the country is still in the early stages of coal phase-out, characterized by prolonged coal subsidies and protracted stakeholder alignment and negotiation. Korea, on the other hand, faced obstacles stemming from an immature policy problem stream, a limited policy alternative stream, and an underdeveloped political stream, resulting in a lack of momentum to open the policy window for coal phase-out. These findings highlight the diverse dynamics and challenges associated with coal phase-out in different countries, providing

valuable insights for policymakers, researchers, and stakeholders involved in energy transition efforts.

Furthermore, the study presents a novel conceptual framework that draws on the varieties of capitalism (VoC), specifically the distinction between liberal market economy (LME) and coordinated market economy (CME), as well as the electricity market structure, either competitive or monopoly, to classify four distinct types of coal phase-out. This framework provides valuable insights into how different countries may navigate their off-coal transition pathways based on their specific form of capitalism and electricity market structure.

By utilising this framework, we can make informed predictions about the trajectory of a specific country's coal exit, thereby contributing to our understanding of how different capitalism (CME or LME) and electricity market structures influence off-coal transition pathways.

However, this conceptual framework based on the varieties of capitalism (VoC) and electricity market structure

has limitations that may render it inapplicable to countries such as France and Greece, which do not fall neatly into either category of LME or CME. Further research on the diversity of capitalist economic systems is needed to refine and evolve the framework.

After conducting a comprehensive examination of the analysis findings mentioned above, it is apparent that Korea's pursuit of coal exit is accompanied by significant challenges, including low public awareness, lack of a clear roadmap, and potential job insecurity for coal plant workers.

Moreover, careful consideration of the analysis findings presented above indicates that the application of the UK's market mechanism approach, known for its competitive electricity market and liberal market economy (LME), may encounter substantial challenges within the Korean context of a coordinated market economy (CME) and de facto state-owned power monopoly.

Despite Korea's history of implementing coal phase-out policies, the current focus is on retiring ageing coal-fired power plants and transitioning to liquefied natural gas (LNG) as a future fuel source. Although affected workers in Korean coal power utilities may have relatively stable job security due to their public nature, support programs for small subcontractor workers are imperative.

Mitigating the economic impact on small coastal towns where coal plants are located can be achieved through strategies such as restoration, regeneration, redevelopment, and attraction of alternative industries. Drawing lessons from Germany's approach, establishing an independent, multi-stakeholder commission can facilitate policy recommendations through social dialogue, even within the context of Korea's monopolistic electricity market that differs from Germany's competitive market. Such an independent commission can play a pivotal role in Korea's government-led transition approach and coordinated market economy, providing a swift path towards a coal-free future. However, achieving this goal

necessitates a clear roadmap developed through social consensus and effective implementation.

Prompt and resolute action to shift away from coal is indispensable for Korea to achieve its carbon neutrality goal by 2050. By addressing the challenges of low public awareness, lack of a clear roadmap, job insecurity for coal plant workers, and economic impacts on coal plant areas while incorporating multi-stakeholder engagement through an independent commission, Korea can ensure a just and successful transition.

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Appendix: Stage 1 Ethical Review

Department of Social Policy, Sociology and Criminology

Preliminary Ethical Approval

This form is to be completed by ALL students in the Department of Social Policy, Sociology and Criminology who are carrying out research. The purpose of this form is to decide whether or not further ethical review and approval is required before the commencement of a given research project.

NAME:

TITLE OF PROJECT: Towards a Transition: Insights from Divergent Off-Coal Transition Pathways - A Comparative Analysis of the United Kingdom, Germany, and Korea
TITLE OF PROGRAMME/MODULE: Global Public Policy (with integrated placement)

Please answer the following questions (delete as appropriate)**:**

- Will the research project involve humans as subjects of the research (with or without their knowledge or consent at the time)? **No**
- Are the results of the research project likely to expose any person to physical or psychological harm? **No**
- Will you have access to personal information that allows you to identify individuals, or to corporate or company confidential information? **No**
- Does the research project present a significant risk to the environment or society? **No**
- Are there any ethical issues raised by this research project that in your opinion require further ethical review? **No**

If you answer NO to ALL the above questions:

Further ethical review is not necessary but you must submit this form to your dissertation supervisor. Please note that, if subsequent to this declaration, changes are made during the study that modify any of the above NO answers to YES, you must inform your dissertation supervisor.

If you answer YES to ANY you should now:

Further ethical review is necessary and you should complete the stage 2 Ethical Review Application Form, and submit this form to your dissertation supervisor.

DECLARATION

I declare that the questions above have been answered truthfully and to the best of my knowledge and belief and that I take full responsibility for these responses. I undertake to observe ethical principles throughout the research project and to report any changes that affect the ethics of the project to my dissertation supervisor.

Signed (STUDENT): K. Kim **Name** (PRINT) DATE: 19.4.2023