Policy Engagements for a Just Decarbonisation: China's 2060 Carbon Neutrality Pledge's Ramifications on the Coal Industry Workforce in Shanxi.

Miss Lucile Charriaut

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Arts in International Development Studies
Common Course
FACULTY OF POLITICAL SCIENCE
Chulalongkorn University
Academic Year 2020
Copyright of Chulalongkorn University

นโยบายการหยุดการปลดปล่อยแก๊สเรือนกระจกอย่างยุติธรรม : การวิเคราะห์นโยบายการปฏิญาณความเป็นกลางทางคาร์บอนภายในปี 2060 ที่มณฑลซานซี ประเทศจีน

น.ส.ลูซิล ชาร์เรียต

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต
สาขาวิชาการพัฒนาระหว่างประเทศ ไม่สังกัดภาควิชา/เทียบเท่า
คณะรัฐศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2563
ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

Thesis Title	Policy Engagements for a Just Decarbonisation: China's 2060 Carbon Neutrality Pledge's Ramifications on the Coal Industry Workforce in Shanxi.
By	Miss Lucile Charriaut
Field of Study	International Development Studies
Thesis Advisor	Assistant Professor Dr. Carl Middleton, Ph.D.

Accepted by the FACULTY OF POLITICAL SCIENCE, Chulalongkorn University in Partial Fulfillment of the Requirement for the Master of Arts

..... Dean of the FACULTY OF POLITICAL SCIENCE
(Associate Professor Dr. AKE TANGSUPVATTANA, Ph.D.)

THESIS COMMITTEE

..... Chairman
(Assistant Professor Dr. KASIRA CHEEPPENSOOK, Ph.D.)

..... Thesis Advisor
(Assistant Professor Dr. Carl Middleton, Ph.D.)

..... External Examiner
(Sam Geall, Ph.D.)

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

ลูซิล ชาร์เรียต : นโยบายการหยุดการปลดปล่อยแก๊สเรือนกระจกอย่างยุติธรรม : การวิเคราะห์นโยบายการปฏิญาณความเป็นกลางทางคาร์บอนภายในปี 2060 ที่มณฑลซานซี ประเทศจีน. (Policy Engagements for a Just Decarbonisation: China's 2060 Carbon Neutrality Pledge's Ramifications on the Coal Industry Workforce in Shanxi.) อ.ที่ปรึกษาหลัก : คาร์ล มิดเดิลตัน

เพื่อให้บรรลุตามคำมั่นสัญญาว่าด้วยการปล่อยคาร์บอนให้เป็นกลางภายในปี 2060 ที่ประเทศจีนซึ่งส่วนผสมของพลังงานยังคงถูกครอบงำโดยถ่านหินเป็นส่วนใหญ่ จะต้องค่อยๆ เลิกใช้โรงไฟฟ้าที่ใช้ถ่านหินเป็นเชื้อเพลิง ถ่านหินที่มีมลพิษสูงจึงไม่ถูกมองว่าเหมาะสมที่จะส่งเสริมเศรษฐกิจที่ยั่งยืน สะอาด และมีอายุยืนยาวอีกต่อไป. ชานซี มณฑลทางเหนือที่ไม่มีทางออกสู่ทะเล ถือเป็นจังหวัดที่พึ่งพาถ่านหินมากที่สุดแห่งหนึ่งของจีน และมีแรงงานถ่านหินจำนวนมหาศาลขึ้นอยู่กับอุตสาหกรรม. การเปลี่ยนแปลงดังกล่าวจะเปลี่ยนแปลงโอกาสทางเศรษฐกิจและแรงงานสัมพันธ์ของจังหวัดนี้อย่างมาก เมื่อพิจารณาถึงความหลีกเลี่ยงไม่ได้ในการเลิกจ้างคนงานถ่านหิน วัตถุประสงค์ของวิทยานิพนธ์นี้คือเพื่อกำหนดว่านโยบายของจีนอยู่ในบริบทของการลดคาร์บอนของมณฑลซานซีและผลกระทบของการเปลี่ยนแปลงต่อคนงานถ่านหินอย่างไร. โดยเฉพาะอย่างยิ่ง จะตรวจสอบว่ามณฑลซานซีจะเป็นผู้นำใน 'การแยกคาร์บอนอย่างเป็นธรรม' หรือไม่ โดยเน้นที่การเปลี่ยนผ่านอย่างเป็นธรรมในอุตสาหกรรมเพื่อลดการปล่อยคาร์บอนในแง่ของสิทธิในการทำงานที่มีคุณค่า.

เพื่อตอบคำถามการวิจัยหลัก วิทยานิพนธ์นี้ได้ทำการวิเคราะห์เนื้อหาเชิงคุณภาพของเอกสารนโยบายที่มีอยู่ซึ่งสนับสนุนคนงานถ่านหินในมณฑลซานซี ตลอดจนการสัมภาษณ์แบบกึ่งโครงสร้างกับผู้เชี่ยวชาญด้านนโยบายสิ่งแวดล้อมของจีน. การวิเคราะห์ได้ตรวจสอบการกำหนดนโยบายการสนับสนุนอย่างใกล้ชิดเพื่อพิจารณาว่ามีการกล่าวถึงคำหลักที่สอดคล้องกับแนวคิดการแยกคาร์บอนอย่างยุติธรรมหรือไม่. ด้วยแนวทางที่ยึดหลักสิทธิมนุษยชน แนวคิดเรื่องความยุติธรรมด้านสิ่งแวดล้อม และแนวคิดทางการเมืองของลัทธิเผด็จการที่กระจัดกระจาย บทความนี้พบว่ามีนโยบายมากมายเพื่อสนับสนุนคนงานถ่านหินตลอดการว่างงานและการจ้างงานใหม่.

ผลลัพธ์เหล่านี้ชี้ให้เห็นว่ามีการระบุความต้องการและปัญหาการจ้างงานที่แตกต่างกันและเป็นที่ยอมรับอย่างสูงในการจัดทำเอกสารนโยบาย. อย่างไรก็ตาม แง่มุมต่างๆ ของกระบวนการยุติธรรมที่เกี่ยวข้องกับการใช้วิธีการแบบมีส่วนร่วม ได้รับการดึงข้อมูลน้อยที่สุดในการวิเคราะห์นโยบายโดยคำนึงถึงโครงสร้างระบบราชการจากบนลงล่างของประเทศจีน. วิทยานิพนธ์สรุปว่าภายในนโยบายต่างๆ ที่เกี่ยวข้อง มีมาตรการมากมายเพื่อให้แน่ใจว่ามีการแยกคาร์บอนออกจากร่างกายอย่างเป็นธรรม แม้ว่าความท้าทายของการดำเนินการที่ประสบความสำเร็จยังไม่เป็นที่แน่ชัด.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

สาขาวิชา	การพัฒนาระหว่างประเทศ	ลายมือชื่อนิสิต .....
ปีการศึกษา	2563	ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

6384033924 : MAJOR INTERNATIONAL DEVELOPMENT STUDIES
KEYWORD: Just decarbonisation, Environmental justice, Coal workers, Carbon neutrality, Policy support

Lucile Charriaut : Policy Engagements for a Just Decarbonisation: China's 2060 Carbon Neutrality Pledge's Ramifications on the Coal Industry Workforce in Shanxi.. Advisor: Asst. Prof. Dr. Carl Middleton, Ph.D.

To achieve its ambitious carbon neutrality pledge by 2060, China, whose energy mix is still largely dominated by coal, must progressively phase out coal-fired power plants. Being highly polluting, coal is no longer perceived as suitable to promote a sustainable, clean, and long-standing economy. Shanxi, a landlocked northern province, is considered one of China's most coal-dependent provinces and accounts for a colossal coal workforce depending on the industry. Such a transition will, therefore, considerably alter the economic prospects and labour relations of this province. Considering the inevitability to lay off coal workers, the objective of this thesis is to determine how just China's policies are in the context of Shanxi's decarbonisation and the impacts of the transition on coal workers. Specifically, it examines if Shanxi will lead a 'just decarbonisation', emphasising a just transition in industries to be decarbonised with respect to the right to decent work.

To answer the main research question, this thesis conducted a qualitative content analysis of available policy documents that support coal workers in Shanxi, as well as semi-structured interviews with experts of China's environmental policies. The analysis closely examined the formulation of support policies to determine whether they are mentioning keywords in alignment with the just decarbonisation concept. Through a human rights-based approach, the concept of environmental justice, and the political concept of fragmented authoritarianism, this paper found that numerous policies are available to support coal workers throughout unemployment and re-employment.

These results suggest that different needs and employment difficulties are identified and highly recognised in the formulation of policy documents. Nevertheless, aspects of procedural justice, involving the use of participatory approaches, were the least retrieved in the policy analysis in consideration of China's top-down bureaucratic structure. The thesis concludes that within various relevant policies, numerous measures are available to ensure a just decarbonisation, although the challenge of their successful implementation is not yet assured.

CHULALONGKORN UNIVERSITY

Field of Study:	International Development Studies	Student's Signature .....
Academic Year:	2020	Advisor's Signature .....

ACKNOWLEDGEMENTS

The completion of this thesis would not have been possible without the support and guidance of my thesis advisor, Dr Carl Middleton, whose expertise, attention to detail and thorough thinking were invaluable in undertaking this research. I am profoundly appreciative of his insightful feedback and for inspiring my research interests and career aspirations in energy policy.

I would like to express my deepest appreciation to the rest of my committee, including Dr Kasira Cheeppensook as Chairman, and Dr Sam Geall as External Committee. Their constructive comments and suggestions notably contributed to bringing this work to a higher level.

I would like to extend my sincere thanks to the experts that I interviewed for this research whose invaluable contribution and agreeability eminently reinforced my thesis' research. I highly appreciate their enthusiasm in participating in my research and for sharing their extensive knowledge on such important and current matters.

I am also deeply grateful to my friends and classmates from the MAIDS program for sharing this experience together, brainstorming through countless stimulating discussions, and keeping each other motivated. I also would like to thank those who have kindly helped me with translation work.

Lastly, I cannot begin to express my gratitude to my parents who, as always, have supported me unconditionally in all aspects of my life. Their genuine interest, wise advice, and sympathetic ear provided me incredible peace of mind and inspire me every day to surpass myself.

Lucile Charriaut

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

TABLE OF CONTENTS

Page

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Chulalongkorn University

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

LIST OF TABLES

Page

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

LIST OF FIGURES

Page

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

CHAPTER 1: INTRODUCTION

CHAPTER OUTLINE

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

1.1 PROBLEM STATEMENT

With the emergence of worldwide concerns revolving around carbon emissions, climate change and pollution, governments and policymakers have started to slowly incorporate greener strategies and strengthen environmental policies. International agreements, such as the Paris Agreement signed in 2016, reinforce the necessity for global action in climate change mitigation and reduction of carbon emissions. One of the first international initiatives regarding environmental concerns began in 1987 with the signature of the Montreal Protocol. Faced with the worldwide disclosure of the ozone depletion, this agreement successfully managed to engage countries in phasing out certain chemicals and substances to protect the ozone layer. In 1992, the United Nations Conference on Environment and Development, or the Earth Summit, was held in Rio de Janeiro in which most of the world's countries engaged themselves in including environmental protection and sustainable policies within their pursuit for economic growth. Five years later, the Kyoto Protocol was signed with rising concerns in global warming and the urgency to reduce greenhouse gas emissions. The idea that individual countries had independent responsibilities and capabilities in batting global warming was put into the light which underlines the need for developed countries to act first under a broad principle of 'common but differentiated responsibility'. Today, countries are engaged to certain extents in incorporating carbon reduction-related policies into their agenda in order to comply with international agreements such as the Paris Agreement adopted in 2015.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

To this day, the world's largest emitter of carbon dioxide, China, has recently become the world's largest investor in clean energy and has demonstrated significant efforts in reducing its emissions over the past decade. Precisely, China's main national strategic plan, the Five-Year Plans for Economic and Social Development, have incorporated strong climate and environmental policies since the early 2000s. In September 2020, the Chinese President, Xi Jinping, made an unexpected new pledge during the UN General Assembly. The President announced that China will become carbon-neutral by 2060 with an expected peak in carbon emissions by 2030. This

announcement will shape China's future plans and strategies as this pledge now became one the major long-term national ambitions that the country is currently holding. The 14th Five-Year Plan (FYP) for 2021-2025 is expected to be significant in the application of certain strategies to achieve carbon neutrality.

With this new ambition, to be witnessed by the entire international community, China will be drawing a roadmap to adopt to achieve this pledge and reach its geopolitical and economic aspirations. This ambition, including numerous plans such as the Beautiful China Initiative, the Nationally Determined Contributions (NDCs) or the FYPs, generated various reactions among international experts and scholars aiming to determine its feasibility, considering the considerable carbon emitter and energy consumer that China has become. It is, with almost no hesitation, that scholars agree on the future success of this pledge, certain even argue that this is far from being an ambitious one (China Dialogue, 2020). Being a one-party state, not unhampered by the necessity to win the popular vote to win the next elections, the People's Republic of China is fast in implementing policies to meet prospective targets. With its strong labour force and technological development, China has the resources to achieve carbon neutrality. As the question concerning the feasibility of this carbon-neutrality pledge was rapidly answered, the question regarding *how* it will be achieved still leaves some interrogations unanswered. Indeed, achieving carbon neutrality is desirable for every country, but such a transition must be done while minimizing costs as much as possible. When considering the costs, the matter is far from being only financial as such transitions greatly impact entire industries and communities.

Scholars have extensively examined the framework of 'just transition', which aims to provide justice to workers, local communities and livelihoods affected by a transition towards a more sustainable lifestyle (McCauley, Heffron, 2018). One clear instance of 'just transition' regards the construction of hydropower dams affecting communities living nearby and requiring resettlement. In a way, constructing zero-carbon sources of energy is highly beneficial for combating climate change when being properly built and operated, however, as often, the most vulnerable communities are

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

often left behind. To follow the 'just transition' framework, those local communities should be included in the decision processes of this project and should be given adequate compensations for their loss of livelihood and means of income. While projects that are deemed too harmful do not go ahead, a zero-impact energy project is impracticable. A 'just transition' should, therefore, include all affected actors and work towards inclusive ways to integrate sustainable technologies or means of production.

The concept of 'just transition' is deeply rooted in some projects relating to renewable energy expansion and industries to be phased-out, such as coal-extracting firms, or communities and provinces dependent on the production or consumption of unsustainable energy sources (McCauley, Heffron, 2018). However, this term is considerably broad and may deviate from focusing on more traditional industries in several parts of the world. Precisely, 'just transition' originated as a Western centric concept and firstly regarded the just transition out of fossil fuels in the United States (Center for Strategic and International Studies, 2020) In recent years, the introduction of the green flourishing industry of renewable energies has also been included in the theoretical research of just transitions. To help understanding the focus of this thesis, the term of 'just decarbonisation' is introduced, offering a more specific perspective to the 'just transition' concept. This term concentrates on the just decarbonisation of the fossil fuels sector specifically while considering a non-European centric frame. Being in the 'wrongdoer' position, stakeholders belonging to these unsustainable industries are not always considered when thinking about a 'just transition', especially outside of Europe. In China, almost 60% of the energy mix consumption comes from coal, contributing to most of the country's carbon emissions. To achieve carbon neutrality, coal should, therefore, be drastically cut down. Such a phase-out would evidently have severe ramifications on the workforce to be discharged from their employment. According to Qiao, Chen, et al (2019), coal contributes to fifteen Chinese provinces' GDP and creates strong dependence in terms of extraction, production, or consumption, seven being coal-dependent developing provinces and eight being coal-dependent

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

developed provinces. Phasing out coal in these provinces without considering affected individuals will certainly lead to mass unemployment, reduction in economic growth, and decline in living standards. Knowing that, can unsustainable energies or industries be phased-out in a *just* manner in consideration of those who will be impacted by the transition? Comparable to a 'just transition', this question can be answered through the term 'just decarbonisation' which will help determine whether the government of China is implementing policies to support sectors most affected by decarbonisation. Taking coal as an example, this industry represents an enormous contribution to China's economic development and energy security, although the country is aware of its unsustainability and uncleanliness and is, therefore, preparing for its phase-out. In this regard, an unjust phase-out could have massive impacts on the communities and the country's economic growth.

The purpose of this thesis is to analyse China's national and provincial policies regarding the framework of 'just decarbonisation'. The aim is to determine whether the government is including support to affected actors in its policies to alleviate the inevitable phase-outs. Support policies can revolve around providing compensation, knowledge, and skill training to be relocated to other industries, such as green jobs, or subsidies. It can also regard the way the phase-out will occur, whether it will be done urgently, to achieve goals faster, or if it will be done consciously with respect to affected actors and to secure economic stability and standards of living. This thesis focuses on the province of Shanxi, a landlocked Northern province with one the largest share of coal consumption in the country. The term 'just decarbonisation' acts as a foundation of this thesis, putting an emphasis on traditional industries to be phased out, instead of focusing on the new green industries. Through this thesis, the concept of Environmental Justice and the Human rights-based approach serve as frameworks to analyse and align the three pillars of sustainable development – economic development, social equity, and environmental preservation – to provide clear reasoning of what Shanxi's decarbonisation will resemble.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

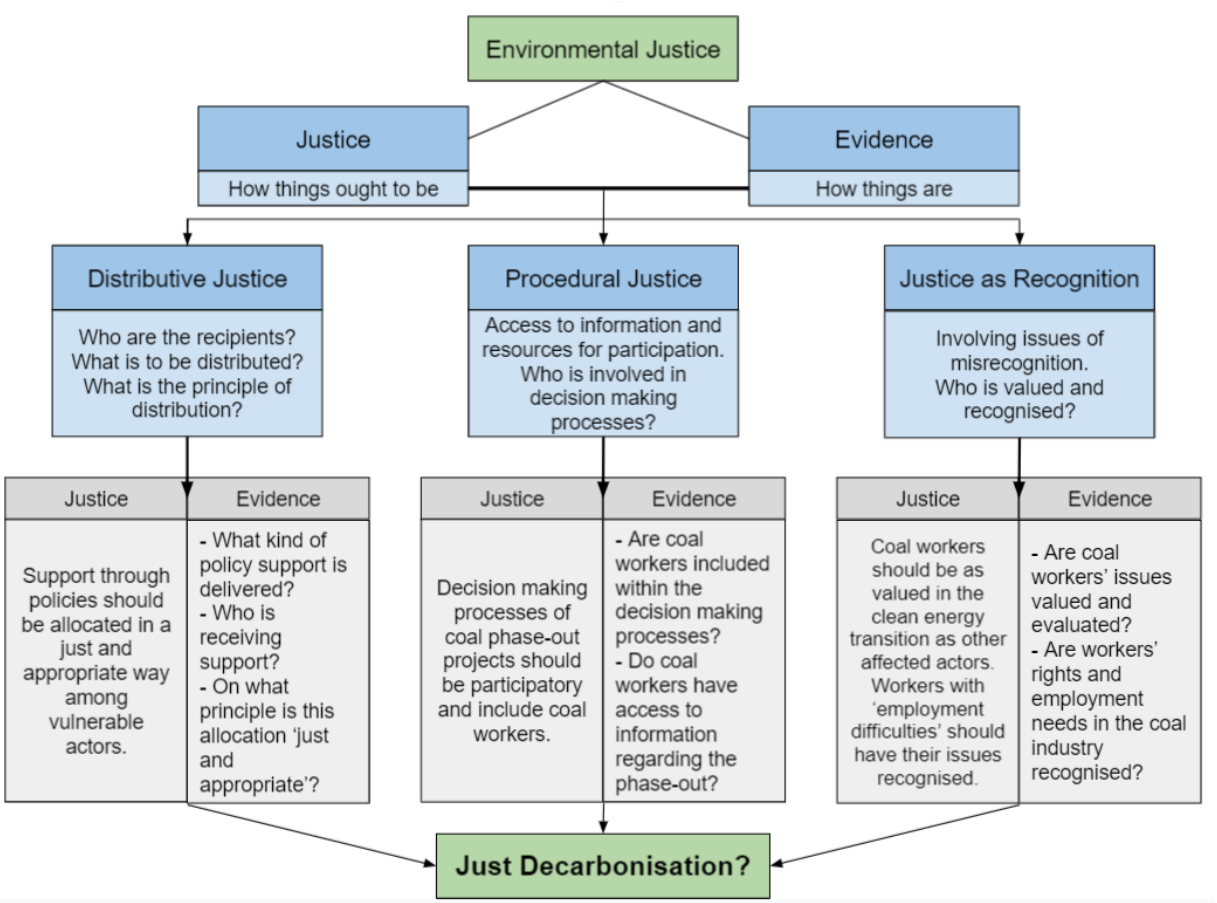
1.2 CONCEPTUAL FRAMEWORK

1.2.1 Environmental Justice

To provide a framework to the knowledge gap that this thesis addresses, the concept of environmental justice is relevant. Figure 1 highlights the two aspects of *justice* and *evidence* described in Gordon Walker's book 'Environmental Justice: Concepts, Evidence and Politics'. In his book, Walker (2012) describes justice as representing what things ought to be in a normative sense, in connection with a particular issue and a particular place. In comparison, evidence regards how things are at this particular place, in a descriptive sense. In relation to just decarbonisation, justice would generally refer to supporting workers and understanding their needs, whereas evidence would look at statistics and information of how the workers' situation currently is. Such a distinction helps in setting a frame in understanding the extent of the issue and its solutions, while defining what justice really is.

Figure 1: *The environmental justice framework in a just decarbonisation*

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University



จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

In order to clarify what the word 'justice' further means; the term can be divided into three particular types of justice. Firstly, distributive justice is associated with determining who are the recipients of this justice, what is to be distributed and by which principle is the distribution occurring. In the context of this thesis, coal workers should be supported through policies in consideration of their current needs and vulnerability. It would, then, be substantial to comprehend what kind of support policies is attributed, how it is distributed and who is receiving it. To allocate support appropriately, it is necessary to understand the 'evidence' aspect of a certain issue. Indeed, this section displays the extent of the issue as it is, such as what is currently being done at a policy level and what are the further needs of different groups, by differentiating groupings in age, gender, or educational levels for instance. The 'justice' section should therefore highlight what ought to be done is consideration to what is

needed from each group. Through this frame, support and aid should be allocated and provided equally among affected actors, in proportion to their actual vulnerability and needs.

Secondly, procedural justice regards who is involved in the decision-making processes and policymaking. For a project or policy to be considered 'just', the processes to implement should include every affected actors' voices. In the case of decarbonisation in the coal industry, coal workers should then be participating in the decision-making processes to share their thoughts and feelings on the delivery of the project. Having affected people directly involved in a project will certainly increase the likelihood for this project to respect communities' rights and secure livelihoods. For communities to be adequately involved, they should have access to information and resources to help them comprehend the extent of the project and how it is exactly affecting them as individuals. For coal workers to effectively participate in the policy processes, they should have access to policy documents, all concerned projects description, as well as other relevant documents informing them of the delivery of specific short-term or long-term targets. The 'evidence' section should, therefore, describe to what extent are affected actors involved in the policy processes, as well as the extent in which they have access to such resources to help them participate.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Lastly, justice as recognition focuses on the vulnerable actors that are not granted enough recognition, and therefore, not considered within the policy processes. With reference to just decarbonisation, the aspect of justice as recognition is essential and most particularly relevant. Indeed, justice as recognition regards which issues are currently recognised and puts a framework on determining why a certain issue is invisible and absent from policy making. While regarding a clean energy transition or decarbonisation, the major emphasis remains an aim for a cleaner environment and, more recently and on a lesser extent, the just transition of low-carbon services within the public sphere. Nonetheless, consideration to polluting services such as coal-fired power plants may be less recognised due to its negative connotation and

the necessity to get rid of it for greater goals. This represents a particular situation considering the motives of these policies to improve air quality or reduce environmental impacts which are considered good actions but are not necessarily flawless. In this case, several actors, such as industries within coal-dependent provinces, rural communities dependent on coal for power, coal workers, and many others are prone to drastic economic and social impacts due to an inevitable phase-out. Through the combined concepts of justice as recognition and just decarbonisation, those issues should be recognised within the policy making framework as well as comprehending the reason why they are currently unrecognised. If an actual policy gap exists, it is essential to understand how this gap is produced, intentionally or not, and why injustice occurs in this framework. As just transition strengthened the social framework within clean energy transition in greater regards to the proper inclusion of low-carbon services, a just decarbonisation through a justice as recognition lens would bring light to another side of the clean energy transition. This would grant more consideration to services to be phased-out and recognition of their rights on equal amount than other affected actors from this transition. Such a consideration is crucial to expect coal-dependent provinces to sustain a decent economic and livelihood stance. Among coal workers, it is also essential to identify areas of misrecognition within demographic groups, such as age, gender, or disabilities. Individuals belonging to these groups may require further support and their needs should be valued and recognised.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Those three types of justice, as well as the differentiation between justice and evidence, are greatly valuable in helping determine whether China's decarbonisation policies can be considered just with respect to coal workers' rights. Environmental justice sets a framework on the subject of this thesis, providing a structure on what justice is defined by and how it can be brought up to a potential conclusion.

1.2.2 Human rights-based approach

To help critically engage with the issue, a human rights-based approach was utilised as a measure of justice. According to the Australian Human Rights Commission, a human rights-based approach is based on five common principles, forming the framework 'PANEL'. Firstly, 'participation' presents the right to actively participate in decisions affecting human rights issues, including access to information. The second principle 'accountability' focuses on effective compliance with human rights standards, being enforced by policies and administrative procedures. Thirdly, 'non-discrimination and equality' implies that all forms of discrimination are prevented and prohibited, while prioritising communities faced with the biggest barriers. The fourth principle 'empowerment' looks to empower communities to fully participate, understand and claim their rights. Lastly, 'legality' requires that all human rights are consistent with the law and recognised through enforceable entitlements. In connection with just decarbonisation, those five principles must be considered while analysing whether China's policies are just. Relevant human rights must be retrieved within China's policies.

Within the human rights-based approach, the main area of concern is Article 23 Right to Work from the Universal Declaration of Human Rights. As a matter of fact, this right implies that all adults have the right to decent work through adequate working conditions and fair wage. The definition of 'decent work' is derived from the International Labour Organisation, implying that a decent work must deliver a fair income, social protection for workers and families, prospects for personal development, active participation in decision making affecting them as workers, and must provide equality of opportunity among different groups of people (ILO, n.d.).

The aspects of distributive justice, procedural justice and justice as recognition can be depicted from this definition. Precisely, concerning distributive justice in the case of just decarbonisation, equality of opportunity within the principle

of 'non-discrimination and equality' is the major pillar of a fair and efficient distribution. Moreover, in terms of procedural justice, the clear aspects are the right to actively participate in the decision making which also embodies the right to assembly and to access information relevant to their situation as workers. In regard to the PANEL framework, 'participation' and 'empowerment' are the main pillars of procedural justice. Lastly, justice as recognition is considered in the ILO definition in the non-discriminatory aspect among gender and other groups but also with respect to recognising other actors' concerns, such as social protection for families. In the paper's case study, coal workers should be recognised and valued within China's policies but looking at deeper demographics beyond the heart of the community, like women within the mining industry, elder people, or outsiders in secondary coal-related economic activities, is necessary to determine the extent of recognition. Through the PANEL framework, justice as recognition is highlighted within the 'non-discrimination and equality' principle but also the 'empowerment' principle.

The principles of 'accountability' and 'legality' are relevant in all three types of environmental justice as those two principles are necessary in the development of adequate and sustainable policies, protecting human rights.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Table 1: 'Human rights involved with the three types of Environmental Justice' below indicates all rights involved with each type of environmental justice and the specific ones this thesis concentrates on. Several rights such as right to social security, life, decent work, adequate standards of living and freedom from discrimination are involved within distributional justice as it aims to determine the just and appropriate distribution of policy support among actors. As laid-off coal workers are entitled to the right to decent work, adequate policy support should be fairly allocated to each of them. By that, this thesis focuses on the right to decent work and the right to security in the case of unemployment. Secondly, procedural justice involves rights such as the right to participation, the right to assembly and the right to information

while determining who is involved in the policy processes. This thesis, thus, concentrates on the rights to participation and access to information which should display whether coal workers have access to information and resources needed for participation and if their voices are being considered in the policy making. Lastly, justice as recognition focuses on the social aspect of the distributive justice's just allocation by determining whether misrecognised actors' issues are valued. In similar way than distributional justice, justice as recognition involves the right to life, to adequate standards of living and freedom from discrimination. Nevertheless, in this thesis, the justice as recognition type concentrates on the freedom from discrimination in order to examine misrecognised actors and if their issues are being undervalued due to belonging to a certain demographics such as gender or age.

Table 1: Human rights involved with the three types of Environmental Justice

Type of Environment Justice	Rights involved	Focus points of this thesis
Distributional Justice	- Right to social security - Right to decent work - Right to life - Freedom from discrimination - Right to adequate standards of living (food, housing, clothing, health care, security in the case of unemployment, disability, old age, sickness, etc)	- Right to decent work - Right to adequate standards of living (security in the case of unemployment)

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Procedural Justice	- Right to participation - Right to assembly - Right to access information	- Right to participation - Right to access information
Justice as Recognition	- Right to life - Right to adequate standards of living - Freedom from discrimination	- Freedom from discrimination

1.2.3 Transitional Theory

Lastly, transition theory was used to analyse and determine what are the opportunities and risks for transition on worker's livelihood. According to Seeliger and Tuork (2013), transition theory focuses on the role of technology in interaction with social and ecological change and development. Shanxi's decarbonisation is clearly enabled by technological advancements, as despite wishing to achieve carbon neutrality for ecological, socio-economic, and geopolitical reasons, this transition could not happen without colossal technological investment.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

To decarbonise, new coal technologies and clean energies must be developed and efficient enough to potentially be considered as a replacement of coal. Transition theory can help emphasize the impacts on workers' livelihood during this transition in comprehension of what are the technologies and industries replacing coal, available to laid-off or affected workers. In terms of benefits, technological advancement in development will bring light to new industries where such workers could be transferred to. Through technological advancements, it is also expected that these 'new green jobs' will be safer than the harsh working conditions in mining and

coal extraction. However, the risk remains that transferring all workers in these kinds of industries might not be executed, which could leave out communities unemployed or with poorer living conditions.

Using transition theory as a tool to analyse Shanxi's coal decarbonisation helped understand how the transition occurs and what are the forces driving this transition forward. Through these aspects, the benefits and harms on affected actors can be determined and associated with aspects of environmental justice.

1.2.4 Fragmented authoritarianism

The fragmented authoritarianism model is often used to describe Chinese politics (Li, B., 2018). This model aims to describe how different sectors within the government make decision on a decentralised framework where policy goals are managed differently by policy makers and may even compete among each other (Zhang, H., 2019). According to Li, B. (2018), this model helps understand the origins of such as regime as a local level and demonstrate how a state is an ensemble of institutions that may benefit or interest some groups more than other. China's traditional governance approach revolved around relying on provincial governments to achieve policy targets (Zhang, H., 2019). In the energy sector, this decentralised model has proved to enhance the expansion of the country' energy production and empowering local manufacturing industries (Kahrl et al., 2011; Ngan, 2010). Nevertheless, this fragmentation at a governmental problem has also brough severe problems such as heavy greenhouse has emission causing serious air quality problems (Andrews-Speed, 2004). Today, this decentralised structure also generates competition among bureaucratic institutions where such agencies pursue different agendas which limits projects' scope and hinders the development of a national long-term plan (Andrews-Speed, 2004).

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

In a coal phase-out, a decentralised system and the lack of a national long-term plan may hinder the efficient formulation and implementation of required policies. However, while relying on provincial government and agencies, the needs of each province are more recognised which should help valuing issues at a local level. Fragmented systems are, nevertheless, extremely bureaucratic, slow, and generally lacks efficiency. Given the urgent need to phase-out coal and incorporate carbon-reduction policies, the Chinese government is aiming to re-centralise to achieve such policy goals involving the entire country.

1.3 RESEARCH QUESTIONS

- How just are China's policies for Shanxi's decarbonisation in the context of its 2060's pledge for national carbon neutrality?
  - What is Shanxi's coal industry situation regarding coal workers' livelihood and economic stability?
  - What policies and underlying policy concepts are available to support coal workers in Shanxi's province in the transition towards carbon reduction?
  - How just are the available policies for supporting coal workers in Shanxi's province in the transition towards carbon reduction?

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

1.4 OBJECTIVES OF RESEARCH

- To evaluate Shanxi's current situation regarding coal dependence in consumption and economic stability
- To identify available policies supporting coal workers in Shanxi throughout the coal-fired power plants phase-out
- To determine different future scenarios for China's coal industry in Shanxi

- To evaluate how just the support policies available for coal workers in Shanxi are

1.5 RESEARCH METHODS

To answer the previous research questions, this thesis used qualitative methods of research through a combination of document analysis as well as semi-structured interviews analysed through a content analysis. These qualitative methods of research were used to extract information relevant to the research questions and the concept of just decarbonisation. Through the conceptual frame of environmental justice, the content was analysed with a human rights-based approach, with respect to workers' rights. This helped determine whether China's policies and long-term vision for carbon neutrality aligns with a just decarbonisation in Shanxi's coal industry. The qualitative expectations of this thesis, regarding the degree of justice displayed in policies regarding the coal phase-out, are that China recognises the right to decent work and unemployment issues on a distributional justice and justice as recognition level. However, the degree to which procedural justice is respected is expected to be relatively low in consideration to China's power relations and political economy.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Table 2: Analysis methods and data required per research questions.

Research question	Data needed	Where to attain data	Research tool	Analysis method
Question 1: *What is Shanxi's coal industry situation regarding worker's*	Background information on Shanxi's current coal industry (number of workers, GDP %, etc)	Academic journals	Document analysis	Document analysis

livelihood and economic dependence?	Through the lens of transition theory, how is the transition occurring and what are the benefits and threats for workers' livelihood?	Academic journals, interviews	Document analysis, semi-structured interviews	Content analysis
Question 2: *What policies and underlying concepts are available to support coal workers in Shanxi in the transition towards carbon reduction?*	Policy content	World Bank documents/ policy documents (State Council Decree No. 42), Interview with World Bank staff	Document analysis, semi-structured interview	Content analysis
	Policy focus on different demographics (age, gender, educational levels)	Policy documents (State Council Decree No. 42), Interview with World Bank staff	Document analysis, semi-structured interview	Content analysis
	Possible future scenarios of Shanxi's coal industry	Interview with academic	Semi structured interview	Content analysis
	Effects of each scenario on workers	Interview with academic	Semi structured interview	Content analysis
Question 3: *How just are the available policies for supporting coal workers in Shanxi in the transition towards carbon reduction?*	How just are the policies retrieved from Q2	Analysis with an environmental justice framework	Analysis with an environmental justice framework	Analysis with an environmental justice framework

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

1.5.1 Content Analysis: Document Analysis

Firstly, a content analysis was conducted by analysing relevant documents concerning Shanxi's decarbonisation plans and current situation regarding its coal industry. Through concept triangulation, documents were analysed with the conceptual frames of environmental justice and fragmented authoritarianism to comprehend how such documents can be perceived in consideration of China's power relations and political economy.

The official documents were retrieved on the Ministry of Human Resources and Social Security, Shanxi Provincial Bureau, and the State Council websites. The policy documents were selected on the basis of referring to unemployment security funds, policies available to laid-off workers, the coal industry, and action plans of decarbonisation in Shanxi. Due to the small amount of recently published policy documents, the published date was not taken into consideration when selecting a document. Although, the dates were taken into consideration throughout the analysis. Table 3: 'Policy documents used for content analysis' displays the fifteen documents that were analysed through content analysis. Regarding non-English language documents, the documents were translated through Google translate. To verify to accuracy of the translation, ten quotes were selected from different documents and translated by Chinese natives. The translation conducted by Google translate, compared to the Chinese natives' translation in Appendix D, was considered similar enough to the translation conducted by Chinese natives. It is however substantial to note the possibility that translation machines may elicit incomplete information and involve, to a certain extent, a margin of error to take into consideration throughout the analysis. A study conducted by Milam Aiken (2019) argues that Chinese, translated to English, is among the top ten languages for translation accuracy with Google translate. It also presents a 60% improvement in accuracy of Chinese-English translation from 2006 to 2016 (Wu et al., 2016). Appendix D: Translation Comparison – Google Translate and

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Chinese Natives (Chinese to English) displays the degree of accuracy of the Google Translate machine in the context of this research and the policy documents analysed.

This content analysis method used for this document analysis is retrieved from the 'directed content analysis' approach, used to validate or confirm a conceptual frame, described in Hsieh and Shannon's 'Three Approaches to Qualitative Content Analysis (2005). Through a deductive process, predetermined key-terms, based on the research questions and conceptual framework, were chosen to extract information relevant to this thesis from policy documents or action plans referring to Shanxi's progressive coal industry phase-out. Firstly, each chosen document was interpreted to determine its context and how it relates to the thesis' objectives. The predetermined codes fall under the three categories of environmental justice: distributive justice, procedural justice, and justice as recognition, displayed in Appendix A. The codes identified in each category were retrieved from the human rights-based approach. Keywords from human right articles discussed in Table 1: 'Human rights involved with the three types of Environmental Justice' were chosen to depict the accurate definition of the article while being relevant to context of this thesis. Throughout the document analysis, Appendix B depicts the specific words that were used to identify each code. After having labelled and allocated a set of codes within the categories, quotes from the chosen documents were linked to the relevant codes or new ideas associated to one theme. A narrative was then constructed to analyse the recurrence of a specific code or theme, how themes relate to each other, while supporting the arguments with quotes from the documents used.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Table 3: 'Policy documents used for content analysis'

#	Document title	Issue	Published date

1	Shanxi Energy Transition and Green Growth Development Policy Operation	World Bank Loan (P170663)	July 17, 2019
2	Supporting Shanxi to Deepen Reform and Promote Energy and Economic Transition	State Council Decree no. 42 (2017)	September 11, 2017
3	Shanxi Provincial People's Government on the current and future period of entrepreneurial employment to do a good job in the implementation of the Opinion	Provincial Decree no. 50 (2017)	December 21, 2017
4	Shanxi Province's " 13th Five-Year " Comprehensive Energy Development Plan	Provincial Decree no. 67 (2016)	2016
5	Notice issued by the General Office of the Shanxi Provincial People's Government on the pilot implementation of the transition policy for coal-fired enterprises in Shanxi Province	Provincial Decree no. 77 (2008)	September 8, 2008
6	Notice of the General Office of the Shanxi Provincial People's Government on speeding up the work of the coal industry to resolve excess capacity	Provincial Decree no. 114 (2016)	August 31, 2016
7	The Shanxi Provincial People's Government issued a notice on the overall implementation of the pilot project on sustainable development	Provincial Decree No. 9 (2007)	April 1, 2007

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

	policy measures for the coal industry in Shanxi Province		
8	Notice of the General Office of the Shanxi Provincial People's Government on the Issue of the 11th Five-Year Plan for the Development of Labor and Social Security in Shanxi Province	Provincial Decree no. 21 (2007)	March 13, 2007
9	Opinions of the Shanxi Provincial People's Government on further speeding up the re-employment of laid-off workers	Provincial Decree no. 3 (2005)	January 5, 2005
10	Implementation Opinions of the People's Government of Shanxi Province on Promoting Employment	Provincial Decree no. 2 (2019)	January 11, 2019
11	Ministry of Human Resources and Social Security National Development and Reform Commission and other seven departments on the resolution of excess capacity in the steel and coal industry to achieve relief from hardship in the process of staff placement	Ministry of Human Resources and Social Security no. 32 (2016)	April 7, 2016
12	Notice of the Ministry of Human Resources and Social Security of the Ministry of Finance on the issuance of the Interim Measures for the	Ministry of Human Resources and	December 7, 2016

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

	Administration of Employment Assistance Funds	Social Security no. 260 (2015)	
13	Implementation of the State Council's Action Plan to Support Shanxi Province to Further Deepen Reform and Promote Resource-based Economic Transformation and Development	Provincial Decree no. 49 (2017)	November 8, 2017
14	General Office of the People's Government of Shanxi Province Notice on Issuing the 2019 Action Plan of Shanxi Province for Winning the Battle for a Blue Sky	Provincial Decree no. 39 (2019)	May 31, 2019
15	Notice of Shanxi Energy Bureau on Printing and Issuing the Working Plan of Shanxi Province for Advancing Coal Consumption Reduction and Equivalence Substitution	Provincial Decree no. 753 (2019)	November 22, 2019

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

1.5.2 Semi-Structured Interviews: Interviews with experts

Secondly, in-depth semi-structured interviews were conducted with experts of China's energy and carbon reduction policies. The interviewees were chosen, firstly, through a purposive sampling approach based on their expertise on the subject and relevant papers that they have published and then a snowball approach based on people they know who could contribute to this research. A total of nine interviews from research institutes, lending organisations, and universities were conducted for this research (see Table 4: List and date of interviews). As the initial aim of this thesis was to

also present perspectives from the governmental level, this initiative was abandoned due to no responses from government officials. Seven of the nine interviews were conducted in English and the remaining two were conducted in French. Semi-structured interviews were chosen to follow a clear interview guide and cover particular topics but still allow the interviewer and interviewee to look upon additional trajectories if needed or adequate to the research's objectives, based on Schmidt's description (2004). This type of interview provides relevant and reliable qualitative data, balancing between a formal and structured interview and the freedom for the interviewee to express themselves on their own terms (Schmidt, 2004). Appendix C provides a sample question list for each targeted group of potential interviewees. These interviews were used to collect information on relevant aspects of this thesis, such as Shanxi's current situation, views on proposed policies regarding environmental justice and different actors, or potential scenarios of China's future coal industry. In consideration of the COVID-19 pandemic, the interviews were held via Zoom or other online platforms.

Table 4: List and date of interviews.

#	Name	Position	Language of Interview	Date of Interview	Method
A	Guoyi Han	Senior Research Fellow (Stockholm Environment Institute)	English	May 13, 2021	Zoom meeting
B	Anonymous (see Research Ethics section)	Research Fellow (Institute of Development Studies)	English	May 18, 2021	Zoom meeting
C	Dewen Wang	World Bank (Senior Social Protection Economist)	English	May 26, 2021	Webex meeting

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

D	Christophe de Gouvello	World Bank (China Energy Team Coordinator)	English/ French	June 3, 2021	Webex meeting
E	David King	Associate Professor (School of Earth and Environmental Sciences, James Cook University)	English	June 9, 2021	Zoom meeting
F	Muyi Yang	Senior Electricity Policy Analysis – Asia (Ember)	English	June 18, 2021	Zoom meeting
G	Hervé Aloncle	Senior Project Officer (French Agency for Development)	French	June 23, 2021	Zoom meeting
H	Qiang Zhang	Project and Partnership Officer (French Agency for Development)	French	June 23, 2021	Zoom meeting
I	Roc Shi	Principal Research Fellow (Australia-China Relations Institute, University of Technology Sydney)	English	July 7, 2021	Zoom meeting

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

1.5.3 Content Analysis: Semi-Structured Interviews

Through an inductive process, a content analysis was used to analyse the previously conducted semi-structured interviews. In a similar way to the document analysis, the interviews were analysed while taking the concept of environmental justice and human-rights based approach as lenses to analyse China's state-society relations in reference to each of the interviewees and their statements. All interviews were transcribed in English word-for-word by the author manually or through transcription software such as *Otter.ai*. This content analysis used for semi-structured

interview analysis is retrieved from the 'conventional content analysis' approach, used to describe a phenomenon while allowing new insights without the use of predetermined terms, described in Hsieh and Shannon's 'Three Approaches to Qualitative Content Analysis (2005). Dominant codes and categories were extracted from the interviews and analysed based on the concepts of environment justice and just decarbonisation. Indeed, quotes were extracted from the interviews and compiled into similar lines of data. These lines were then reduced to one- or two-word summary, or codes, while constantly being compared to each other to identify possible associations between codes. With a solid list, the codes went through a process called 'closed-coding' which symbolises the action of compiling these codes into bigger categories, reflecting the purpose of the research. While analysing more interviews, new themes may emerge and constant examination and comparison between codes and categories must be undertaken. Lastly, the write-up of the finding delivered a discussion on the symbolism of each category and codes and how relevant they are in the aim to answer the research questions. While analysing the answers provided in the interviews, it was necessary to take into consideration the position of each of the interviewees to cite the interviews in their proper context and not take it as an objective truth.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

1.6 RESEARCH SCOPE

The units of analysis of this thesis are *coal workers in Shanxi Province*, analysed through academic journals, one World Bank loan document, Chinese policies and interviews of relevant experts. The chosen relevant academic journals must be published less than five years ago and must discuss Shanxi's economic situation, coal industry and coal workers' livelihood in the province. The publisher and authors of the academic journals are not relevant to the study. Secondly, the World Bank loan that was analysed, with an environmental justice frame and human rights-based approach, is called 'Shanxi Energy Transition and Green Growth Development Policy Operation'.

The policies analysed must be Chinese policies submitted by provincial bureaus and government agencies of the province of Shanxi. Their date of publication must be taken into consideration to reflect the policies' evolution through time. The policies may also be submitted by the national government or ministries of the People's Republic of China but must target or include the province of Shanxi. The major theme of all policies must regard Shanxi's decarbonisation action plan, from present actions up to 2060. The policies must focus on the phase out of the coal industry and coal-related activities, as well as secondary economic activities depending on coal, which was analysed with an environmental justice frame and human rights-based approach.

Lastly, two groups of experts were interviewed – from academia and lending institutions (World Bank). In academia, the experts must have studied and published on China's environmental policies and its carbon neutrality goals. Staff from lending institutions must be related to the World Bank loan to be analysed and have expertise on Shanxi's situation and China's environmental policies. The aim was to interview about ten subjects and collect information on Shanxi's decarbonisation and coal workers' livelihood which can be analysed through an environmental justice frame and a human rights-based approach. In the end, nine experts were interviewed due to the difficulty to find subjects with knowledge in this topic. Interviews were also considerably consistent with each other, therefore, the need for more interviewees did not seem tremendously significant. The slight gap was also filled with academic journals and additional statistics and documents recommended by the interviewees.

1.7 SIGNIFICANCE OF RESEARCH

The significance of this research revolves around contributing knowledge to the general public on the understanding of how just China's policies are regarding Shanxi's decarbonisation. Enabling a just decarbonisation on a policy level should be a necessity in order to expect to maintain adequate standards of living and

working conditions. Official actions concerning carbon neutrality and the green economy are considerably recent in the global sphere. Such actions are essential to prevent and minimize further climate threats in the near future. Deeply considering social issues and impacted actors is crucial to support a just transition toward carbon neutrality and minimize future social costs such as unemployment or low energy accessibility and affordability.

This research provides a perspective on what kinds of social considerations exist in the world's largest coal producer and carbon emitter in the context of a coal phase-out. If China manages to decarbonise while minimizing socio-economic costs, its actions may encourage other nations to engage in such a transition. Shanxi's coal industry is one instance of an industry or community affected by a massive economic reform and will inevitably have to adapt and accept the coal reduction. Understanding the aspect of justice with regard to this case study helps gain an insight on how society could remain optimist in combating climate change by sharing knowledge and adopting adequate policies securing living standards. This research contributes to knowledge by providing the concept of just decarbonisation into the theoretical literature. This concept is more focused than the known concept of just transition, by concentrating on industries threatened by decarbonisation directly. As this concept was analysed through a case study and the concept of environmental justice, the paper provides a useful approach to understanding decarbonisation issues and what is formulated on a policy level.

Through providing information on the on-going policies that China is undertaking, demonstrating how relevant and inevitable this transition will be to future economies, as well as providing a clear framework on what justice ought to be, this paper aims to bring some optimism in the fight against climate change and environmental-related social issues. Clearly, countries like China have comprehended the urgent need to transition quickly for environmental and sustainability issues but

making social issues a priority will be crucial to achieve goals such as the 'Beautiful China' initiative.

1.8 RESEARCH ETHICS

This thesis focuses on the framework of justice on a policy level. Throughout the entirety of the research, ethical issues must be considered and addressed. Indeed, the conducted research must follow principles of objectivity, integrity, transparency, honesty, openness, respect of intellectual property, confidentiality, social responsibility, non-discrimination, and legality. Throughout the research, interviewees' anonymous requests must be respected with reference to confidentiality principles. This research does not support or tolerate any kind of fabrication, falsification or plagiarism of data, results, or words. While this thesis is not directly interacting with concerned subjects, the idea of justice is deeply depicted, and appropriate conclusions must be drawn from the adequate definition of justice. Data retrieved from policies, documents and interviews are honestly represented within the findings of the paper.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

1.9 RESEARCH LIMITATIONS

The main methodological limitation of this thesis is the limited access to data in measuring the areas of justice within China's policies. The most insightful way to measure justice in this particular case study would have been to interview individuals impacted by a coal phase-out. Justice is indeed culturally and socially specific and interviewing different demographics of coal workers would have been insightful in comprehending how deeply it is impacting them and to what extent do they feel supported. Through this approach, environmental justice could have been used as a

framework to determine how just each actor judges the level of justice they are faced with.

This method is, unfortunately, out of reach considering language barriers and the COVID-19 pandemic, preventing any kind of field work, and limiting interviews to online connections only. Aiming to reach out to multiple demographics of coal workers willing to share their idea of justice within a coal phase-out is unsuitable considering the current situation and the risk to not collect a sufficient sample size required for resourceful findings and an adequate conclusion. This research would, therefore, be recommended for further research in the future as it can provide essential information to the idea of justice and how directly affected actors judge this framework. Despite being less precise to the exact situation of coal workers in Shanxi, the human rights-based approach was chosen as an alternative to measure justice through a universal view of human rights.

Another limitation revolved around not being able to interview government officials considering language barriers and not receive responses by email. Such a limitation was overcome through the analysis of policy documents which allowed a considerable understanding and overview of the actions undertaken at a policy level.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

1.10 THESIS STRUCTURE

This thesis is divided into six chapters including an introductory and concluding chapters. While the second chapter presents the literature review, the three following chapters each focus on the sub-questions displayed in Section 1.3. In the same order, Chapter 3 introduces Shanxi province and its coal industry while considering coal workers livelihood impacted by the transition out of coal. The reasons for such a phase-out, as well as the measures undertaken to reduce coal use are presented to understand why such support policies are required for coal workers. Such policies are

introduced in Chapter 4 which is divided into the types of policies offered to laid-off workers. Several policy concepts such as fragmented authoritarianism is analysed in this chapter in consideration of such policies and China's carbon neutrality pledge. Lastly, these policies are analysed in Chapter 5 with the environmental justice framework and the human rights-based approach. This analysis helped answer the main research question addressing whether Shanxi's policies mention the keywords associated with a just decarbonisation with respect to supporting laid-off coal workers.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

CHAPTER 2: LITERATURE REVIEW

CHAPTER OUTLINE

2.1 INTRODUCTION

The literature review below attempts to provide a background of relevant information available within the literature. In order to determine what is the current knowledge gap in the field, several topics are addressed by providing descriptions of relevant available research, analyses, and criticisms. Firstly, China's environmental policies since the 10th Five-Year Plans are discussed to describe the overall history and structure of China's environmental policies, including its successes and failures. Second, policy recommendations from experts reacting to the 2060's carbon neutrality pledge are described. This follows a discussion on the formulation and implementation of carbon reduction policies on a regulatory level in China and other parts of the world. To deepen the focus, the fourth section concentrates on the power sector and how carbon reduction policies may affect this sector the most. Moreover, benefits and threats of carbon neutrality on Chinese actors are displayed to understand the gains and losses of different parties, such as the Chinese government itself, the private sector, the civil society, and more specifically, coal-dependent provinces. This section follows a discussion on concepts relevant to this study, such as environment justice, fragmented authoritarianism, and the socio-technical approach, to help setting a conceptual framework into understanding the relevance of this study within the theoretical literature. Lastly, the current knowledge gap is addressed and introduces the relevance of 'just decarbonisation' on a provincial level.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

2.2 CHINA'S ENVIRONMENTAL POLICIES SINCE THE 10TH FIVE-YEAR PLAN

China's Five-Year Plans (FYP) outline the country's economic and social strategies since the 1950s and have greatly contributed to its economic development by setting clear targets and indicators. General issues and concerns to be covered were depicted in each plan, with appropriate policy plans to remedy or improve such issues,

which greatly varies from period to period. Environmental policies started to be given greater importance in the early 2000s with increased urbanisation and air pollution concerns. Since then, each FYPs have evolved and adapted to the successes and failures of the past one. Overall, according to Guan (2020), the application of previous FYPs were considered successful in terms of meeting targets. Recent FYPs have been relatively more successful with the lessons learnt from past mistakes, for instance, the 13th FYP, by making the environment a priority, radically changed Beijing in reducing air pollution and smog in the timelapse of only five years (Guan, 2020). In the following, China's FYPs since 2000 will be described to fset the context in the country's previous environmental targets and its variation and adaptation over time.

The 10th FYP, of 2001 to 2005, included strong importance to the environment as a part of economic growth and sustainability. It included targets such as an 18.2% increase in forest cover which was successfully attained and a 10% reduction of sulfur dioxide (SO2) (Jiankun, Ye, Zheng, 2019). As the emissions of SO2 increased, the 11th FYP (2006-2010) put into place obligatory targets, which were referred to as governmental obligations and were based on voluntary actions of the private sector (Jiankun, Ye, Zheng, 2019).

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

The 11th FYP included a new target, a reduction in energy consumption per unit of GDP, and was set for a 20% decrease which was closely achieved. In terms of SO2, the 10% reduction target was overly successful with an actual reduction of 14.3% (Jiankun, Ye, Zheng, 2019). During this period, in 2009, China made its first pledge of reducing carbon dioxide (CO2) emissions by 40 to 45% compared to 2005 levels by 2020 (Jiankun, Ye, Zheng, 2019).

The 12th FYP (2011-2015) came into place with two new indicators, reduction of CO2 emissions per unit of GDP and the increase in the share of non-fossil energy (Jiankun, Ye, Zheng, 2019). The targets for each of these indicators were a 17% reduction in CO2

emissions per unit of GDP and an 11.4% increase in the share of non-fossil energy and were both overachieved at 20% and 12% respectfully (Jiankun, Ye, Zheng, 2019). In 2015, China introduced its Nationally Determined Contribution (NDC) under the Paris Agreement promising the peak in carbon emissions by 2030.

With rising concerns of air pollution in urban centres, the 13th FYP (2016-2020) included two more targets: percentage of days of good or excellent air quality in a year in cities with air quality worse than the national standard and the percentage in the reduction of PM2.5 concentration in similar cities (Jiankun, Ye, Zheng, 2019). The targets were set for above 80% of the year and an 18% reduction in PM2.5 concentration (Jiankun, Ye, Zheng, 2019). From current observations, these targets are expected to be met. The period during the 13th FYP also presented the vision of Beautiful China which is an initiative of 'socialist modernization by 2035 which also overlaps with the NDC for 2030.

In 2020, a blueprint of the 14th FYP (2021-2025) was released providing insight into China's future strategies revolving around green finance, allocating resources and energy more efficiently, green buildings and green technological innovation (Wong, 2020). It is also in 2020 that, as mentioned earlier, President Xi Jinping announced a 2060's pledge of national carbon neutrality at the United Nations General Assembly which will add pressure on policy efficiency for low-carbon development.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

2.3 POLICY RECOMMENDATIONS FOR NATIONAL CARBON NEUTRALITY

China's surprising carbon neutrality pledge has generated numerous reactions among scholars. From recommendations for carbon reduction policies to what is expected from the Chinese government, recent literature seeks to finely analyse and predict China's roadmap to carbon neutrality, with respect to minimising economic or

social costs. This section is particularly important considering the substantial effect that this pledge could have on the world if it were achieved. Multiple experts have expressed their interest in analysing the likelihood of China's carbon neutrality ambition considering the extensive presence that China occupies in the world's economy. As the specific roadmap to achieve this pledge is not yet available, experts seek to provide policy recommendations while regarding different strategies and what could best apply to China's political, economic, and social position. As observed, the road towards carbon neutrality is far from being clear and unique, instead, numerous possibilities and strategies exist, and the way decision-making will occur may considerably alter how efficiently the world's economy will decarbonise.

Indeed, according to Yu, Cui, McJeon et al. (2020), the Chinese government must implement five specific strategies for a proper transition; promoting sustainable demand through increasing energy efficiency without undermining standards of livings, decarbonizing electricity generation by transitioning out of coal power generation and installing more diverse and cleaner technologies, electrifying end-use sectors such as heat production and vehicles, transitioning to low-carbon energy fuels when electrification is not doable on an economic or social level and finally, storing carbon in natural systems mainly in the industry and transport system through carbon capture or CO2 removal technologies.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Concerning the installation of cleaner technologies such as renewables, Yu, He, Li, Chen (2020) claim that simply switching out from fossil fuels to clean energy has not been proven to be sufficient in order to modify the energy consumption structure, which remains the biggest problem in phasing out coal consumption, because renewable energies are not yet practical enough in terms of power generation and wasted installed capacity, as well as the strong dependence on coal in certain provinces. Instead, a focus on a decrease in energy intensity and renewable energy development, through improvement in energy structure, technological innovations and advancements and industry restructuring, is crucial to expect carbon neutrality (Yu, Hu, Li, Chen,

2020). Another scholar agrees with the previous point, arguing that energy substitution plays a less important role than energy efficiency improvement in the aim of reducing carbon intensity (Weng, Zhang, 2017). However, Weng and Zhang (2017) point out that it can strongly be predicted that energy substitution will become more and more significant as time goes by, and technological advancements have been introduced. As a matter of fact, Cui (2020) predicts strong industrial and technological upgrades and new openings for durable growth in what is being referred to as post-pandemic "green recovery".

2.4 REGULATORY LEVEL OF CARBON REDUCTION POLICIES

In itself, carbon neutrality can be achieved through different types of national policies. Through the past, it was observed that China has often implemented regulatory policies, as well as practical subsidy schemes, to achieve its past Five-Year plans. Decision making on a policy level will have significant effects on how well this transition will occur. It is essential to analyse what happens on this level to establish adequate methods toward decarbonisation in consideration of China's economic and social situation. Indeed, China must enhance its micromanagement on a provincial level to assess each provinces' status and needs in consideration of potential coal dependence. Comprehending China's stance is fundamental to determine China's current challenges and opportunities throughout decarbonisation. While taking examples from policies implemented in other parts of the world, certain approaches can be considered in China's clean energy transition.

On a policy and regulatory level, the European Union's clean energy transition can be used to collect recommendations. Indeed, in some cases, voluntary agreements in partnerships between the government and energy-extensive firms have been proven to be more efficient than setting regulations, by promoting energy-saving

activities and decreasing energy tax (Hernandez, Zaveri, 2019). From an EU standpoint, Hernandez and Zaveri (2019) also argue that policy research is mandatory to expect a proper transition, as, in the past, policies tended to only be analysed by looking at how many environmental laws were passed but not the quality of those laws, how efficient they were and their social impacts. It is also crucial to compare the effects on these policies on energy consumption and production in different firms or provinces (Hernandez, Zaveri, 2019). In consideration of the size of China and its diverse environment in its different provinces, implementing micromanagement on a provincial level plays a significant role in properly phasing out from coal (Shen, Xie, 2017). This kind of micromanagement can be depicted in China's provincial FYP which differentiate provinces' status and needs in tackling such environmental issues, for instance, more aggressive targets in heavily polluted and populated regions such as the Beijing-Tianjin-Hebei region.

Today, China is faced with numerous struggles at this level, such as coal-dependent provinces in terms of economy and/or electricity generation and poor implementation of local regulators' development plans which are not in accordance with provincial regulators (Shen, Xie, 2017). The Ministry of Finance takes part in encouraging more practical subsidy schemes for clean energy investment as well as a more attentive local development system (Shen, Xie, 2017). On another note, Fang, Zhang, Long et al. (2019) argue that differentiated regulations for carbon dioxide emission control on individual provinces are necessary and point out the possibility for multi-criteria allocation on an equity principle to value distributive justice in carbon allocation which would allow Southern provinces to increase their carbon emission allocations while the Northern provinces should cut down. On macro-management, the ministerial level should implement industrial policies revolving around domestic power generation, subsidy plans, technological innovation, and manufacturing capacity (Shen, Xie, 2017). According to Shen (2016), some of the most challenging aspects of macro-management is the lack of coordination among ministries that do not work in similar

fields and operate on a fragmented scheme as well as the increasingly overheated market. In energy policy on a macro-management level, the EU has implemented Capacity Markets and State Aid Guidelines which, according to the scholar, strongly helped in shaping the final outcome of certain policies as well as a tool to influence the energy sector (Szulecki, Claes, 2019).

2.5 SECTORAL ACTIONS: THE POWER SECTOR

To analyse a policy for carbon neutrality on a more specific level, affected sectors and industries should be deeply examined. Indeed, switching to carbon neutrality may reshape the entire system, and most specifically the power sector which is tremendously affected by decarbonisation as it counts for about 40% of China's carbon emissions, making the transition a priority (Jiankun, Ye, Zheng, 2019). The power sector must be strategically re-shaped in order to expect carbon neutrality in respect to current economic trends and sectoral structures. The most important actions to undertake within this sector are electrification in end-use sectors[1], decarbonising power generation and incorporating low-carbon energy (Cui, 2020).

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

In terms of electrification, coal-with-electricity, or clean coal, is considered an appropriate alternative, with current resources, according to Jiankun, Ye and Zheng (2019). Other researchers suggest that the key to rapid electricity reform in end-use sectors and a more resilient power system is to increase demand response, reform an innovated electricity grid and enhance coordination between power policies and other sectors (Yu, Cui, McJeon et al., 2020). In terms of decarbonising power generation, phasing out from coal is crucial. According to Jiankun, Ye and Zheng (2019),

[1] Transitioning carbon-based fuels to electricity in the end-use transport sector (cars, trains, aircrafts), end-use residential sector (homes, apartments), end-use commercial sector (offices, schools, hospitals, restaurants, stores) and the end-use industrial sector (equipment and facilities used for construction, manufacturing, agriculture, ...)

one of the most efficient ways to do that is to shut down small-scale and old coal-fired units and updating large units of coal-fired power to increase generation and increase in energy intensity. In relation to incorporating low-carbon energy such as renewable energies, implementing distributed systems of small-scale renewable projects, providing incentives to buyers and investors, and exploring new business frameworks for the expansion of clean energies are considered some of the most efficient and feasible implementations. Jiankun, Ye and Zheng (2019). Shen and Xie (2017), present that China's slowdown in economic growth has created a drop in energy demand which led to heavy energy oversupply and created competition between existing renewable energies which modified the entire energy dynamics and interests' composition of the sector. The new strategy proposed by Shen and Xie (2017) is similar to the distributed systems as they argue that this system was not valued by the industrial sector. They suggest that a distributed, differentiated, and local approach is the most beneficial as it offers no limit to capacity expansions and is more cost-efficient with less power loss in grids (Shen, Xie, 2017).

Shen (2016) assets that the key to implementing carbon-reduction policies in the power sector is to dissolve the monopolistic stance of grid companies and allow other companies' electricity sales to operate through purchasing directly from the energy producers to enable a distributed and competitive system open to renewable energy investment. However, Shen (2016) adds that these small-scale projects have higher transaction costs and banks, and grid companies are reluctant to invest in it. One solution for that would be to create a 'low-carbon ideology' which would base policies and interests on shared-value in relation to climate change mitigation (Shen, Xie, 2017).

Lastly, Hernandez and Zaveri (2019) suggest that technology is considered one of the most substantial factors in transitioning within the power sector by developing new types of energy sources and storage. In itself, technology must be

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

integrated within a legal framework, compromising research and development to enable a reduction in energy costs and increasing energy efficiency (Hernandez, Zaveri, 2019).

2.6 BENEFITS AND THREATS OF CARBON NEUTRALITY ON CHINESE ACTORS

After having examined the required structural changes within the power sector, affected actors in this sector must be considered. As a matter of fact, such a shift will have substantial impacts on China's entire system, from GDP growth in the long-run and sustainability to threat to short-term economic stability with unemployment challenges. Energy is a commodity that affects every sector, through consumption or extraction for economic purposes. Such a shift generates interests and threats in consideration to the particular sector and actors may not necessarily perceive benefits in the short run. In this section, we will examine the interests of the Chinese government, different markets within the private sector, the civil society and then focus on a provincial assessment and most precisely, coal dependence on a micro-management level.

Concerning actors' interests, certain researchers describe this transition as being of multiple and fragmented interests which are not considered as a barrier to the economic development of clean energies, as long as each actor receives what they sought in the policy process (Shen, 2016). Indeed, Shen (2016) presents that actors without specific interests in environmental issues seek interests through instrumental benefits that contribute to economic prosperity and sustainability. According to Shen (2016), capacity expansion of the power sector is recognised as the most widespread interest among actors in terms of policy target.

On another note, Akermi and Triki (2017) argue that strengthening coordination and cooperation among significant actors is crucial, as well as implementing partnerships between the private sector, international institutions, governments, and the civil society to guarantee proper energy transition for sustainable development. Jiankun, Ye and

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Zheng (2019) describe that identifying 'co-benefits' is the key to shaping policies to bring the actors' attention into this transition. As a matter of fact, in addition to environmental preservation and public health improvement, researchers present strong positive impacts of low-carbon policies and renewable energy development on the labour market and the taxation and fiscal system, by having higher investment in environment-related capital and therefore labour input and reducing other types of taxes like income taxes (Jiankun, Ye, Zheng, 2019). On this thought, low-carbon policies also have a positive impact on social welfare in raising human capital investment and diminishing income inequality (Jiankun, Ye, Zheng, 2019).

2.6.1 The Chinese government

While analysing the central Chinese government, or the State Council, as a major actor being involved in this transition but also being affected by it, Shen and Xie (2017) identify three main motives for taking part in such a transition. Firstly, the Chinese government is expected to benefit from it on geopolitical terms by decreasing reliance on foreign imports of energy and increasing local energy security and self-reliance (Shen, Xie, 2017). Secondly, on an environmental stance, adopting carbon-neutral policies will relieve the country from pollution-related problems (Shen, Xie, 2017). Thirdly, the most significant motive is economic as clean energies are considered as a 'sunrise' industry and phasing out outdated coal-fired plants, which are non-sustainable, will favourise economic growth as this transition would have to be done at some point in the future (Shen, Xie, 2017). This 'sunrise' industry is also opening great opportunities in terms of investment, local benefits in terms of GDP, employment and tax income, and local technologies development (Shen, Xie, 2017).

According to Shen (2016), the expansion in large-scale projects on clean energies benefits both central and local governments by helping to reach objectives and outperform competitors in the regulatory system and helps develop local economies in

isolated areas. Yu, Cui, McJeon et al. (2020) argue that such transition also helps to mobilise international environmental vision and put China into a trustable position among the international community. There are now four main ministry entities within the government which are the National Development and Reform Commission (NDRC) and the National Energy Commission (NEA) which are in charge of regulating and inspecting investments evolving around renewable energies, the Ministry of Industry and Information Technology (MIIT), in charge of monitoring and overseeing manufacturing operations of clean energies, and the Ministry of Finance (MOF), in charge of monitoring and budgeting the 'Renewable Energy Development Fund' but had limited influence (Shen, 2016). These entities used to work on a fragmented board in which coordination was lacking, now future strategies are aiming for more united work cooperation (Shen, 2016).

2.6.2 State-Owned Enterprises

China has seen its state-owned enterprises (SOEs) become a considerably important component of its economy over the past decades. Precisely, according to Lin et al (2020), there are more than 150,000 state-owned enterprises in the country which are considered essential to the national and international market. In comparison with private enterprises, SOEs were originally considered of less performant due to their lower production capacity (Lin et al, 1998, Allen et al, 2005). While the number of SOEs has decreased since the late 1990s, such enterprises still offer great advantages to the Chinese economy (Lin et al, 2020). Indeed, SOEs allow for governmental interventions in the market and are great to maintain social stability – e.g., Hiring excess workforce and implement social welfare and retirement and insurances funds (Lin et, 2020; Shleifer and Vishny, 1994). However, their inferior performance compared to non-SOEs is noticeable in the Chinese market. This is partly due to the fact that SOEs have undefined property rights as they are considered public goods that are accessible to the

public to be consumed (Lin et al, 2020). While parties may overconsume certain assets, the state must impose stricter monetary policies and other policy burdens which reduce productivity (Lin et al, 2020).

While the central government is aware of such advantages and disadvantages, several reforms have implemented since the late 1970s (Lin et al, 2020). Such reforms revolved around operating rights, corporatization of SOEs, ownership rights, Stock Exchange establishment, state-owned assets management systems establishment, focus on large and important SOEs, merging central SOEs, and more recently, anti-corruption campaigns (Lin et al, 2020).

2.6.3 The private sector

In the private sector, a few different actors are being affected differently by this transition. According to Fang, Zhang, Long et al. (2019), firms within the country have entered into a new chapter centralising more on quality over quantity and speed of production. Regarding coal-related firms, Hernandez and Zaveri (2019) argue that this transition has evidently a negative impact on the industry as this sector is required to be phased out. Nonetheless, several researchers highlight the inevitability, on sustainable and realistic terms, to maintain such industry and that those firms will have to switch out one day or another (Weng, Zhang, 2017).

Likewise, concerning grid companies, favouring clean energy has become undesirable as it is not as economically interesting due to their low development, but scholars argue that this transition should become a priority (Shen, 2016). As stated earlier, investors and lending institutions are reluctant to invest and fund small-scale clean energy projects as there is a high transaction cost and no discounted monetary loans from banks are provided. Nevertheless, in their early development, implementing large-scale projects is interesting to investors and lending

institutions as it guarantees profit returns and benefits from economies of scale (Shen, 2016).

Regarding the market itself, researchers demonstrate energy as being a simple commodity which is prone to taxes, prices, and subsidies (Hernandez, Zaveri, 2019). Hernandez and Zaveri (2019) also point out that excessive propaganda and spread of ideas that cheap fossil fuel was the only realistic efficient energy source to sustain China's huge energy output has strongly impacted how the market views renewable energies. However, in terms of actual impacts on the market, scholars argue that, in economic impacts, this transition would bring economical optimization, create export opportunities in the power sector and develop rural economy, and in terms of industrial impacts, it would strengthen the local economy by developing SMEs, help adapt firms to shift into a modern and more efficient energy system and having energy independence (Akermi, Triki, 2017).

2.6.4 The civil society

Civil society[2] is also affected by this transition and can take place in its implementation. Researchers present that the general public can foster active participation, equity, mutual trust and responsibility required to implement energy transition (Akermi, Triki, 2017). Clearly, its level of climate concerns, based on education and level of public awareness, can deeply influence clean energy transition and generate debates and discussions evolving around innovation and change, which remain an indirect impact (Hernandez, Zaveri, 2019).

According to Akermi and Triki (2017), the social impacts on the civil society evolve around receiving new job opportunities in green industries, poverty alleviation in rural regions, improve energy access and diminishes provincial disparities

[2] society considered as a community of citizens linked by common interests and collective activity. (Oxford English Dictionary)

and inequalities. Nevertheless, Jenkins, et al. (2018) and Sovacool, Martiskainen, Hook, et al (2019) disagree and point out the importance of considering hazards of the energy system impacting communities unfairly (eg. forced relocation, leading to loss of livelihood when building renewable energy plants) as well as uneven access to energy-related services, in terms of availability, accessibility and affordability. Indeed, through the concept of 'energy justice', communities that are often already poor and marginalised, are excluded and unrepresented from decision making in implementing energy-related projects (Jenkins, et al., 2018). According to Sovacool, Martiskainen, Hook, et al (2019), this lack of representation greatly widens already existing inequalities and disparities among communities. Regarding workers affected by this transition, it is clear that carbon neutrality will lead to the end of certain polluting industries, such as coal in China. Faced with inevitable unemployment, workers' livelihoods will be severely impacted. This debate among prioritising economic growth, the environment or social impacts is perpetuating within the literature, as it is challenging to focus on all three aspects in perfect equality. As China is now dedicated to implement and invest in environmental policies, the traditional debate between environmental preservation and economic growth can be overlooked. However, social equity, within the sustainability framework, remains a topic that really comes to light only recently. The considerably recent concept of 'just transition' has enforced the consideration of workers' rights and livelihoods in adopting more environmental-friendly policies, such as increasing the share of renewable energy within the energy mix. Nonetheless, when considering an actual *just* transition, one must considerably focus on firms and industries to be inevitably phased out by such a transition and what support will be given to them. In China, the current literature has further developed on renewable energy transition and has lost focus on fossil-fuel industries which will be shut down and see a tremendous amount of people lose their employment in coal-dependent provinces. While considering this entire workforce, a just decarbonisation

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

would then be necessary to ensure the respect of workers' rights, compensation and/or training towards other industries, such as renewables.

2.6.5 Provincial level: coal dependence

With a surface area of almost 10 million square kilometres, it is easily assumed that sources of income and GDP growth must vary from provinces to provinces within the country. Different provinces may be impacted by a clean energy transition differently in consideration to their current energy structure and most particularly the extent to their dependence on coal, which remains the major energy consumed in China. A clean energy transition will require the progressive phase-out of coal-fired power stations which will heavily alter the operation and livelihoods of coal-dependent provinces. For this transition to be less costly, in terms of financial and social costs, careful provincial assessment must be undertaken to maintain current standard of livings and, hopefully, increase them with later advancements of greener energies. Assessing the current situation of Chinese provinces with regard to coal dependence, in consumption and for economic purposes, is therefore crucial to comprehend how the 2060's pledge will reshape the country.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

While taking into consideration the role of coal in livelihoods and economic stability of certain provinces, it would be understood that provinces consuming and holding a considerable amount of coal for extraction would not be in favour of transitioning out from coal. According to Qiao, Chen, Dong, et al (2019), there are seven provinces in the country that can be considered as 'coal-dependent developing provinces' which is determined by a lower GDP average than the national one and a coal consumption higher than the national one. Those provinces are Guizhou, Henan, Ningxia, Qinghai, Shaanxi, Shanxi, and Xinjiang (Qiao, Chen, Dong et al, 2019). There are also eight other provinces considered coal-dependent but developed, which is measured by having a GDP and overall coal consumption higher than the national level

(Qiao, Chen, Dong, Dong et al, 2019). All of these provinces referred to as 'developed' are on the eastern part of the country, in comparison to most of the western 'developing' ones but are still considered coal-dependent in consumption. The coal-dependent developed provinces are Hebei, Heilongjiang, Inner Mongolia, Jiangsu, Jilin, Liaoning, Shandong, and Tianjin (Qiao, Chen, Dong et al, 2019). The consumption rate can be analysed as being higher than the national 60% in electrifying households, public spaces or industries but by also contributing to the economy in exports as all of the seven provinces mentioned as 'developing' are located in western and central China, where resources are greater and coal extraction is being most practiced.

In this research, it was found that those provinces strongly benefit from coal as a core source of income and would, therefore, have colossal economic incentives in continuing its extraction and exploitation (Qiao, Chen, Dong et al, 2019). It is certain that, when aiming for a decrease in the overall national consumption of coal to promote sustainability, the Chinese's government must severely consider the economic state of these coal-dependent developing provinces as such reduction in consumption and production will strongly impact standards of living, tax revenues, employment, and the provincial GDP. According to He, Lin, Zhang et al. (2020), Shanxi, a landlocked northern province with one of the largest shares in coal production in China, had 46% of its tax revenue and 29% of its regional GDP coming from coal-related sectors in 2018. In total, Shanxi accounted for almost one million employed workforce (976,070) in the biggest coal enterprises (Bridle, Kitson, Duan et al, 2016). This workforce has been severely decreasing since 1999, when the first coal industry reforms were implemented, and small or illegal coal mines were closed.

This phase-out will present considerable social and economic challenges if done rapidly, this is why a clear cut down of coal is not feasible at the moment and progressive changes must be undertaken. Over the past twenty years, China has ordered the closure of thousands of small-scale and illegal coal mines and prioritised the

development of updated large-scale mines which often produce more and consume less, with the complementation of clean coal technologies such as carbon capture (He, Lin, Zhang et al., 2020).

2.7 RELEVANT CONCEPTS IN ENVIRONMENTAL JUSTICE

With the rising interests of the international community on environmental politics and climate justice, multiple approaches and concepts soared within the theoretical literature adopted by numerous scholars or international organisations. One of the most known concepts in international development's literature, sustainable development, represents a symbol of the United Nations' seventeen Sustainable Development Goals. In itself, sustainable development seeks to unite environment protection, social equity and economic growth within a framework that does not compromise the needs of future generations to access resources (Carter, 2007). While this concept remains generally broad, Carter (2007) introduces the concept of ecological modernisation as a practical and clearer solution. The term of ecological modernisation recognises the opposing goals of environmental protection and economic growth and how an economic system can be made greener by reforming existing political, economic, and social institutions without having to change the entire system (Carter, 2007). By that, Carter (2007) argues that an economy would greatly benefit from incorporating environmentally friendly policies within its institutions, through dematerializing production and decoupling resource use to perverse living standards and become less dependent on such natural resources, which also leads to less environmental degradation. Similarly, in the context of China, the concept of ecological civilization greatly relates to the sustainable development framework. Indeed, the construction of the ecological civilisation economic model has been largely explored in recent years in the country. It is symbolised by aiming to achieve sustainable development by forming an environment-friendly and resource-and-energy saving economy (Dong, et al, 2021). Faced with serious environmental problems such as

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

pollution, China introduced ecological civilisation (shentai wenming) to find balance between the three core elements of sustainable development – economic growth, social equity, and environmental preservation – in addition to features relating to Chinese governance (Kuhn, 2019). Such an ideology is predominantly presented in Chinese literature as a common vision of the country's environmental governance. As these concepts remain generally broad and can be divided into their weaker or stronger forms, they provide general insights to better introduce the most specific concepts and school of thoughts pertaining to this thesis.

2.7.1 Energy Justice and Environmental Justice

The concept of energy justice, also referred to as 'just transition' in most recent literature, strongly focuses on the social equity part of sustainable development within the environmental framework. According to Jenkins et al. (2018), when implementing new environmental projects, such as building renewable energy sources, energy justice looks at the fair distribution of resources, equal protection from environmental hazards and burdens, access to natural resources and fair treatment of affected communities. Jenkins, et al. (2018) introduce three core notions – availability, accessibility, and affordability – which seek to determine the winners and losers on a community level of such a 'green' transition. In terms of protection, Sovacool and Dworkin (2015) add that there is an urgent need to generate intergenerational responsibility at an international level and recognise the highly uneven and unequal impacts in terms of accessibility and externalities which more than often are imposed on already poor and marginalised communities. Under the energy justice literature, the communities financially dependent on industries to be phased out by carbon-reduction policies are considerably less represented. As Sovacool et al (2019) recall, the framework revolving around energy justice has a phenomenal focus on low-carbon technologies implementation rather than fossil fuels. In the context of this thesis, just

decarbonisation would therefore focus on such communities and industries within the framework of environmental justice.

Environmental justice includes three major types of justice: distributive justice, procedural justice and justice as recognition (Jenkins et al., 2018). First, distributive justice promotes fair distribution of energy-related resources and services, as well as equitable access to decision making (Jenkins et al., 2018). Moreover, Sovacool et al (2019) add that, to guarantee equal access, social goods to be distributed must be carefully identified, as well as who to distribute them to, and the most appropriate mode of distribution which can be based on merit, need, status or rights. For instance, in the context of just decarbonisation, if a coal-fired power station would be phased out and compensation would be given to employees, it should be done fairly. Secondly, procedural justice regards who is included in the decision-making mechanisms (Jenkins et al., 2018). Sovacool et al (2019) highlights the need for public participation, transparency, impartiality, representative justice, and due process, as well as being capable to identify who makes decisions and whose voices are listened to. This justice is required to unveil the fairness of decision making which impacts communities directly and promotes equitable outcomes. Through this view, employees of an industry to be phased-out should be included in the policy processes, potentially including compensation or relocation and training for another industry, which should be done through open participation. Thirdly, justice as recognition looks at who is valued and recognised or not in the decision making (Jenkins et al, 2018). This justice seeks to identify vulnerable people that risk to become even more vulnerable through the transition (Sovacool et al, 2019). This can include people who may face discrimination or disregard which, therefore, requires fair representation without distortion (Sovacool et al, 2019). In terms of just decarbonisation, policymakers might not feel the necessity to include employees from a plant to be phased out, but they deserve to have their views represented, most importantly when compensation is given, it should be implemented in adequacy to people's needs and vulnerabilities.

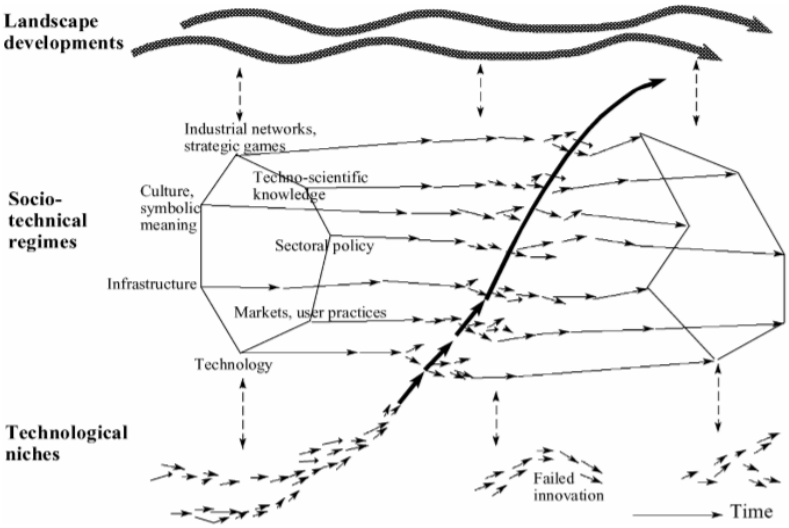
จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

2.7.2 Socio-technical approach (Multi-level Perspective)

For a transition to occur, it is necessary to comprehend the general system in which it is based on. The multi-level perspective (MLP) on sociotechnical systems attempts to provide a contextual understanding of how innovation and technology change over time (Jenkins et al, 2018). According to Geels (2002), the MLP represents processes of sociotechnical change which occur at three non-linear levels: landscape, regime, and niche. Firstly, the macro-level, the landscape changes slowly and is affected by global factors such as global trends, or political, environmental, or socio-economic contexts (Jenkins et al, 2018). In the context of this thesis, greater concerns evolving around climate change impacts the landscape of technological change. According to Geels. (2002), socio-technical landscapes represent a set of rooted external structural trends, such as economic growth, wars, cultural values or environmental problems, which are difficult to change. Secondly, regimes are considered at a meso-level and are constituted of major technologies and institutions which are deeply implemented within technological systems, providing stability to the technological system (Jenkins et al, 2018). In a similar way than landscapes, regimes change slowly but are still faster than landscape as they are under the influence of the dynamic niche level (Jenkins, et al, 2018, Geels, 2002). One example of a regime in China is the coal's value chain providing stability and representing a set of routines matured by its heavy implementation. Lastly, the lowest level, the niche, is the most dynamic one where revolutionary innovation occurs in specific markets (Jenkins et al, 2018). This micro-level is considered protected from markets within the regime level because of their early development and low technical performance (Geels, 2002). Niches are extremely crucial to technology transition as they provide places for learning processes, social networks to support innovation and represent the root for change within a technological regime (Geels, 2002). In the context of energy, the niche can be represented as newly innovated renewable energy sources, although solar panels and

wind turbines are now advanced enough to be considered regimes (Jenkins, et al, 2018). The interconnected linkages between all three levels are illustrated in Figure 2.

Figure 2: *A dynamic multi-level perspective on Technological Transitions.*

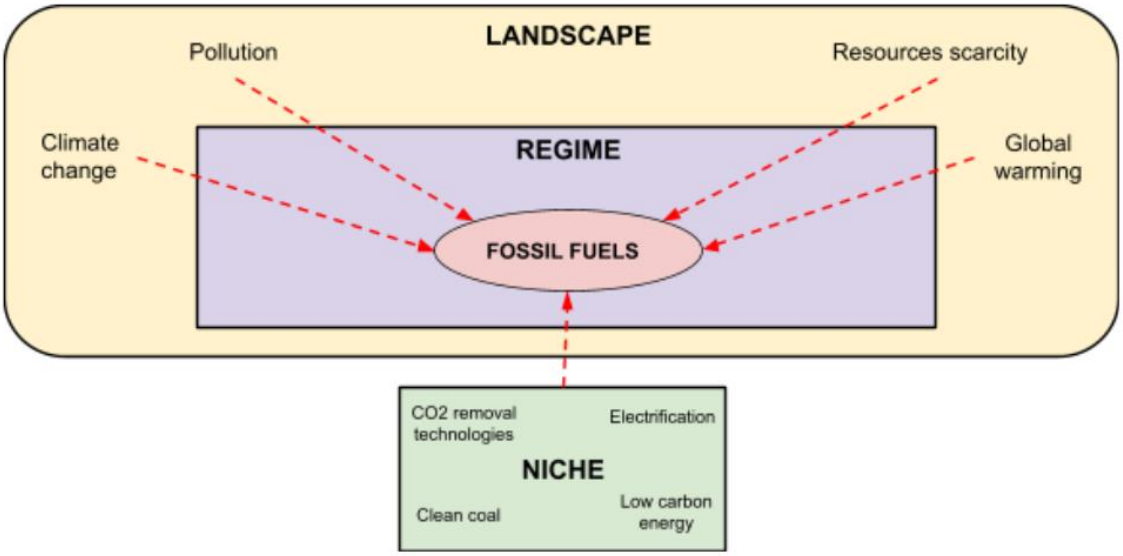


. (Geels, F. W., 2002)

Geels (2002) stresses the point that these levels do not represent administrative or geographic scales but rather temporal and structural scales through analytical concepts. In its 2014's paper, Geels (2014) describes how changes occur at each level; niches being supported by powerful groups, improvements in price and performance or learning processes, regimes are destabilised by landscapes' changes which creates opportunities for niche-innovation to diffuse, and landscapes are impacted by global and external trends. In the context of this thesis and taking climate change as a landscape, coal-fired power stations are pressured as they are highly polluting and contributing to environmental problems, which gives light to low-carbon energy sources to diffuse to, later on, become well-implemented regimes. Middleton. (2016) highlights that regimes tend to be represented in terms of inertia or lock-in but actually, as pictured in the example, stability is far from being always guaranteed within regimes.

The MLP can be used to give a contextual understanding of the non-sustainability of certain industries, which is pictured in Figure 3, which will, therefore, inevitably need to go through a 'just decarbonisation'. In energy transition, scholars often refer to winners and losers, in this case, a regime losing over a new niche-innovation, however, the term of socio-technical change often lacks importance to the 'socio-' aspect (Jenkins et al, 2018). It would, therefore, be necessary to examine the social impacts of such a transition while keeping in mind technological changes.

Figure 3: The fossil fuels phase-out through the lens of a multi-level perspective



CHULALONGKORN UNIVERSITY

2.8 CURRENT KNOWLEDGE GAP

The available literature provides an overview of particular topics and aspects that have been discussed regarding China's energy trends and carbon reduction policies. Considering that China's 2060 pledge has recently been announced, the literature on this particular matter is limited. While this announcement has surprised numerous scholars, the excitement is being shown through papers seeking to determine the feasibility of this pledge, as well as providing policy recommendations for its achievement. As the roadmap towards China's carbon neutrality is not yet entirely clear,

a general trend is being drawn with understanding to the country's previous environmental policies and Five-Year Plans. Without this clarity, an actual policy analysis of the long-term 2060 pathway is challenging to conduct. However, governmental documents shaping short-term and regional carbon reduction policies are available and help in comprehending how China will strategically decarbonise. While keeping in mind the 2060's carbon neutrality pledge, analysing such documents on a policy level should be extensively carried out to determine how China's decarbonisation will occur and what the effects will be.

Moreover, theoretical literature has recently been more involved in analysing the new sector of greener energies and its relation to energy justice. Indeed, the term 'just transition' is originally employed to set a framework on the importance of worker's rights and securing livelihoods while transitioning to a more sustainable mode of consumption and production. With the rapid technological development of renewable energy sources, the literature shifted towards analysing the just transition's framework within the flourishing green energy sector, which englobes the just inclusion of renewable energy sources within the energy mix. This has led to a knowledge gap revolving around a particular attention to the sector to be phased out, such as fossil fuel industries, in relation to environmental justice. While climate and environmental activists are applauding a transition out of fossil fuels, the process to a complete phase-out must still be extremely thought out to minimise socio-economic costs. This quest for greater goals, such as carbon neutrality, must not put a shade on other substantial aspects of our society, such as worker rights and livelihood security in rural areas currently dependent on such polluting industries. The literature currently lacks such focus, especially in China, a country developing at a remarkable speed embodying a near carbon neutral future. The concept of 'just decarbonisation', that is addressed in this thesis, puts a notable attention on the sectors to be phased-out which is required to contribute to a sustainable clean energy transition, respecting all affected actors. While

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

keeping in mind the 2060's carbon neutrality goal, this thesis puts a strong emphasis on the coal industry in one coal-dependent Chinese province, Shanxi, and the policies available to support the laid-off coal workforce.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

CHAPTER 3: SHANXI'S COAL INDUSTRY AND BENEFITS AND THREATS OF THE COAL PHASE-OUT ON COAL WORKERS' LIVELIHOOD

CHAPTER OUTLINE

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

3.1 CHAPTER INTRODUCTION

This chapter aims to provide background information and insights regarding Shanxi's coal industry as well as an understanding on coal workers' livelihood impacted by the coal phase-out. In order to comprehend the necessity for policy support packages discussed in the following chapters, an overview of Shanxi's current situation must be conducted.

As China pledged to become carbon neutral by 2060, a progressive coal phase-out is considered necessary to achieve such an ambition. Carbon reduction policies are not new in the country's policy agenda. Indeed, in the past two decades, China has made tremendous efforts to restructure its environmental policies, aligning with economic goals. To achieve the 'Beautiful China' Initiative (BCI), a strategic plan and roadmap proposed at the 18th National Congress of the Communist Party of China (CPC) to fulfil the United Nations 2030's SDGs and develop the Chinese nation under the policy position of ecological civilisation by 2035, the country is aware that coal cannot remain a sustainable source of energy due to its highly polluting ramifications. As a matter of fact, the BCI concentrates on the implementation of the 'five-in-one' strategy which aims to fundamentally transform the Chinese nation by making serious progress in ecological, political, economic, social, and cultural matters (Wang, Liu, 2020).

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

The focus of this study is Shanxi, a landlocked northern Chinese province whose regional GDP largely relies on coal-related sectors. As this sector employs close to a million persons in the province, a premeditated phase-out must be carefully done in order to minimize social costs in regard to unemployment or reduction in livelihood standards. As this thesis focuses on the ramifications of the coal phase-out on coal workers' livelihoods, an initial overview of Shanxi's coal industry will be conducted (see section 3.2). This will be followed by an understanding of the coal phase-out causes, illustrating the urgency of the energy transition in the country (see section 3.3). With this

understanding, an overview of the coal phase-out action plan of the province will be displayed, representing methods and mechanisms for coal mines' closures (see section 3.4). Lastly, coal workers' livelihoods will be analysed with respect to the benefits and threats of the coal phase-out on their standards of living (see section .5).

This chapter will largely rely on policy documents analysed and interviews conducted, offering an outline of Shanxi's coal industry and information required to understand the urgency and socio-economic challenges of the phase-out and the necessity for laid-off coal workers' governmental support.

3.2 SHANXI PROVINCE

3.2.1 Shanxi Profile

The Province of Shanxi (山西) is a landlocked northern Chinese province whose capital and largest city is Taiyuan, located in the centre of the province. The province is principally known for being a leading producer of coal in the country, carrying the largest coal reserves in the country in 2000 and producing nearly a quarter of China's total coal production (Wei, 2003). Nevertheless, the province's GDP per capita remains lower than the national average (Qiao, Chen, et al. 2019).

Map 1: Map of Shanxi

TUBS (2011)

As a matter of fact, sectors like agriculture or forestry are limited in the province due to decreasing water resources, soil erosion, a forest coverage of only 12% and local dry climate experiencing frequent droughts (Shanxi Provincial Bureau, 2006). Shanxi's agricultural population represented two thirds of its total population and the province's rural labour force represented almost one third (Shanxi Provincial Bureau, 2006). With a relatively important rural population, 42% in 2019 compared to 13% in Beijing, employment opportunities for the rural population are lacking in the agricultural sector.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Over the past years, Shanxi made efforts in urbanising the province through urban planning laws and diversifying employment in industrial production. Precisely, industries like coal, electric power, steel and metallurgy considerably grew over the past decade with improvements in enterprises systems, operating mechanisms, industrial restructuring, and advancements in technological progress. According to the Shanxi Provincial Bureau (2006), numerous industries from Shanxi ranked among the top ones in the country. According to Interview H, (June 23, 2021), Shanxi now plays a big role in renewable energy development, such as solar panels and wind turbines, and

is now one of the biggest bases of renewable energy in the country. He adds that economic diversification is in great progress in the province.

Through the mechanisation and digitalization of such industries, as well as a progressive phase-out in the coal industry, the unemployment rate has increased from 1.2 to 3.3% from 1990 to 2018 in Shanxi (National Bureau Statistics of China, 2018). Already in the early 2000s, Shanxi had introduced significant unemployment and social security including social insurance coverage, fund collection, retirement pensions, reemployment assistance, and free employment services (Shanxi Provincial Bureau, 2006).

3.2.2 Shanxi Coal Industry

3.2.2.1 Coal Industry History

As the Chinese economy was booming, it was in the early 1990s that numerous coal enterprises entered the market in the ambition to meet the rising demand for energy. As a matter of fact, the difference in primary energy consumption between 1995 and 2017 was an astonishing increase of 252%, in comparison with an increase of only 1% in the European Union between the same two dates (BP Energy Outlook, 2019). Considered as the 'black gold', large reserves of coal resources, its wide distribution, its complete varieties, and excellent quality made coal production a strikingly lucrative industry in Shanxi Province. According to Interview A, (May 13, 2021), this increase in energy demand drove millions of workers into the coal industry in the hope to significantly raise their living standards.

Shanxi rapidly became one the most coal producing provinces in the country, along with Inner Mongolia, due to their important reserves of coal. Interview C, (May 26, 2021) shares that coal resources greatly contributed to income growth in Shanxi and also improved people's livelihood. This regional opportunity rushed millions of people

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

into this industry while overlooking certain working standards. Indeed, according to Interview A, (May 13, 2021), while coal workers made decent income, the working conditions were not ideal and work safety was not a priority at the time.

In the mid-1990s, concerns revolving around air pollution as a ramification of coal production were increasingly reported. As coal was not principally for rural consumption, coal producing provinces like Shanxi, and most particularly its rural population, suffered from the environmental and health impacts of coal production without greatly benefiting from it. It is in the 9th Five-Year Plan (1996-2000) that the government clearly acknowledged the necessity to control pollution and protect environmental resources.

"Since our country is now rapidly promoting industrialization and since we have adopted methods of extensive production and operation, waste of natural resources and environmental pollution are quite serious. With population growth and economic development, this problem will probably become even worse. [...] Governments at all levels should tighten environmental management according to the law, and in particular, they should effectively control and deal with industrial pollution and improve the urban environment."

Report on the Outline of the Ninth Five-Year Plan (Li Peng, 1996)

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

In the 2000s, Interviewee I, (July 7, 2021) shares that the two main policies implemented by the government at the time regarded the consolidation of small coal mines and coal capacity control. The policies did not yet consider a coal phase-out at the time but were principally about the consolidation of small coal mines to improve productivity. At the end of 2020, coal mines producing less than 600,000 tons in the year 2020 permanently closed in Shanxi (Decena, 2020). Interviewee I, (July 7, 2021) adds that this benchmark increases every year.

3.2.2.2 Coal Industry Current Issues and Trends

Over the past decade, the government has promoted policies of carbon reduction by closing down small-scaled outdated coal mines that are more polluting and less productive. Precisely, between 2016 and 2019, the province closed 106 coal mines which accounted for 116 million tons of outdated capacity in coal production (Sheng, 2020). As mentioned in Interview F, (June 18, 2021), coal consumption has slowed down but is still growing due to a colossal demand. Similarly, Interview I, (July 7, 2021) highlighted the difference between the absolute value and the percentage of coal consumption over the years. As presented in Table 5, between 1990 and 2017, the share of coal consumption in the country has greatly decreased, however, the absolute value has almost quadrupled, due to the rising demand. With such an important demand, any attempt to reduce the capacity may have severe socio-economic costs in relation to affordability, energy shortages, and unemployment. Indeed, coal is an important contributor to energy security in China as it proved itself to be stable and capable enough to generate and secure energy for the entire country.

Table 5: China's Coal Consumption in 1990 and 2017 (absolute value and percentage)

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

	1990	2017
Total Coal Consumption (percentage)	76.2%	60.4%
Total Coal Consumption (absolute value)	105,523 (10,000 tons)	385,723 (10,000 tons)

China Statistical Yearbook (2019)

Today, Shanxi remains one of the main coal centres of China and one of the most carbon intensive provinces of the country. In addition to contributing to the country, coal-related sectors contributed 46% to tax revenue and 29% of the regional GDP of the province in 2018 (He, Lin, Zhang et. al. 2020). Datong city is considered the coal

capital of Shanxi for holding most of its coal reserves and employing a significant part of the working labour of the province (Audin, 2020). With the third largest coal mining enterprise in the country, Datong Coal Mine Group, the city itself has about 14% of Chinese coal production at peak time, as stated in Interview B, (May 18, 2021).

In Shanxi, most coal mines are state-owned and the remaining small-scale private-owned have recently merged with the larger SOEs. Through fragmented authoritarianism, a policy concept portraying China's governance regarding its top-down approach, decentralisation dynamics, and potential opposing interests between agencies, China's SOEs report to numerous different institutions. Indeed, with a total of more than 100,000 SOEs, the larger part of them is under the control of localities such as provinces or counties while reporting to provincial State Council's State Asset Supervision and Administration Commissions (SASACs) (Hubbard, 2017). While other SOEs may report to the Ministry of Finance or other 'central' agencies or be under the administration of central SASACs, the variance between central directive and local interpretation generates significant fragmentation (Hubbard, 2017). As the state is both viewed as an owner and regulator within an SOE, conflict of interest may arise. Nevertheless, the general perception of SOEs revolves around being considerably more resilient to the current overcapacity reduction policies in coal supply as they have their own kind of compensation and reorientation programs settled by the state agency in charge.

According to Interview A, (May 13, 2021), the working conditions greatly improved over the past decade. Indeed, consolidating coal mines by closing small, outdated coal mines where work safety used to be the most deplorable was one of the biggest contributions to increased safety. Larger coal mines enable more control and safety regulations are considerably more developed than the last decade. Nonetheless, work conditions are still hazardous due to the mining being underground.

'Most of the working conditions in Shanxi's coal industry is underground mining and because coal is buried there, it's a risky business. There are hundreds of 1000 people who have died in the past few decades because of these risky activities. Therefore, the other trend, nowadays, is to digitize the industry to try to replace human activities as much as possible. Combined with the de-capacity policies, the unemployment rate is actually accelerating in these provinces.'

Interview B, (May 18, 2021)

As stated in Interview B, (May 18, 2021), the unemployment rate has increased in the province's coal industry due to de-capacity policies and industry's digitalization. Interviewee I, (July 7, 2021) shares that today, the number of workers has greatly decreased due to the use of machines in the mines.

One of Shanxi's coal industry's most significant challenges remains meeting the increased energy demand while being progressively phased-out to meet carbon reduction targets. As a matter of fact, a total phase-out from coal is not conceivable at the moment, or never according to several interviewees. Interviewee H, (June 23, 2021) believes that China will still produce coal in 2060 on a much lower level of consumption and that coal will be compensated by other types of technologies such as Carbon Capture and Storage (CCS) to meet carbon neutrality but in terms of energy security, China will never give up coal totally.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

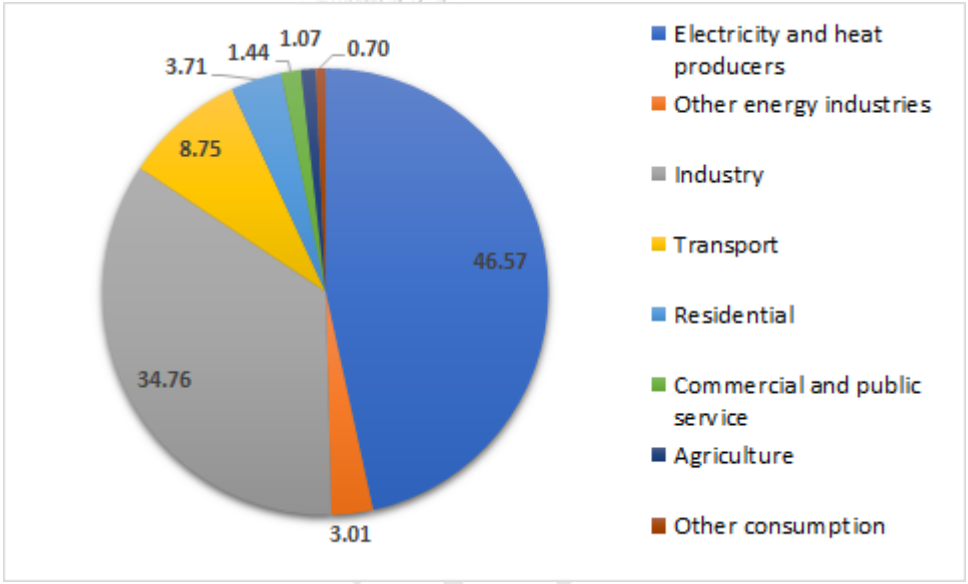
3.3 COAL PHASE-OUT CAUSES

3.3.1 Environmental Factors

The environmental reasons behind the progressive phase-out of coal are quite perceptible. Precisely, Figure 4 and 5 illustrates how the electric sector generates almost half of the country's total CO2 emissions and that more than 80% of these emissions

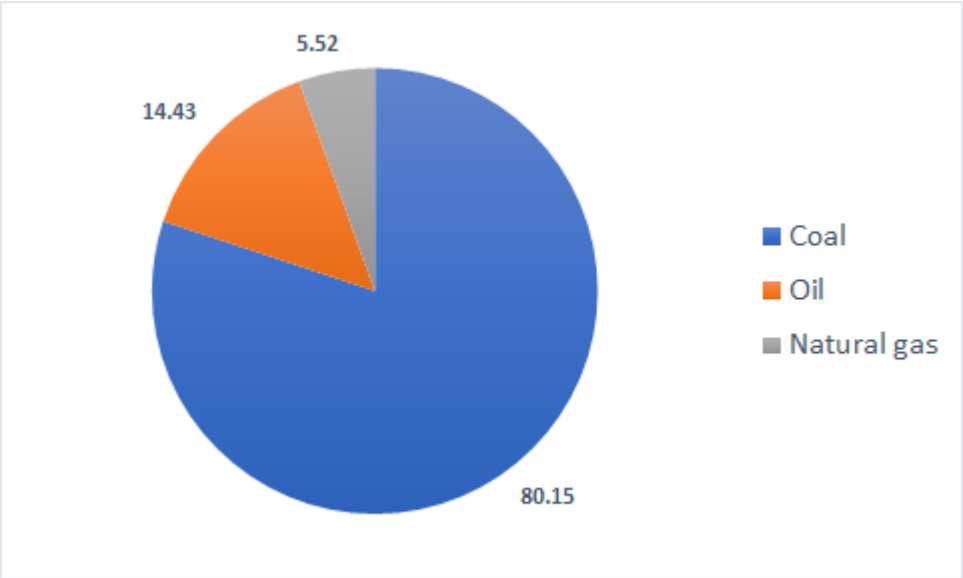
come from coal only. China generates 27% of the world's total emissions, being the world's largest polluter far ahead from the the second-largest polluter, the United-States, generating 11% of the world's total emissions (Larsen, Pitt, et al, 2021). However, in consideration of its enormous population, China is actually far behind the United States in terms of emissions per capita, reaching 10.1 tons per capita in 2019 against 17.6 in the United States (Larsen, Pitt, et al, 2021).

Figure 4: CO2 emissions by sector, China – 2018 (in percentage, rounded)



International Energy Agency (2018)

Figure 5: CO2 emissions by energy source, China – 2018 (in percentage, rounded)



International Energy Agency (2018)

Over the past decades, China saw its economy grow along with its carbon emissions. As a matter of fact, its per capita emissions nearly tripled over the past twenty years and its global emissions increased by 25% in the past decade (Larsen, Pitt, et al, 2021). Historically, coal resources clearly contributed to economic development and income growth in the country, although its consumption generated drastic environmental impacts. The use of coal is, indeed, highly polluting as it releases toxic airborne pollutants in the combustion process used to break chemical bonds holding carbon atoms to release energy. Pollutants such as carbon dioxide, sulphur dioxide, mercury, nitrogen oxides or particulate matter can heavily damage the environment and individuals' health.

Air pollution generated by coal can cause several environmental effects such as acid rain, which damages trees, crops, soils, or water quality. Water acidification in lakes, rivers or streams is extremely harmful to the ecosystems and biodiversity such as fishes and other water species (Deval, Murray et al, n.d.). Air pollution has also proved to accelerate the natural process of eutrophication which is defined by a high

concentration of nutrients in water, stimulating the growth of algae but can also result in the loss of animal and plant diversity (Deval, Murray et al, n.d.). The effects on wildlife are, indeed, significant as animals can similarly experience toxic pollutants in the air contributing to illnesses, reproductive failures, or birth defects (Deval, Murray et al, n.d.). With crops and trees, air pollution or UV due to ozone depletion can lead to reduced growth and crop yields, environmental stresses, and increased plant vulnerability to disease (Deval, Murray et al, n.d.). Furthermore, as stated in Interview B, (May 18, 2021), over mining, particularly done by private, unregulated small mining companies, releases toxic substances onto the environment making multiple areas inhabitable and uncultivable.

Evidently, coal production also contributes to global climate change through the emissions of greenhouse gases such as carbon dioxide and methane. This accumulation of greenhouse gases has disturbed the atmosphere's natural balance of gases, trapping more of the sun's heat and increasing the Earth's temperature (Deval, Murray et al, n.d.). This phenomenon, commonly known as global warming, has drastic ramifications on natural resources and human health. To alleviate future casualties, numerous global agreements such as the Paris Agreements, joined by China, aim to limit the global temperature to 2 degrees Celsius. To meet such ambitious targets, China must significantly reduce coal use while minimizing local environmental concerns in Shanxi.

3.3.2 Socio-Economic Factors

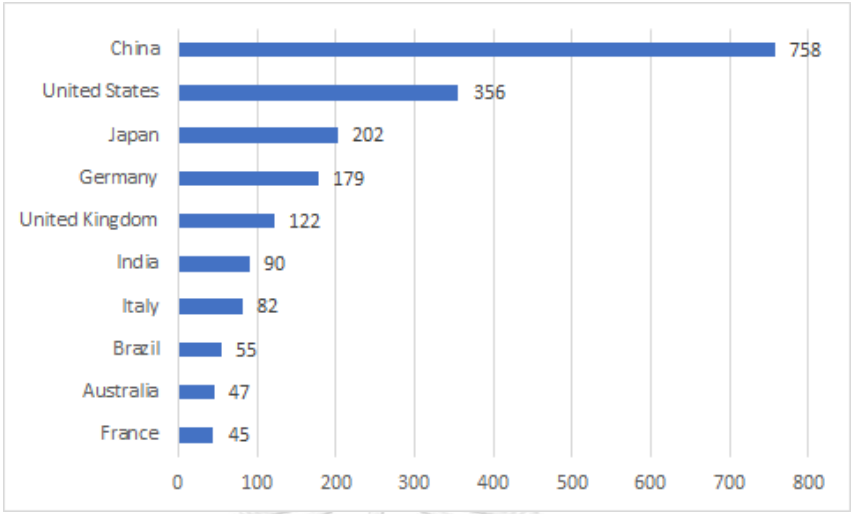
Reducing carbon emission through phasing-out coal also has substantial socio-economic impacts. As stated, air pollution accumulated in the air can be heavily harmful to human health. Long-term exposure to toxic pollution, urban smog, or particle pollution can cause severe health effects such as cancer, respiratory, immune, reproductive, and neurological illnesses, and, in worst cases, death (Deval, Murray et

al, n.d.). Some people, such as children, elders, people with underlying conditions or people who are often outdoors, are particularly vulnerable to air pollution. According to a study conducted by Robert Rohde and Richard Muller (2015), approximately 1.6 million people die in China due to air pollution every year, which represents more than a quarter of all deaths in the country. The impacts of coal use on agriculture and the environment previously discussed also have serious effects on the population, including farmers or villages that need to be relocated. Such changes can severely alter livelihoods and standards of living, especially in the already-vulnerable rural societies.

Adding to drastic social ramifications, air pollution also has significant economic impacts in China. Precisely, according to a study by Keith Crane and Zhimin Mao (2015), China is losing 6.5% of its GDP annually due to health impacts and lost productivity caused by air pollution. Indeed, to avoid hazardous health problems, factories must close when the air quality is not adequate. Besides, the economy also takes a toll on the overabundant hospital visits and sick days that air pollution causes.

In addition to improving environmental sustainability, it is clear that strategically reducing the use of coal will also benefit livelihoods and the economy. As stated in Interview A, (May 13, 2021), this energy transition will lead to a climate friendly economy in which several areas are already market-proven, such as the renewable sector. As governments and the private sector recognise the future economic opportunity that this transition represents, China realised that its traditional coal-powered economic system is now 'out of esteem' today. As illustrated in Figure 6, China is now the world's largest investor in renewable energy capacity and owns the entire European market in solar power due to its ability to manufacture at a lower price than its European competitors.

Figure 6: Global renewable energy capacity investment from 2010 to H1 2019, $bn.



Frankfurt School-UNEP Centre/BNEF (2019)

According to Interview A, (May 13, 2021), this green market is now a clear answer to China's struggles since the global financial crisis. It has become clear to the Chinese government that the road to 2060 will be challenging but is necessary in consideration of the economic opportunity it represents and in view of the world's socio-technical landscape. As Interviewee A, (May 13, 2021) quotes; "It is not because anyone asked us to do this, it is because we want to do this.", China, indeed, sees great potential in this new economic model.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Apart from those national economic benefits, reducing coal consumption and production may also avoid further trading costs with regard to exporting energy. As a matter of fact, the European Union has recently put forward plans regarding a European Carbon Border Tax which would require trading partners to pay tax on carbon imports (Abnett, Twidale, 2021). While such a system was conceived to protect industries in Europe from foreign competitors that are not charged for their carbon output and can, thus, produce at a lower cost, China could be one of the countries to suffer the most from such an added carbon cost (Xu, Stanway, 2021). Indeed, as the world's top

manufacturer in numerous sectors, reducing its overall carbon emissions could greatly avoid further trading complications in the near future.

3.3.3 Political Factors

As the largest polluter in the world, China is criticized by many for being considered a 'dirty country'. However, according to Interview B, (May 18, 2021), China is partly a 'dirty country' because the heart of the global value chain happens to be located in China, led by foreign and national industries. As coal is still dominant in China's newly boomed economy, its dirtiness is of serious concern in the global sphere. Decarbonising China is, indeed, an action that will have an impact on the entire world's economy, considering the place that the country now holds. Nevertheless, as stated in Interview B, (May 18, 2021), political struggles between the West and China and a potential decrease in technological cooperation, due to China's place as a huge competitor on green technologies, will not help China reach carbon neutrality. Despite such political struggles, China has demonstrated great efforts in participating in international treaties such as the United Nations Framework Convention on Climate Change or the Kyoto Protocol. Its active participation shows a rising international responsibility on battling climate change, viewed as a global common issue rather than, solely, a national concern to address. This participation has become increasingly significant in the past few years as China understood the political and economic benefits of such involvement. Indeed, such efforts helped stimulate low-carbon projects and engender a greater international reputation as a proactive country on environmental issues.

Geopolitical affairs will have colossal impacts on this energy transition, regarding the new economy, climate change, and technological cooperation. As a matter of fact, according to Interview B, (May 18, 2021), transformation cannot be done by any single country, we need cooperation as climate change is an urgent global issue.

Interviewee F, (June 18, 2021) adds that despite China being the world's second largest economy, it is still considered a developing country and China's development has been uneven across the entire country as certain rural areas remain poor. Given the size of the country and the scale of the challenge, China, like any other country, will need support, especially considering that China's coal phase-out will benefit the entire world on climate concerns.

As stated in Interview F, (June 18, 2021), China should not do this transition on its own as we now live in a globalised world and China's actions will end up affecting other countries. For instance, Interviewee F, (June 18, 2021) takes the example of Indonesia that China is importing a lot of coal from for fuelling coal-fired power plants. A reduction in coal importation will evidently occur as China aims to drastically reduce its carbon emissions and may decide to focus on domestic coal mining activity throughout the progressive phase-out to secure local employment or economic stability. This will inevitably affect Indonesia's economy which then may have ramifications on the regional economy. This shows how such a transition must be executed in a coordinated fashion among countries, especially considering China's strong economic presence.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Nevertheless, China's view as a 'dirty country' is often perceived as the one and only cause of today's climate concerns. Adding on existing political struggles with the West, this view is subject to the idea that China is the only responsible and, therefore, should decarbonise by itself. While China has goals of becoming a self-reliant economy and embracing energy security by being entirely independent, the road to 2060 will be challenging without collaborations, according to several interviewees. As stated in Interview F, (June 18, 2021), given the current geopolitical situation, countries aiming to be relatively independent, thinking it will make them more secure, may experience serious difficulties and should rather aim to become more interdependent in consideration of the globalised world we are living in.

The road towards 2060's carbon neutrality may prove China's trustworthiness to certain economies that still perceive China as a dirty country. By decarbonising, China will show to the world a whole new level of development, considerably beyond its existing technological advances and multiple urban centres.

3.4 COAL PHASE-OUT ACTION PLAN

In 2020, President Xi Jinping announced updated climate targets on China's Nationally Determined Contributions (NDC) to achieve by 2030. It includes a reduction by more than 65% of CO2 emissions per unit of GDP and an increase of 25% of non-fossil energy in primary energy consumption, compared with 2005 levels (Reuters, 2020). To contribute to such objectives, the use of coal will have to be drastically reduced. Despite a stipulated maximum of 58% share of coal in China's energy consumption throughout its 13th Five-Year Plan (2016-2020), the absolute value of coal is still growing due to the high demand for energy. On Earth Day, 22nd April 2021, the Chinese President promised that China will strictly limit the growth of coal consumption throughout the 14th 5YP (2021-2025) and a progressive phase-out will start during the 15th 5YP (2026-2030), aiming to peak carbon emissions by 2030 (Yi, S., 2021). While it is an important statement set by the central government providing a clearer direction, Interviewee F, (June 18, 2021) wonders how this can be translated into actual targets for local governments to implement. From the conceptual lens of fragmented authoritarianism, while responsibility is delegated through a downward approach, provincial governments may have different interests in consideration of their provinces' needs which may differ from the central directive. Such a fragmentation can engender tensions between localities and the central government but also generate space for bargaining and autonomy. Indeed, localities may create their own provincial 5YPs but must pursue the targets set by the central government (Interview H, June 23, 2021). According to Interview I, (July 7, 2021), the next steps concerning provincial's targets

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

are relatively unclear considering the uncertainty of energy and coal demand in the next few years and the unknown stability of renewable energy in the future.

While no clear policies have been formulated to reach 2060, several approaches have been utilized over the past decade in reducing carbon emissions in the power sector. As stated in Interview B, (May 18, 2021), China's environmental governance is considered as a top-down approach as national targets are developed by the central government, such as the NDC targets, and these targets are broken down into different provinces, and broken down again into different cities by the province. Through this process, the city officers would, thus, decide which coal mine to close for instance or to reduce capacity to a certain level. Interview H, (June 23, 2021) emphasises that, in the long term, the energy transition should never be looked at by isolating a province from another because China is a country where the central government has a lot of power. Precisely, as stated in Interview F, (June 18, 2021), provinces must wait for the central plan to be developed before formulating its own 5YP, which exemplifies the fragmented authoritarianism policy concept.

Regarding reducing capacity in coal mines, small mines are usually unable to properly run through capacity limitation and often end up merging with larger coal mines, often SOEs. The elimination or consolidation of small mines by merging them with larger coal mines helps enhance the efficiency required to facilitate better internal management and working conditions which ultimately avoid additional carbon emissions often generated by small and outdated mines. Indeed, as stated in Interview I, (July 7, 2021), larger mines are safer and easier to regulate. For air quality control, Interviewee H, (June 23, 2021) informs that, in 2011, there was a considerable restructure in Shanxi where all mines whose capacity were under 1.2 million tons of coal per year were forced to close or to be acquired by bigger mines.

As a second general policy aiming to reduce carbon emissions in the coal industry, the government issues capacity permits to be traded across the country. According to Interview I, (July 7, 2021), the government monitors the permit rather than

the coal price which gives the government a lot of flexibility to regulate and send signals to certain coal mines to reduce capacity. These trading permits also help each province to manage their capacity while following the allowance set by the national total capacity to each mine. If a province or mine decides not to operate, they can simply sell their permits to other mines that wish to expand their capacity. Such a system is particularly relevant in China considering the differences in coal reserves and production across the country.

Understanding this distinction between provinces is necessary considering that the coal phase-out will occur differently in each of them.

"Once China announced its 2060 carbon neutrality pledge, many countries thought that Shanxi would eliminate coal, which would be painful for Shanxi. However, this is not true because according to the national 14th Five-Year Plan, two differentiations are emphasised; there is a reduction in coal production in provinces where there are low coal reserves, and there is a concentration of coal production in provinces where there are a lot of coal reserves."

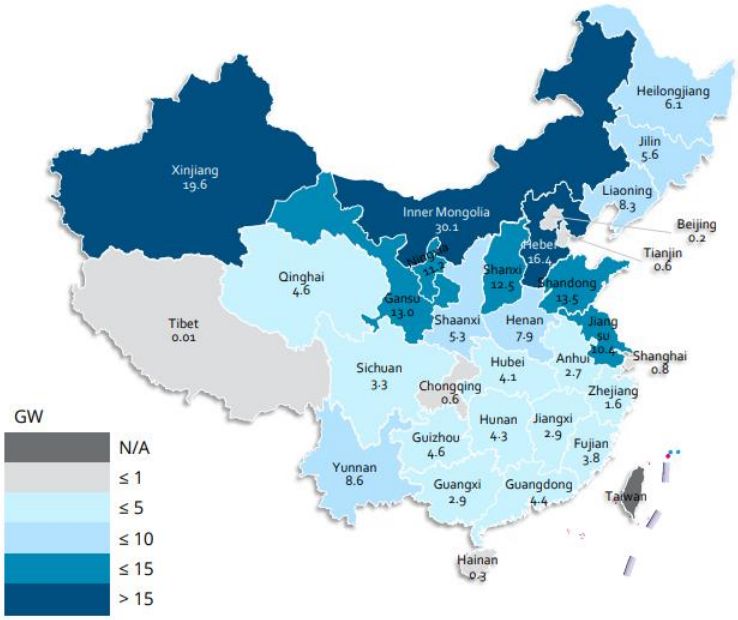
Interview H, (June 23, 2021)

According to Interview H, (June 23, 2021), there are two main reasons for this differentiation. First, China's energy security is of major concern and its energy mix is based on the reserves of fossil fuels. As a matter of fact, China owns a lot of coal compared to oil and gas and is considerably dependent on the gas and oil's import. For China, it is essential to keep coal as part of the energy mix faced with uncertainties in the future. The second reason regards the necessity for a 'smooth transition' which means that the coal phase-out should not happen hastily and should rather be gradual to avoid disturbing provincial economic stability and livelihoods, especially in coal-dependent provinces. Indeed, while Shanxi is aiming to reduce its dependence on coal, neutrality may not happen in all provinces, according to Interview G, (June 23, 2021). Considering that Shanxi is the largest producer of raw coal in the country, the province

risks being used as support in sustaining energy security rather than a model for renewable energy. Huang and Liu (2017) argue in their research that understanding the geographical perspective of China's energy planning is necessary while analysing energy transitions. In energy planning, China divided its country into six regions – North, Northwest, Northeast, South, East and Central – in which the three northern regions largely focus on supplying resources due to their high availability (Huang, Liu, 2017). While the three remaining regions are considerably more inclined towards fostering industries due to their high human and financial resources, such geographical and demographic variations are substantial to comprehend energy planning. Figures 7 and 8 notably display the contrasts between the northern regions and the remaining ones regarding renewable energy installed capacity. Shanxi, as a northern province with the largest reserves of coal in the country, will inevitably be used as support for energy security. Nevertheless, as perceived in the figures below, renewable energy installed capacity, such as solar PV or wind turbines, has significantly increased in the province in the aim to diversify the country's energy mix. While Shanxi's coal reserves represent a key role to China's energy security in the short-term, important renewable energy investments are essential to achieve carbon neutrality in the province, especially in consideration of the country's geographical energy planning and the role of Northern provinces in supplying energy.

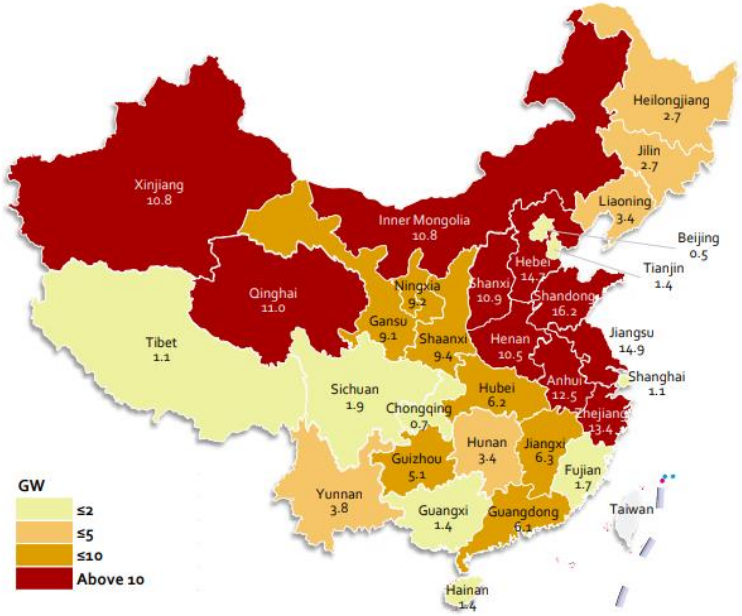
จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Figure 7: Wind capacity (GW) by province in 2019



China's National Energy Administration (2019)

Figure 8: Solar PV installed capacity by province in 2019



China's National Energy Administration (2019)

3.5 RAMIFICATIONS OF COAL PHASE-OUT ON COAL WORKERS' LIVELIHOODS

Considering the importance of coal in Shanxi, an energy transition will inevitably have ramifications on coal workers' livelihood. This section will focus on the social aspect of the coal industry with respect to its workforce, which is the concentration of this thesis. Coal workers' livelihoods are defined by the idea that their livelihoods entirely depend on the coal industry and government officials must take into consideration the impacts of a phase-out on the workforce throughout policy making. Later analysed concepts, such as environmental justice, are particularly relevant in understanding the ramifications of this transition on coal workers' livelihood. Indeed, as justice remains socially specific, such a concept sets a framework on areas that justice relates to, such as aspects of recognition, inclusivity, and equal distribution.

3.5.1 Threats of Energy Transition on Coal Workers' Livelihoods

3.5.1.1 Forced Unemployment

With almost one million coal workers in Shanxi in 2016, the coal phase-out will inevitably engender a rise in unemployment in the province (Bridle, Kitson, Duan et al, 2016). As previously stated, small-sized, less efficient, often private, coal mines are almost all eliminated or consolidated with larger state-owned mines. In 2016, the Minister for Human Resources and Social Security, Yin Weimin, announced that about 1.3 million coal workers and 500,000 steel workers could lose their jobs in the next few years and that 100 billion yuan will be invested to relocate these workers into the workforce (Yao, Meng, 2016). According to a report published by the Chinese Academy of Social Sciences' Institute of Urban and Environmental Studies and the Research Institute for Global Value Chains (2017), the coal sector employed 5.29 million workers in 2013 and estimated a reduction of 2.3 million workers by 2020, down to less than three million. In April 2021, the coal sector reported to have 2,570,000 workers in the

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

country compared to 5,296,816 in December 2013 at its peak rate (CEIC, 2021). Figure 7 clearly shows a sharp drop in employment in the coal sector after 2014.

Figure 9: China Number of Employee: Coal Mining & Dressing[3] (10,000 persons) (1998-2021)

CEIC Data, National Bureau of Statistics (2021)

In addition to an enforced phase-out engendering unemployment, the coal sector is also prone to a mechanization transformation, according to Interview G, (June 23, 2021). As a matter of fact, this dimension may be the most significant global impact on employment in the energy sector as it aims to construct coal plants that are considerably more efficient and with larger technological assets, needing a lower labour force. There is, therefore, an employment reduction that is natural and is linked to a technological evolution. As the largest coal producing province in China, Shanxi's unemployment rate has been increasing over the past year and without economic diversification, laid-off coal workers will struggle to find re-employment in the province. Such an area is particularly severe when considering workers with

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

[3] *Coal dressing: Method used to remove sedimentary rock from mine roof to avoid loose parts to fall and cause injury.*

employment difficulties and potential areas of misrecognition from the environmental justice framework.

3.5.1.2 Lack of Local Opportunities and Mobility Issues

As previously described, Shanxi is relatively rural compared to other provinces in the East of the country. As technicians specialised in the mining sector, rural laid-off coal workers may struggle finding re-employment in the province, most particularly the elders who may not be able to undergo training and had spent their entire life in one industry. The increasing unemployment rate in Shanxi shows that there is still a considerable amount of people who stay in the province despite the lack of opportunity available to them. The young population, however, flies to urban provinces seeking higher standards of living, which does not help the local economy.

The aspect of mobility was emphasised by several interviewees. According to Interview B, (May 18, 2021), rural coal workers are not very mobile as there are many constraints for these people to leave their province and family. Nonetheless, this issue has remarkably changed over the past two decades as it used to be extremely challenging to travel across the country. As stated in Interview I, (July 7, 2021), most Chinese cities are now expanding and are recruiting more and more people as long as they pay tax and contribute to the economy. Interview E, (June 9, 2021) emphasised that the amount of migration occurring in China is phenomenal as millions of people are migrating from rural to urban areas. In 2015, the rural-to-urban migration represented almost half of all migration types in the country (UNFPA, 2018). However, complex household registration systems, still prevalent in the country, may hinder rural workers to find employment outside of their province. For instance, the Hukou system in China is used for houseful registration which officially records a person's name, date of birth, parents, or spouse with a specific area. Through this migratory control, a person is recorded as an official and permanent resident of this area, which has long divided the

urban and rural provinces of the country in the past (Chan, Zhang, 2009). Today, while such restrictions have greatly decreased over the past decades, this system still exist. As migration is still relatively controlled in the country, rural migrants may not legally be considered urban workers, and would, therefore, not be eligible for urban welfare benefits. This creates challenges when considering the threats to these workers' livelihoods if they were to migrate to another province. As specified in Interview H (June 23, 2021), certain programmes, such as the Fujian poverty eradication programme, found that eradicating poverty locally was impossible and decided to relocate the population at risk. As young people were encouraged by local governments to relocate to other provinces, their migration was supported, and their formation was paid by the local government and local enterprises. While this project was overall considered successful, such projects are lacking as there is still a lack of coordination between provinces and cities hindering the proper and supportive transfer of labour, according to Interview B (May 18, 2021). Nevertheless, such significant migration waves show the absence of sustainable employment opportunities in provinces like Shanxi. Coal workers are particularly vulnerable considering that over half of them are over 46 years old and 60% of them are educated to lower secondary school levels or less (Hao, 2017). From an environmental justice lens, the extent of vulnerability must be recognised at all levels. Relocating or finding re-employment in a province that is economically dependent on a dying industry is a real challenge for this mining community. It is clear that, in such cases, the central government and provincial bureaus must get involved to support this laid-off workforce and promote employment in rural areas.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

3.5.2 Benefits of Energy Transition on Coal Workers' Livelihoods

3.5.2.1 Compensation Schemes and Employment Transfers

While taking into consideration the issues previously discussed, policy support packages must be provided by government officials to alleviate social costs associated with the coal phase-out. While coal workers will inevitably lose their

employment, they will benefit from social support throughout unemployment and re-employment. Indeed, according to Interview C, (May 26, 2021), the province of Shanxi has already introduced a variety of measures to provide support to laid-off workers, such as income coverage, compensation, or training. The expert adds that the government considerably supports the villages and the local communities by providing social services such old-age pensions, training and relocation opportunities, early-retirement compensation, or social insurances and subsidies for people with employment difficulties. Chapter 4 will describe in more detail all support policies available to laid-off coal workers.

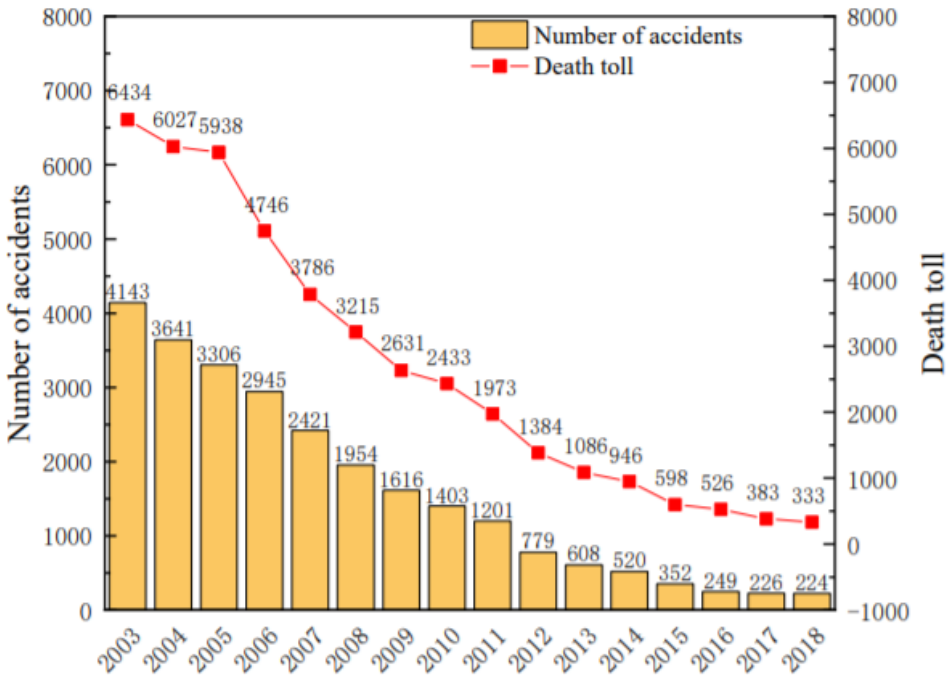
If adequately introduced, such services can offer a wide range of opportunities to workers. Considering the urgent need to promote employment in rural areas to compensate for the phase-out of the coal industry, Shanxi has made efforts to diversify opportunities for economic growth. Indeed, as stated in Interview H, (June 23, 2021), the province has made considerable efforts to approve new business projects in other industries by shortening the approval process in the last two years. Precisely, before then, it could take up to one year to approve a project which is now simplified and can be approved in about three months. With rigorous entrepreneurship and training programmes, laid-off coal workers have the opportunity to start a business or open a small shop in a simplified manner, providing an adequate environment for economic growth. In addition to such programmes, laid-off coal workers from state-owned enterprises benefit from unemployment insurances and subsidies during the training period or entrepreneurship programme for example. Such guidance is required to promote employment in the province and provide job security.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

3.5.2.2 Higher Work Safety

While accessing different employment opportunities after their lay-off, these offers may provide higher job safety compared to coal mining. As previously stated, the work safety in Shanxi has greatly improved in the past years through efforts of consolidation and closure of outdated unregulated mines (see Figure 8).

Figure 10: Changes in the number of coal mine accidents and deaths in China (2003-2018).



Ke, W., Wang, K. (2020)

Despite this, coal mining remains a risky activity as mine collapse and mine explosions have been a long feature of underground coal mining, according to Interview E, (June 9, 2021). It may also cause health problems such as pulmonary diseases like black lung disease. As stated that the share of coal is decreasing but its absolute value has considerably increased due to the growing demand, the cases of 'black lung' diseases, or pneumoconiosis, keep increasing over the past years. According to the National Health Commission of the People's Republic of China (2020), 873,000 cases

of workplace pneumoconiosis were reported by the end of 2018 compared to 559,000 in 2000. The yearly new cases have slightly decreased in recent years but still remain relatively high, on an average of 30,000 new cases (National Health Commission of the People's Republic of China, 2017).

While it is clear that coal mining does not appear as an extensively safe job activity, the wage is considered 'decent' by several interviewees with respect to distributive justice (see Chapter 5, 5.2.1.1). According to Interview A, (May 13, 2021), the risks related to coal mining do not represent a significant factor for workers to want to leave the industry and seek different jobs. Indeed, in consideration of the previously discussed limitations of coal miners to seek different employment, such as age, mobility issues, or lack of local opportunities, coal mining offers a decent income and is perceived as an income security that would not be available elsewhere. It is for this reason that a coal phase-out would benefit workers if they were forced to leave their employment and be guided and supported into finding re-employment, which would not be occurring if they would simply leave the industry as a phase-out would not occur. If adequately implemented, the employment guidance provided by the government, due to the forced closure of mines, offers laid-off coal workers safer work opportunities and financial compensation throughout unemployment, securing their living conditions and providing them with safer work conditions.

Chulalongkorn University

3.6 CHAPTER SUMMARY

This chapter brought attention to Shanxi's coal industry and the ramifications of the coal phase-out on coal workers' livelihoods. The sub-question of this chapter regarded Shanxi's coal industry situation regarding coal workers' livelihood and economic stability. Indeed, as determined, Shanxi is considered a coal-dependent province economically as it is the most coal-producing province of the country and

greatly contributes to the region's economy. Faced with environmental issues such as air pollution, the central government put in place carbon reduction targets while understanding the future opportunities for development in a low carbon economy. It is clear to the world that coal has no place in such an economy, and it must be drastically reduced or even eliminated to meet the 2 degrees Celsius global temperature target under the Paris Agreement.

Various measures have been put in place over the past two decades to reduce coal use in China. The main measure implemented is the consolidation of coal mines by closing down small-sized, outdated, more polluting and less efficient coal mines or by merging them with larger state-owned mines. Today, almost all mines in Shanxi are SOEs which emphasises the fragmented SOE model engendered due to potential inconsistency between the centre and the localities. Nevertheless, such mines are known to have safer work conditions for workers and to be easier to regulate, despite the place of the state both as a regulator and owner and the different reporting agencies. Numerous interviewees shared the importance for China to maintain its energy security that coal has provided throughout the country's economic boom. As a matter of fact, with the rising energy demand, the absolute value of national coal consumption keeps increasing, despite a reduction in the share of consumption in China's energy mix. Being capable of sustaining such a demand is necessary to maintain economic standards and protect livelihoods.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

A coal phase-out in a province like Shanxi would have inevitable ramifications on the province's economic stability due to its low industry diversification. In truth, the unemployment rate has increased over the past year in the province as the laid-off coal workforce struggles finding local re-employment. As the number of employees in the mining industry has drastically reduced due to the closure of mines, the central government and the provincial bureau provide various policies to support this workforce throughout unemployment and re-employment which should comply with the framework of environmental justice discussed in chapter 5. Indeed, as

the coal labour force is relatively older and less mobile, such governmental efforts are crucial to sustain adequate livelihoods.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

CHAPTER 4: AVAILABLE POLICIES AND POLICY CONCEPTS TO SUPPORT LAID-OFF COAL WORKERS IN SHANXI

CHAPTER OUTLINE

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

4.1 CHAPTER INTRODUCTION

This chapter displays the policies available to coal workers faced with unemployment due to the progressive coal phase-out occurring in the country. Focusing on the province of Shanxi discussed in Chapter 3, Provincial Decrees as well as State Council Decrees including Shanxi province, will be analysed to compile what kind of support is available to coal workers. After having understood the reasons and context of the progressive coal phase-out in Shanxi, as well as the ramifications on the coal workers, the policies available to support them will be stated to be, then, analysed through different justice frameworks in Chapter 5. The inductive content analysis helped detect the most common types of support and the extent of their availability to the laid-off coal workforce.

The types of policy support will be divided into four sections: unemployment insurances (see Section 4.2.1), re-employment opportunities (Section 4.2.2), promotion of local employment (Section 4.2.3), and subsidies and other social services (Section 4.2.4). Each section will overview articles from all policy documents analysed in relation to the specific type of support. The analysis found several types of unemployment insurances, including basic living security insurances, old-age pensions, and other types of insurances in accordance with the individual's vulnerabilities and needs. Likewise, the re-employment opportunities formulated in policy documents include training and education, opportunities for transfers in other industries, as well as efforts in improving re-employment services to ease accessibility. Moreover, the promotion of employment in Shanxi comprises entrepreneurship promotion and efforts to diversify employment in the province, understood as a concrete challenge in Chapter 3. Lastly, subsidies and other types of social services will be compiled, listing the types of available subsidies, as well as efforts to improve the social security system.

Furthermore, the policy concept of fragmented authoritarianism and China's policy position of ecological civilisation, with the understanding of China and

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Shanxi's guiding ideologies, were chosen to set a framework on China's governance in consideration of the coal phase-out and the carbon neutrality pledge (see Section 4.3). This consideration will help comprehend the further analysis of the policies with the justice's frameworks used in Chapter 5.

4.2 AVAILABLE POLICIES TO SUPPORT LAID-OFF COAL WORKERS

4.2.1 Unemployment Insurances

4.2.1.1 Basic Living Security Insurance

After being laid-off, coal workers will inevitably lose their means of income sustaining their standards of living. For many of them, finding re-employment is challenging due to the lack of local opportunities and their low mobility. Consequently, being supported throughout unemployment is necessary. This section will display the basic living security insurances available to laid-off workers, in consideration to their needs and vulnerabilities.

In the Provincial Decree no 2 (2019) 'Implementation Opinions of the People's Government of Shanxi Province on Promoting Employment', Article 10 aims to:

"*Implement unemployment insurance benefits. For unemployed persons who meet the conditions, the unemployment insurance fund will issue unemployment insurance benefits, and the basic medical insurance premiums that should be paid by the individual will be disbursed from the unemployment insurance fund.*"

Shanxi Provincial Decree no 2 (2019)

This article refers to unemployment insurance benefits for unemployment persons. This includes financial compensation as well as a coverage of the basic medical insurance premiums. Examples of these financial aids in the 'Opinions of the Shanxi

Provincial People's Government on further speeding up the re-employment of laid-off workers, include:

"The economic compensation or living allowance required for the dissolution of labor relations between the provincial enterprises and laid-off workers shall be settled by the enterprise and the finance according to the ratio of 4:6, but the amount of financial assistance shall not exceed 5000 yuan per person."

Provincial Decree no. 3 (2005)

"Unemployment insurance benefits shall be paid in accordance with the provisions for persons who meet the conditions for receiving unemployment insurance benefits. During the period of receiving unemployment insurance benefits, other unemployment insurance benefits such as workers' medical insurance paid by the unemployment insurance fund may be enjoyed in accordance with the provisions, and the social security agencies shall make corresponding records of their rights and interests."

Ministry of Human Resources and Social Security no. 32 (2016)

Article 10 of Shanxi Provincial Decree no. 2 (2019) indicated that only 'unemployed persons who meet the conditions can receive such financial help. Indeed, groups of people with 'employment difficulties' are described, as well as people with low security:

"Article 12: Improve the long-term mechanism of employment assistance.

We will adjust the scope of the employment difficulties and make the urban elderly unemployed, those who experience low insurance and long-term unemployment, and zero-employment family members the key targets of employment assistance."

Shanxi Provincial Decree no. 50 (2017)

"Article 11: Guarantee the basic livelihood of the people in difficulties.

For eligible laid-off and unemployed persons with living difficulties, temporary living allowances will be given, and the subsidy standard will be comprehensively determined according to the degree of family difficulties and the level of consumption in the region. For families that meet the minimum living security conditions, they will be included in the minimum living security scope in a timely manner in accordance with the regulation procedures. Those who meet the requirements for temporary assistance shall be given temporary assistance in a timely manner in accordance with the prescribed procedures. Through comprehensive measures, we will help the people in need to overcome their difficulties."

Shanxi Provincial Decree no. 2 (2019)

As formulated in the policy documents, numerous types of people can enjoy unemployment insurance, which includes temporary living allowances, subsidies, and employment assistance. This section focuses on assistance available to laid-off workers throughout unemployment only, excluding re-employment, which will be discussed in a later section.

On a national level, the Ministry of Human Resources and Social Security National Development and Reform Commission and seven other departments published a policy on the resolution of excess capacity in the steel and coal industry to achieve relief from hardship in the process of staff placement (MHRSS no. 32, 2016). Concentrating on the coal and steel industry, laid-off workers with employment difficulties may benefit from social insurance subsidies. In the time of a coal phase-out, this policy specifies that 'if an enterprise terminates labour contracts, they shall pay economic compensation in accordance with the law, repay the wages owed to the employees during their employment, and make up for the social insurance premiums owed.'. It is clearly noted that coal and steel workers benefit from temporary unemployment insurance throughout their unemployment period, in consideration of the coal phase-out and the necessity to support this important workforce. Interview C,

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

(May 26, 2021) emphasized that Shanxi introduced a variety of measures to provide support, income, and other kind of compensations for laid-off workers and affected communities affected by the closure of a coal mine. As specified, the degree of support depends on the vulnerability of the individual and if they are considered as a person with 'employment difficulties', which includes zero-employment family members, people with disabilities or work-related injuries, people with low insurance and older people.

4.2.1.2 Early-Retirement and Old-Age Pensions

Among people with unemployment difficulties, older people represent a considerable part of the coal workforce, as determined in Chapter 3. Variety of measures are available to older laid-off workers who may not be able to undergo training or to be re-employed. One of the main measures implemented to workers who are within five years of their retirement age is early retirement:

"For laid-off workers [who are] less than 5 years (including 5 years) from the retirement age stipulated by the State, they may, upon their own application, withdraw from the enterprise. During the period of retirement, the enterprise shall pay the basic living expenses in accordance with the provisions, and the enterprises and employees shall pay social insurance premiums in accordance with the prescribed proportion to the retirement age stipulated by the State. Among them, for state-owned special hardship enterprises, the local government adopts a variety of financing channels to protect their basic livelihood, at the same time, according to the local average social wage of 60% of the previous year as the contribution base to pay social insurance premiums."

Shanxi Provincial Decree no. 3 (2005)

This system also allows a type of support to workers whose retirement age is more than five years but less than ten years:

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

"When a laid-off worker [is] more than 5 years (excluding 5 years) and less than 10 years (including 10 years) from the retirement age stipulated by the State, the enterprise may, upon their own application, terminate the labor relationship and sign an agreement with them to pay the old-age pension and medical insurance fee, and the enterprise shall no longer pay the financial compensation or living allowance."

Shanxi Provincial Decree no. 3 (2005)

Provincial decrees and national policies offer options to older laid-off workers to either receive economic compensation including living expenses paid by the enterprise or to apply for basic old-age insurance premiums and basic medical insurance premiums which shall be paid by the employee (MHRSS no. 32, 2016). Such agreements must evidently be done under the consent of the enterprise, the choice of the employee, and the signing of an agreement. When the retirement age is reached, the formal retirement procedures are formally carried out.

4.2.2 Re-Employment Opportunities

4.2.2.1 Training and Education

As specified in Interview C, (May 28, 2021), younger laid-off workers, who may not be offered the possibility to retire early, have the opportunity to undertake re-employment training and vocational skills training. Such services are particularly enforced in coal cities with the incentive to train the coal mine personnel. According to Shanxi Provincial Decree no. 9 (2007), by the end of the 11th Five-Year Plan, the total number of skilled workers in the province had reached 2.17 million, of which technicians and senior technicians accounted for 6% of the total number of skilled workers and 19% were senior workers. In the same document, great attention is brought to vigorously develop vocational training and improve the quality of workers by

implementing the high-skilled personnel training project and accelerating the training of skilled workers needed for the economic and social development of the province.

"Give full play to the role of existing educational and training resources, relying on vocational colleges, high-level technical schools, technical colleges and other key vocational education and training institutions, set up a number of model high-skilled personnel training bases and regional public training bases to accelerate the training of high-skilled personnel."

Shanxi Provincial Decree no. 9 (2007)

"According to the needs of transformation, each coal city should build 2-3 public training bases to strengthen the skill training of employees and the reemployment training of laid-off workers. [...] New employees will be trained for 3-6 months, and they will meet the job requirements through assessment and appraisal, which will fundamentally improve the quality of employees. For laid-off workers, according to the needs of the enterprise to change production, formulate corresponding training plans, through training, so that each laid-off worker has 1-2 new labor skills, to smoothly embark on new jobs."

Shanxi Provincial Decree no. 77 (2008)

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

As stated in this quote, the training will be evaluated through assessment and appraisal. Shanxi Provincial Decree no. 9 (2007) specifies that the province aims to establish an open, fair, and impartial evaluation mechanism for skilled personnel. Such a system may be conducted by gradually forming a socialized vocational skills appraisal, enterprise skills workers assessment, vocational college qualification and special vocational skills assessment work system. The province aims to gradually implement the identification method that is linked to work performance and the production process in enterprises and promote the combination of professional skills identification and professional teaching in schools. Moreover, Shanxi engaged itself to

encourage industries, enterprises, and the whole society to carry out various types of vocational skills competitions, post training activities, and guide enterprises to establish an incentive mechanism that combines the use of skilled workers with training and assessment, and the relationship between remuneration and performance contribution (Shanxi Provincial Decree no. 9, 2007).

Indeed, the incentives for laid-off workers must be considerably interesting and financially beneficial. For that, Shanxi Provincial Decree no. 3 (2005), specifies that all kinds of vocational training institutions are free of charge and that training subsidies may be allocated in instalments. More information regarding training subsidies and people with employment difficulties will be discussed in Section 4.2.4.1.

Undeniably, training must be accessible to all, and Chapter 3 has determined that coal workers are particularly vulnerable to being stuck in unemployment. The previous chapter discussed rural workers being less mobile and having more difficulties finding new employment after being laid-off. Shanxi Provincial Decree no. 9 (2007) stipulates to 'vigorously carry out skills training for rural workers, improve their vocational skills, transfer capacity, improve the labor preparation system, and enable more than 90% of the newly-growing urban and rural workers to receive the necessary vocational skills training before they become employed.'. Several documents highlight the need to promote training for coal mine personnel as the establishment of effective staff training mechanisms and talent use mechanisms, considered necessary for the sustainable development of Shanxi's industries.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

4.2.2.2 Improvement of Re-Employment Services

While training and vocational skills training are significant elements of re-employment promotion, other elements of employment services and human resources development guidance are necessary for the smooth transfer of labour. Indeed, Shanxi Provincial Decree no. 50 (2017) aims to fully implement various support policies to

promote the re-employment of the unemployed in structural adjustment, transformation and upgrading. Moreover, the province will adjust the scope of people with employment difficulties to become key targets of employment assistance by including people who have been unemployed in the long-term, people who have a low insurance, older people, and zero-employment family members. The Ministry of Human Resources and Social Security Decree no. 32 (2016) defines a type of employment assistance as:

"For unemployed persons who terminate labor contracts with enterprises, in accordance with the law, they shall register their unemployment in a timely manner. They will be provided with free employment guidance, employment introduction, policy advice and other services, and will be incorporated into the local employment and entrepreneurship policy support system. For the unemployed and long-term discontinued workers, transfer training or skills upgrading training should be carried out in general, and training should be targeted and effective, and vocational training subsidies should be granted in accordance with the provisions. For those with zero-employment families and persons with employment difficulties, a certain cost-of-living allowance may be granted as prescribed during the training period."

MHRSS no. 32 (2016)

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

In Shanxi, unemployed people can register for unemployment at public employment service institutions in their place of residence, and apply for local employment and entrepreneurship services, employment support policies, and preferential tax policies for entrepreneurship and employment of key groups. Among them, workers who are older, disabled, and subsistence allowance families can apply for identification of persons with employment difficulties in their permanent residence and enjoy employment assistance (Provincial Decree no. 2, 2019). Such employment services are meant to adhere to the market to promote employment, provide human resources development guidance, focus on improving the quality of human resources supply, and promote the effective docking of supply and demand (Provincial Decree no. 50, 2017).

"We will improve the employment management service organization system covering urban and rural workers, establish and improve the network of public employment services, strengthen the public service function of the government to promote employment, and comprehensively establish a public employment service system to provide effective services to urban and rural workers."

Shanxi Provincial Decree no. 9 (2007)

"We will improve employment service management agencies at all levels and work platforms for community labor security, establish a public employment service system, and carry out public employment services to the community. We will strengthen the construction of professional instructors and community workers and carry out a pilot project on integrated employment in urban and rural areas."

Provincial Decree no. 9 (2007)

With respect to provincial governments' responsibilities, Shanxi Provincial Decree no. 3 (2005) highlights that all levels of municipalities shall increase their financial investment in labour market construction and community labour security institutions, arrange special funds for labour market construction according to financial resources and work needs, and encourage them to improve the function of employment services as soon as possible.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Such efforts must be strengthened in coal cities which are particularly prone to the higher unemployment rate due to the progressive coal phase-out. As determined in Chapter 3, small-sized mines are very likely to be phased-out or to be merged with larger mines. As those small mines are often private, the Provincial Decree no. 77 (2008) aims to 'implement various employment and reemployment support policies for non-public economic entities to increase their enthusiasm and initiative in absorbing and relocating laid-off and unemployed people'. Indeed, such efforts are necessary in a province like Shanxi in which enterprises have no choice but to lay-off employees due to de-capacity policies or mine closures. The MHRSS Decree no. 32 (2016) puts light to the importance of determining in advance the approximate number of workers to be

laid-off, understanding the employment needs, and formulating a plan for re-employment assistance. Moreover, it is specified that for enterprises that must lay-off more than 100 persons, a special recruitment event shall be held. To support this initiative, numerous other types of supporting measures are put in place in Shanxi's coal cities:

"Strengthen the construction of the public employment service system of the whole province, especially the coal cities [...]. Conscientiously implement the relevant national and provincial policies for supporting employment and reemployment, such as tax relief, small and secured loans, social insurance subsidies, free job placements, and one-time job training subsidies, and improve various supporting measures."

Provincial Decree no. 77 (2008)

"Relying on the work platform of sub-district and community labor security, provide employment assistance, develop jobs suitable for disadvantaged groups, especially public welfare jobs, help disadvantaged groups achieve reemployment, and implement underpinning placements for zero-employment families and other people with employment difficulties."

Shanxi Provincial Decree no. 77 (2008)

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

"In the pilot work of promoting the sustainable development of the coal industry, it is an important task to promote the re-employment of laid-off unemployed people, promote various forms of employment, and encourage workers to start businesses. Through the guidance of support policies, enterprises are encouraged to absorb laid-off workers for re-employment. We will increase the development of public welfare posts, fully implement various support policies and improve employment stability. We will establish a linkage mechanism between unemployment insurance and minimum living security for urban residents to help laid-off workers re-enter the workforce as soon as possible."

Shanxi Provincial Decree no. 9 (2007)

These supporting measures and employment assistance must be continued throughout the new employment found for it to be sustainable. As a matter of fact, Shanxi Provincial Decree no. 50 (2017) indicates that when an individual signs a labour contract with a new enterprise, the enterprise shall participate in social insurance and pay a housing provident fund (HPF). The individual may benefit from employment support in accordance with the provisions and participate in old-age pension, medical insurance, and housing provident fund. Such initiatives are necessary for supporting and integrating workers into new enterprises.

4.2.3 Promotion of Employment in Shanxi

4.2.3.1 Entrepreneurship Promotion

In addition to enhancing re-employment services while optimizing the integration of workers through vocational skills training, local employment must be promoted to create opportunities. Indeed, policy documents include numerous mentions of entrepreneurship promotion in the province. In Shanxi Provincial Decree no. 50 (2017), the province aims to optimize the entrepreneurial environment by integrating resources of various departments, accelerating the construction of business incubators, creative spaces, small and micro-enterprise entrepreneurship, and innovation centres, and providing guidance services and policy support for entrepreneurs.

"Encourage all localities to accelerate the construction of key groups of entrepreneurial incubation carriers, provide low-cost support, guidance services and policy support for entrepreneurs, and provide certain rewards and supplements based on the number of entities settled in, the effectiveness of incubation services, and the effectiveness of employment promotion."

Provincial Decree no. 2 (2019)

"For workers and unemployed persons of enterprises who decide to start a business, they shall be provided with entrepreneurship training, targeted entrepreneurship guidance, project consultation and follow-up services. We will support the construction of entrepreneurship platforms, actively cultivate entrepreneurial innovation carriers adapted to the characteristics of workers in the steel and coal industries, expand the pilot scope of homecoming entrepreneurship to mining areas, and improve the incubation capacity of entrepreneurial services by increasing investment in special construction funds. For self-employed or registered enterprises, tax relief, venture guarantee loans, venue arrangements and other policy support shall be given in accordance with the provisions."

Ministry of Human Resources and Social Security Decree no. 32 (2016)

To adequately promote entrepreneurship and encourage laid-off workers to start businesses, public employment entrepreneurship services must be strengthened. It is stated in the Provincial Decree no. 50 (2017) that the province will make full use of the employment entrepreneurship service subsidy policy to support public employment service institutions and universities in carrying out recruitment activities and entrepreneurship services. The policy mentions that local governments may grant certain subsidies for employment and entrepreneurship services according to the annual recruitment activity plans, size and number of services and effects of public employment service institutions and universities. Moreover, the province aims to 'expand the scope of self-service for service recipients, promote online processing and online feedback, and develop the full informatization of employment and entrepreneurship service management'.

While fully deploying public employment entrepreneurship services by supporting institutions and universities carrying such services, workers engaged in such activities must be financially supported. In the Provincial Decree no. 77 (2008), a strong attention is brought to improving entrepreneurship support policies, setting up special funds for entrepreneurship, building entrepreneurship service platforms, implementing

support policies such as business guidance, small loans, and encouraging independent entrepreneurship and the development of small and medium-sized enterprises.

"Article 3: Increasing policy support for entrepreneurial secured loans.

Further increase the launch of guaranteed loans for entrepreneurship. Those who meet the conditions for applying for secured loans for business start-ups can start their own businesses, which can be increased from a maximum of RMB 100,000 for secured loans and RMB 150,000 for business start-ups."

Provincial Decree no. 2 (2019)

"Article 7: Strengthen policy support.

We will implement preferential tax policies to support and promote entrepreneurial employment in key groups. For [...] persons with employment difficulties who start a small micro-enterprise for the first time or engage in self-employment to drive more than 3 people into employment and operate normally for more than 1 year, a one-time employment subsidy shall be granted according to the standard of not more than 1000 yuan per person according to the number of employees driven into employment. For workers who start a business in high value-added industries, the standard of one-time employment subsidy for entrepreneurship can be adequately raised, and the scope of subsidies may be appropriately loosened."

Provincial Decree no. 50 (2017)

As formulated in the policy documents mentioned in this section, the provincial government strongly encourages and supports the development of local entrepreneurial employment. It was determined in Chapter 3 that Shanxi must seriously promote its local employment as the unemployment rate remains on the rise and the young population flies out of rural areas. Optimizing an entrepreneurial environment is one of the main strategies used by the localities and the central government to promote and diversify employment in the long-term, considering Shanxi's strong dependence on one single industry, coal.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

4.2.3.2 Diversifying Employment in Shanxi

While entrepreneurship is strongly encouraged, other non-public existing industries must be promoted and diversified to lessen the economic dependence on the coal industry and facilitate the transfer of labour. Indeed, the province has made considerable efforts to expand employment. Throughout the 11th Five-Year Plan period, 1.5 million new urban jobs were created in the province, 1.5 million surplus rural workers were transferred, and the registered urban unemployment rate was kept within 4% (Provincial Decree no. 9, 2007). Such numbers were achieved by expanding employment routes, improving the quality of employment and the social entrepreneurship environment, actively exploring long-term mechanisms to promote employment, promoting integrated urban and rural employment, establishing a more complete public employment service system, and enhancing equal employment and free movement of urban and rural workers.

Re-employing laid-off workers is one of the most important priorities in connection to Shanxi's socio-economic development. For that, expanding employment by developing jobs through various channels and linking employment expansion with economic growth is necessary.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

"In formulating economic and social policies and investing in major construction projects, governments at all levels should take the expansion of employment as an important factor, by encouraging, supporting and guiding the development of non-public economy such as individuals and the private sector, actively developing labor-intensive industries with large employment capacity, service industries and small and medium-sized enterprises with various types of ownership, improving the employment structure and expanding employment capacity."

Provincial Decree no. 9 (2007)

While the central government must strengthen regional coordination and cooperation among provinces, localities must manage its workforce by enhancing employment rights protection, assisting in the progress of labour export, implementing training programmes, and guiding and organising the orderly transfer of surplus rural labour to non-agricultural industries and town (Provincial Decree no. 9, 2007).

On a national level, the central government encourages the private sector to engage with larger markets, such as expanding to foreign markets or developing new products. Such measures should create new employment spaces for Chinese nationals as the country's economy is tremendously growing.

"*Support enterprises to carry out [...] international production capacity cooperation and equipment to develop new products, new business conditions, and new industries, in the optimization, upgrading and expansion of domestic and foreign markets to create new employment space.*"

MHRSS no. 32 (2016)

Faced with a rising unemployment rate, the Provincial Decrees show that Shanxi has understood the importance in promoting employment and new industries in the province. Indeed, such efforts are necessary considering the uncertain future regarding the coal industry and the economic stability of the province.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

4.2.4 Subsidies and Other Social Services

4.2.4.1 Available Types of Subsidies

The Notice of the Ministry of Human Resources and Social Security and the Ministry of Finance on the issuance of the Interim Measures for the Administration of Employment Assistance Funds (Decree no. 260, 2015) describes a variety of subsidies available to laid-off workers. Article 13 specifies that such funds are determined by the provincial social and financial departments of the localities in consideration of

provincial issues and realities. Employment assistance funds are divided between subsidies for individuals and capacity-building subsidies for public employment services (Provincial Decree no. 2, 2019). This section will solely focus on subsidy funds for individuals, which, in the context of this thesis, refers to laid-off coal workers. These subsidies are used for expenditures such as vocational training subsidies, vocational skills appraisal subsidies, social insurance subsidies, public welfare job subsidies, employment internship subsidies, or job-seeking entrepreneurship subsidies.

Article 7 of the MHRSS Notice no. 260 (2015) introduces the social insurance subsidies which are meant to benefit college graduates and persons with employment difficulties. In the case of people with employment difficulties, in which most coal workers are part of, the social insurance subsidies may benefit them with basic old-age insurance premiums, basic medical insurance premiums and unemployment insurance premiums. While people with employment difficulties may find flexible employment, a certain amount of social insurance subsidies shall be granted, and the standard of subsidies should not exceed two thirds of their actual contributions. The duration of social insurance benefits for this group can be extended to a maximum of three years depending on the age at which they were initially approved for social insurance benefits, except for persons who are less than five years from retirement age.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Likewise, Article 8 of this same Notice defines the subsidies for public welfare posts which also focuses on people with employment difficulties, with an emphasis on zero-employment family members and elders. Through these subsidies, these people shall receive job subsidies in accordance with the local minimum wage standards operating on the same period system as the social insurance subsidies.

Article 10 concentrates on subsidies for job-seeking and entrepreneurship which represents a one-time subsidy distributed to low-security families, disabled people, and college graduates who have started a business within the first year of their

graduation, have received state student loans, and are actively seeking employment and entrepreneurship.

The last type of subsidies, defined in Article 5 and 6, revolve around vocational training which may be granted to five categories of people:

- Rural transfer workers
- Urban registered unemployed persons
- New high school graduates who have not continued their studies in urban and rural areas
- College graduates in the year of graduation
- Children of poor families

In the context of Shanxi's coal phase-out, laid-off coal workers may be part of rural transfer workers or urban registered unemployed persons. People from such categories who participate in employment skills or entrepreneurship training and have obtained qualification certificates shall be granted a certain standard of subsidies. Article 6 specifies that subsidies for vocational skills appraisal shall be offered to those who have passed the initial vocational skills appraisal and received a certificate.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

"*From January 1, 2019 to December 31, 2020, people with employment difficulties and zero-employment family members will be given a living allowance subsidy during the training period. The subsidy standard is no more than 15 yuan per person per day. The living expenses subsidy policy can only be enjoyed once a year per person and cannot receive unemployment insurance benefits at the same time.*"

Shanxi Provincial Decree no. 2 (2019)

"*Article 5: Expand the scope of subsidies for employment and traineeship.*

Starting from January 1, 2019, the province will implement the "Three-Year Employment Internship Program for 50,000 Youths", and a total of 50,000 unemployed youths will be organized to participate in employment internships within three years."

Shanxi Provincial Decree no. 2 (2019)

While considered a stable source of funding, the inclusion of funds for public employment services in the budget allows the distribution of subsidies for free services and training. In addition to subsidies for workers, enterprises may be granted vocational training subsidies to promote the transfer and placement of workers (MHRSS no. 32, 2016). In Shanxi, such efforts are clearly essential to support workers throughout unemployment and re-employment.

4.2.4.2 Improvement of the Social Security System

Throughout the past decade, numerous improvements and advancements have been made in the social security system. The Provincial Decree no. 9 (2007) understands the importance of further expanding the coverage of social insurance and achieving equal access to social security for all types of employed persons in cities and towns. Such efforts aimed to improve the rural social security system and old-age insurance coverage. This decree carefully defines areas for improvement in different types of insurance, such as health insurance, unemployment insurance, work injury insurance, maternity insurance, or rural old-age insurance. Most efforts revolve around gradually expanding the coverage of insurance, establishing a system that meets the needs of its recipients, and optimizing management systems.

Similarly, the Ministry of Human Resources and Social Security Decree no. 32 (2016) has the objective to strengthen the social security link. This includes expanding the scope of social insurance to include people with vulnerabilities such as families that meet the minimum living security conditions. The decree also specifies

that while workers may receive unemployment insurance benefits, they may also benefit from other insurances such as workers' medical insurance paid by the insurance. Strengthening the social security link also aims to implement financial security and stability revolving around the different types of funds such as wages, social insurance premiums, retirement expenses, or financial compensation.

"*Article 4: Actively and steadily explore the operation and supervision mechanism of social security funds.*

[...] We will improve the supervision system of social security funds, improve the organizational system of multi-party supervision, realize the full supervision and off-site supervision of the operation of social security funds, and ensure the safe operation of social security funds. "

Shanxi Provincial Decree no. 9 (2007)

Moreover, the social management service system is another area for improvement. In the Provincial Decree no. 9 (2007), it is described that such an improvement must start with the establishment of standard service facilities for social insurance agencies. Over the past decade, various improvement measures were conducted such as strengthening basic management, standardizing service processes, and promoting standardization, informatization and the establishment of updated social insurance agencies' services.

Other efforts relate to improving policies of subsidies for vocational training which aims to appropriately raise the standards of subsidies and establish a linkage mechanism for employment service subsidies, skills evaluation, and vocational training to improve the quality and effectiveness of training and maximize the promotion of training institutions (Provincial Decree no. 50, 2017).

With regard to coal workers, Shanxi Provincial Decree no. 77 (2008) states that improved measures should be implemented to include all employees of coal enterprises, including migrant workers and workers with work-related injuries, improve

the basic pension insurance policy by expanding coverage, and improve basic medical insurance systems for employees and retirees of state-owned coal enterprises with difficulties.

4.3 POLICY CONCEPTS REGARDING CHINA'S GOVERNANCE

4.3.1 Guiding Ideology

China's governance has been guided through several political theories and concepts over the past decades. Indeed, each policy document analysed in this thesis included a section on the country or province's guiding ideology. Older documents, like Shanxi Provincial Decree no. 21 (2007), drew strong attention to Deng Xiaoping's theory and the 'Three Represents' thought. In comparison to today's Xi Jinping's thought, Deng Xiaoping's theory focused on the quick development of eastern provinces through the vision of 'early and common prosperity'. Such efforts led to uneven development and economic inequality in the country but has led to the transformation of the coastal provinces into today's urban centres (Daekwon, 2017). Moreover, Deng put a strong emphasis on producing low-quality and inexpensive commodities through cheap labour (Daekwon, 2017). Lastly, the Deng era was also symbolised by more arbitrary rules and keeping a lower profile in international affairs (Daekwon, 2017).

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

This era in the second half of the 20th century is also exemplified by the 'Four Modernization' goals that were proposed by Chinese Premier Zhou Enlai in 1964. This concept represented four areas of development that the country focused on: agriculture, industry, science and technology, and the military. This development concept was only implemented under the support of Deng Xiaoping in the late 1970s after the death of Mao Zedong who carried the ideology of the Cultural Revolution, a decade-long period of socio-political chaos and 'impurity purging' to reassert his authority over the

government (Phillips, 2016). The embrace of 'Four Modernizations' after this period led to an important departure towards a stronger emphasis on economic development.

As stated in Shanxi Provincial Decree no. 21 (2007), the 'Three Represents' thought also represents a strong theory supported by the Communist Party of China. Set forth by former Chinese President, Jiang Zemin, in 2000, it presents the three representations that the CPC stands for: 'development of advanced productive forces, orientations of an advanced culture and the interests of the majority of the people of China' (China Internet Information Center, n.d.).

"The guiding ideology of the "Eleventh Five-Year Plan" period.

The province's labor security work should be guided by Deng Xiaoping's theory and the important thought of "Three Represents", guided by the scientific concept of development, and focus on the overall national economic and social development of the province."

Shanxi Provincial Decree no. 21 (2007)

Under Chinese President Hu Jintao (2003-2013), guiding ideologies revolving around the coal industry and energy policy aimed to promote sustainable development, embracing socio-economic development, environmental protection, while promoting energy security in which coal was still perceived as the main contributor.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

"The guiding ideology of the pilot work (2007):

Guided by the scientific concept of development, starting from ensuring national energy security and promoting the sustained and healthy development of Shanxi's local economy, [...]. Long-term mechanism to cultivate dynamic, support economic and social responsibility of the market body, form a conservation and reasonable resource development mechanism, establish coal enterprises to transfer production, coal city transformation and development assistance mechanism, promote Shanxi coal industry as soon as possible into a high rate of resource recovery, safety

and security, reduce environmental pollution, enhance economic benefits, comprehensive coordination and sustainable development path."

Provincial Decree No. 9 (2007)

"Guiding ideology.

In accordance with the strategic deployment of building a new national energy and industrial base, guided by the scientific concept of development, with the goal of cultivating new pillar industries and replacing industries, focusing on resource-based cities and large coal enterprise groups, adjust the industrial structure, extend the industrial chain, build production parks, develop non-coal industries and modern service industries, place laid-off workers from coal enterprises in re-employment, and promote the transformation of development from resource-dependent to innovation-driven."

Provincial Decree no. 77 (2008)

"The central government has clearly put forward the guiding ideology that employment is the foundation of people's livelihood and has made expanding employment and controlling unemployment an important goal of the government's macro-control, clarified the idea of perfecting the social security system, and initiated the pilot work of perfecting the urban social security system. All this provides stronger guarantees for employment and social security."

Provincial Decree no. 21 (2007)

In comparison to Xiaoping Deng's theory, Xi Jinping's thought, first mentioned in 2017 at the 19th National Congress of Chinese Communist Party, is defined as Xi's 'new era' (Daekwon, 2017). Through this thought, Xi Jinping aims to lead a more balanced economic growth and promote industrial innovation in a more dynamic way, such as strengthening digital or smart technologies, instead of just concentrating on inexpensive commodities (Daekwon, 2017). More importantly, Xi's new era is

symbolised by an active participation in international affairs, in comparison to Deng's wish for China to 'bide its time and keep a low profile' (Daekwon, 2017).

Under Xi Jinping's thought, Shanxi's coal industry is expected to follow an 'energy revolution' by reforming the energy management system, raising mine efficiency, modernising coal through the use of updated large-scale coal mines, coal bed methane, and new energy, as well as, promoting energy technology innovation (Provincial Decree no. 67, 2016).

Shanxi Provincial Decree no. 67 (2016) highlights the ideological importance to establish a low-carbon, clean, safe, and efficient modern energy systems for China's energy mix contributing to its green transformation. This includes a focus on:

- Consolidating the foundation of energy supply,
- Encouraging energy technology innovation,
- Developing energy ecological construction,
- Optimizing energy consumption structure,
- Promoting the formation of innovative, green, and coordinated energy systems.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Likewise, Shanxi Provincial Decree no. 49 (2017) includes a guiding ideology that targets to firmly establish and implement the new development concepts by adhering to improving the quality and efficiency of socio-economic development and environmental protection. In terms of energy revolution, the guiding ideology remains to boost energy supply, promote industrial transformation and upgrading, alleviate ecological impact, and encourage international cooperation. In connection with Xi Jinping's thought, such ideologies set a framework to effectuate a substantial breakthrough in resource-based economic transformation and allow the full release of Shanxi into innovation and entrepreneurship.

4.3.2 Fragmented Authoritarianism

In literature, China's governance has long been described with the political concept of 'fragmented authoritarianism', first proposed in 1988. It asserts the diverse interests and demands of different actors in Chinese society, influencing policies made at the centre. This decentralisation is therefore defined by bureaucratic bargaining engendered by strong activists, agencies, international organisations, or local governments pursuing their own initiatives. Such a concept is viewed in a considerably more progressive light than the 'party-state' vision of China's governance, in which the party and the state are now significantly differentiated according to several scholars (Ming, n.d.).

Nevertheless, according to Interview B, (May 18, 2021), any country that is big enough will have some form of fragmentation. He explains that the diversity of interests is always the starting point to illustrate how governance occurs on the ground. Indeed, considering the size of China and its diverse economic development, such fragmentation is normal. A more substantial question that Interview B, (May 18, 2021) reveals is how an energy transition, or a coal phase-out, would happen through a fragmented system. It is understandable that stakeholders may have different interests regarding a coal phase-out, from coal mines, provinces depending on coal economically and coal workers to the global communities, activists, and the Ministry of Ecology understanding the unsustainability of coal and its ecological impacts.

As stated earlier, Interview H, (June 23, 2021), recommended never looking at the energy transition in Shanxi by isolating its governance from other provinces or the central government because China is a country whose central government still holds a considerable amount of power. Despite this, he shared that the provinces must wait for the central Five-Year Plan to develop their own plan but will decide at what rhythm

they wish to do the transition, depending on their capabilities. While Chinese governance is still largely considered a top-down approach, the central government would set national targets that would, then, be broken down into provincial targets, and then into smaller targets for each city.

On a fragmented system, coal SOEs' interests may differ from one another as each owner may have different rights over financial profits, supervising, or investment approvals (Hubbard, 2017). As explained in chapter 3 that SOEs are under the control of different agencies, those rights may be unevenly distributed, affecting the behaviours of these enterprises (Hubbard, 2017). While the establishment of SASAC aimed to consolidate these rights, the fragmented SOE model remain in the right to appoint the top leadership of some important SOEs, which rests with other central agencies, or through different incentives in the stock market (Hubbard, 2017). This fragmentation also plays a role between SOEs' and national and provincial governments' interests due to the regulator role of the state that may decide to transform monopolies according to the central plan, which may not align with the SOE's direct interests or consumers' needs. In the formulation of the analysed policies, it is clearly noted that the national or provincial plans delegate tasks to different agencies and ministries. Fragmentation may also be engendered when numerous agencies or departments are responsible for a task, but their interests may be divergent throughout the operation. As demonstrated in the quotes below, responsibilities are designated to different departments, depending on the policy and its requirements.

"(10) Secure placement of workers in the coal and steel industry to reduce overcapacity. [...]. (Provincial Human Resources and Social Security Department, Provincial Development and Reform Commission, Provincial Economic and Information Commission, Provincial Coal Department, Provincial Finance Department, Provincial SASAC, Provincial Internal Revenue Service, Provincial Land Tax Bureau, and Provincial General Trade Union are responsible)."

Provincial Decree no. 50 (2017)

"(12) Improve the long-term mechanism of employment assistance. [...] (Provincial Human Resources and Social Security Department, Provincial Civil Affairs Department, Provincial Finance Department, and Provincial Disability Federation are responsible)."

Provincial Decree no. 50 (2017)

On another hand, fragmentation would allow for further understanding of issues at a local level. In the context of this thesis, recognising laid-off coal workers' interests throughout this phase-out is necessary to expect a just decarbonisation. Multiple actors with various interests are involved in this energy transition and allowing their participation in policy processes in a coordinated measure may alleviate socio-economic costs throughout the transition.

4.3.3 Ecological Civilisation

On another hand, ecological civilization as the policy position of China's governance is presented in China's constitution as the guiding ideology of the country's environmental policies.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Ecological Civilization was initially presented as a response to ecological damage in China. Today, this ideological framework also presents a common vision for the country's future with respect to ecological modernisation and sustainable development. In the Notice of Shanxi Energy Bureau on Printing and Issuing the Working Plan of Shanxi Province for Advancing Coal Consumption Reduction and Equivalence Substitution (Provincial Decree no. 753, 2019), the guiding ideology refers to ecological civilization as one of the main political concepts to implement regarding coal consumption reduction.

"Guiding Ideology:

Guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, we will fully implement the spirit of the 19th National Congress of the Communist Party of China and Xi Jinping Thought on ***Ecological Civilization****, firmly establish a new concept of green development, continue to adopt [...] the work of total coal consumption control, coal equivalence and reduction substitution as an important way to strengthen macro-control, strictly control the quota, reduce the existing stock, improve energy efficiency and clean substitution, optimize energy structure, promote clean and efficient utilization of coal and improve energy utilization level, with the focus on reducing coal consumption of high energy consumption, and industries with excess capacities, thus ensuring both safe and stable supply of energy and completion of the annual goal of coal consumption quota reduction across the province."*

Shanxi Provincial Decree no. 753 (2019)

Written in the Chinese constitution in 2018, ecological civilization can be associated with the three elements of sustainable development – environmental protection, social equity and economic growth – with additional specific dimensions relating to China's governance and political civilisation (Kuhn, 2019). In its ideological sense, ecological civilisation considers that nature should not be exploited without constraint but is rather part of life. Used as a reference, this concept guides China's political making in formulating policies and pledges in accordance with ecological modernisation and environmental protection (Kuhn, 2016).

With visions such as the Beautiful China Initiative, ecological civilization represents a foundation to what a desirable future China pledges to become. In the context of this thesis, the carbon neutrality pledge, being guided by the ecological civilization framework, represents an opportunity for the Chinese Communist Party to establish a development vision through an energy revolution. As coal has long been considered a major contributor to air pollution, efforts to phase-out the industry may emphasise the guiding role that China aims to represent, from its top-down governance

approach, in developing its country based on innovation, economic growth and environmental protection. While the concept also allows for bottom-up actions, it promotes participation and collaboration with respect to how the transition is occurring and the promotion of labour unions (Kuhn, 2019). Such efforts may also change the global perspective of China in terms of its place in environmental politics and in the green and renewable market.

4.4 CHAPTER SUMMARY

This first section of this chapter concentrated on the policies available to coal workers faced with unemployment due to the progressive coal phase-out. This chapter aimed to answer the second sub-question focusing on the policy and policy concepts available to support coal workers in Shanxi's province throughout the progressive coal phase-out. The content analysis showed that numerous types of policies are available to them throughout unemployment and re-employment.

Firstly, the chapter described policies regarding unemployment insurances which included basic insurances, insurance for people with employment difficulties such as low-security families or older people, which included early-retirement options. Secondly, policies revolving around re-employment opportunities were described which involved vocational skills training opportunities and improvement of human resources services to ease accessibility to employment and encourage labour transfers. The third section presented efforts in promoting employment in the province. As described in Chapter 3, rural coal workers are particularly vulnerable considering the lack of employment opportunities in the rural areas, thus, such efforts are considerably needed. The policy documents mentioned several times entrepreneurship promotion and efforts to diversify employment in the province, which is considerably dependent on the coal industry today. This section found that entrepreneurship training and guiding was a strategy noticeably used in the province to create employment. Lastly, different

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

types of subsidies available to laid-off workers were explored. It was determined that various types of subsidies are available to different demographics of workers in consideration of their situation and if they classify as 'persons with employment difficulties'. For instance, subsidies for job-seeking and entrepreneurships or subsidies for vocational training are available. The social security system was also discussed as it considerably evolved over the past decades, through improving certain areas such as expanding insurance coverage or reforming institutions.

In section 4.3, policy concepts regarding China's governance were analysed in consideration of the coal phase-out and the energy transition. The content analysis found that the guiding ideologies of the issuance provenance were clearly stated at the beginning of each policy decree. Depending on the topic and date of the policy, the guiding ideologies were based on China's most significant political ideologies such as Xi Jinping's thought, Deng Xiaoping's theory, or ecological civilization. Such concepts provided frameworks to the understanding of the necessity for an energy revolution while minimizing socio-economic costs. The political concept of fragmented authoritarianism was also described in context of this thesis for a further understanding of China's decentralisation and the effects on the energy transition. Such ideas are important to comprehend the further analysis of the available support policies studied in chapter 5.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

CHAPTER 5: ENVIRONMENTAL JUSTICE AND JUST DECARBONISATION OF SHANXI'S COAL INDUSTRY

CHAPTER OUTLINE

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

5.1 CHAPTER INTRODUCTION

This chapter will discuss the three types of environmental justice in relation to the coal phase-out in Shanxi: distributive justice, procedural justice, and justice as recognition. In the context of Shanxi's coal phase-out and the ramifications of the coal-fired power plants' closures on the laid-off coal workers, this chapter will attempt to determine if Shanxi's policies mention the several keywords associated with a 'just decarbonisation' according to the human rights-based approach and the environmental justice framework. With the analysis led on the policies described in Chapter 4, this chapter will separately examine the three types of environmental justice in accordance with the human rights involved with the coal phase-out in Shanxi.

Firstly, within this context, the 'evidence' dimension of distributive justice ought to determine what kind of support is distributed, if coal workers are equally benefiting from this governmental support and on what principle is this support being distributed (see Section 5.2). Analysis on the distributive justice component, based on the human rights-based approach, will be undertaken through the right to decent work (ILO, n.d.) and the right to adequate standards of living (Article 25, UDHR).

The second type of environmental justice discussed in the section 5.3 of this chapter is procedural justice. It aims to answer whether coal workers are included in the policy processes, and if they can have access to information regarding the coal phase-out or policy support available to them. The right to participation (Article 19, UDHR) and right to access information (Article 19, UDHR) are the rights that will be used through the human rights-based approach in order to determine if Shanxi's policies are in favour of a a just decarbonisation.

Lastly, justice as recognition, discussed in section 5.4, involves issues of misrecognition. Within this context, this section regards vulnerable actors and aims to determine if their issues are valued and recognised within policy documents. The human

right of being free from discrimination (Article 2, UDHR) is used as a framework to examine the extent of recognition. All three perspectives of environmental justice will help determine whether Shanxi's policies mention the keywords associated with a a just decarbonisation of its coal industry with respect to its workforce.

5.2 DISTRIBUTIVE JUSTICE

5.2.1 Right to Decent Work

Within distributive justice, the right to decent work is derived from the International Labour Organisation's definition of 'decent work':

> *'Decent work sums up the aspirations of people in their working lives. It involves opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men.'*
>
> International Labour Organisation (n.d.)

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Within this definition, a few important keywords emerge that are relevant to the definition of distributive justice. While aiming to determine the level of justice in the distributive aspect, the definition of 'decent work' brings up areas revolving around fair income, social protection, social integration, and equality of opportunity. Through distributive justice, such aspects should be equally experienced by coal workers throughout unemployment and/or re-employment.

5.2.1.1 Fair Income

In the context of Shanxi's coal phase-out, the keyword of 'fair income' was chosen to determine the individual financial stability of coal workers working in the

coal industry and while being re-employed by another industry after their lay off. Through a distributive justice lens, a fair income would imply that all types of coal workers are equally benefiting from adequate revenues as coal workers and in their new industry. As this component does not involve the unemployment processes and support policies, this section is not directly related to the research question of this thesis but still remains insightful in order to understand coal workers' livelihood and the ramifications of the transition.

According to Interview A, (May 13, 2021), the significant demand for energy in the early 1990s had driven millions of individuals in coal mining, considered as a flourishing sector. The interviewee adds that coal mining – or the 'black gold' – was appraised as an extremely lucrative business and private mine owners took that opportunity to increase their wealth significantly. Today, most of the major coal employers are owned by SOEs but coal workers, considering the tough and low work safety in underground mining, make a 'decent or even good income' and their jobs can be perceived as an 'attractive employment for most of the coal workers'. Precisely, in 2005, the average monthly salary in state-owned coal mines was 1,816 yuan and the national average monthly wage was approximately 1,500 yuan in the same year (World Bank, China Coal Information Institute, 2008, National Bureau Statistics of China, 2019). The national average wage has dramatically increased over the past year to almost 7,000 yuan per month in 2018 (National Bureau Statistics of China, 2019). Average wages in the mining industry have proportionally increased as well but are now slightly below the national average. Interviewee A (May 13, 2021) believes that, considering these adequate income levels, there is not any kind of 'self-motivated drive to leave the industry' among coal workers, especially in view of the workers' low mobility and the need to gain completely new skill sets to join another industry.

In the 'Notice of the General Office of the Shanxi Provincial People's Government on the Issue of the 11th Five-Year Plan for the Development of Labor and

Social Security in Shanxi Province' published in 2007, great importance was given to promoting harmony and stability in labour relations. It includes 'improving the macro-control mechanism of wage income distribution and standardizing the order of wage income distribution in enterprises'. According to this Provincial Decree, the wage of most workers had greatly increased by about 8% per year during the 11th Five-Year Plan period (2006-2010). In this notice, Shanxi's Provincial Government engages itself to further improve macro-guidance systems in wage guidance, labour market wage guidance, and gradually raise the minimum wage standard in accordance with the level of economic development.

"We will continue to promote the transformation of the wage decision mechanism of enterprises, guide enterprises to vigorously implement the system of collective bargaining on wages, and establish and improve the mechanism for normal wage growth of employees of enterprises. We will improve the rules and regulatory mechanisms for wage income distribution of state-owned enterprises, and strengthen the supervision of the income distribution of state-owned sole proprietorships and state-controlled enterprises in high-income monopoly industries."

Shanxi Provincial Decree no. 21 (2007)

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Through other provincial decrees such as the 'Opinions of the Shanxi Provincial People's Government on further speeding up the re-employment of laid-off workers', numerous support packages are provided to different demographics of coal workers in order to protect their basic livelihoods and provide a contribution on their wage. On a national level, the Notice of the Ministry of Human Resources and Social Security of the Ministry of Finance on the issuance of the Interim Measures for the Administration of Employment Assistance Funds also engages itself to provide 'subsidy standards in accordance with the local minimum wage standards'.

Regarding distributive justice, the code of 'fair income' was not identified to a large extent considering the focus on unemployment in the documents analysed. As being part of the 'decent work' definition, this code served to provide a general insight on coal workers' income situation. According to the available information, coal workers seem to receive an adequate wage in consideration of their work conditions. It is understandable that the phase-out of the coal industry will disturb their living conditions which should be supported by policy support packages examined in the next sections.

5.2.1.2 Social Protection for families

The definition of 'decent work' refers to 'social protection for families'. In the context of a coal phase-out, families of laid-off coal workers would also be severely impacted if they are not able to find an alternative income. Social protection for families could be defined as subsidies, social security, or allowances and represents a substantial component for a just decarbonisation. This section aims to determine the level of justice within available policies in protecting coal workers' families in the consideration of forced unemployment.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

In the policy analysis conducted, the terms of 'zero-employment family members' or 'low-security families' were mentioned several times. After a laid-off, 'zero-employment family members' can be defined as families who relied solely on the income of the coal worker, which leaves the family incomeless. In the 'Shanxi Provincial People's Government on the current and future period of entrepreneurial employment to do a good job in the implementation of the opinion' (2017), the Provincial Government engages itself to adjust the scope of people with 'employment difficulties' to include zero-employment family members and other vulnerable actors as key targets of employment assistance. Moreover, in the 'Implementation Opinions of the People's Government of Shanxi Province on Promoting Employment' (2019), it is

written that zero-employment family members will be given a living allowance subsidy during the training period that the laid-off family member will undertake. This document includes a section that aims to strengthen the social security link in which 'families meeting the minimum living security conditions' are included in the minimum living security aid. Subsidies for 'low-security families' are described in 'Notice of the Ministry of Human Resources and Social Security of the Ministry of Finance on the issuance of the Interim Measures for the Administration of Employment Assistance Funds', which includes the subsidies for public welfare posts and the subsidies for job-seeking and entrepreneurship.

Through a distributive justice lens, the term of 'social protection for families', meaning that affected families can equally benefit from social services and financial help, is represented within the provincial and national policies. It is, although, not a component that is frequently found in the documents as it is usually only mentioned while considering people with 'employment difficulties'. Compared to laid-off coal workers, families are not directly considered among the most affected actors of coal mine closures but their vulnerabilities in case of social insecurity is recognised and addressed.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

5.2.1.3 Re-Employment Opportunities

Another key term of the definition of 'decent work' is social integration into a new workplace which firstly involves re-employment opportunities in the context of a coal phase-out. As described in Chapter 4, there are numerous policies available to promote employment, entrepreneurship, training, transfers to other industries, and improve re-employment services. Those kinds of services are crucial to expect a just decarbonisation of the coal industry and enables the laid-off coal labour force to be re-employed and maintain adequate standards of living.

According to an Economist from the World Bank, a variety of measures have already been introduced to provide support and training to rescale workers into new industries or relocate them from one coal mine site to another. Indeed, as many outdated small-sized coal mines are being closed or private coal mines are being merged with state-owned larger coal mines, coal workers from such coal mines are being transferred to larger coal mines as much as possible. While coal capacity is reducing but still growing, the number of coal workers employed by the industry has drastically reduced over the past decade. Precisely, the rate of unemployment has increased from 1.2 to 3.3% from 1990 to 2018 in Shanxi (National Bureau Statistics of China, 2018). To find new employment, laid-off coal workers must be trained to gain new skills and to enter a new industry that requires completely different sets of skills. As highlighted by most interviewees, coal workers in Shanxi tend to have lower education levels, especially elders, which makes re-employment services such as education and skills necessary.

Opportunities within green employment, such as the renewable sectors, were amply discussed with interviewees. Indeed, according to Interview B, (May 18, 2021), most large electricity or utility companies do fossil fuels and renewables which makes transfers easier, such as the Shanxi Coal International Energy Group which has made significant investments in solar. Nonetheless, special skills and expertise are required to enter the renewable sectors and cannot be acquired in a couple of months. Most coal workers are actually trained to do something quite different from their previous career. As a matter of fact, according to the interviewee, some of them open a small shop because they can receive compensation schemes, or some others go into the tourism industry depending on their personal networks, families and friends. Interviewee B adds that the training provided by the government may work for some people if the skills learnt are related to the job sought later on, but it cannot guarantee a job. According to an Economist at the World Bank, the skills acquired during the training are often very specific, therefore, finding a job with the use of these specific skills can often be a challenge. In several cases, finding employment in the same province is a difficult task

considering the increasing unemployment rate, inadequate training, and the lack of accessible opportunities. One solution for workers unable to find employment is to relocate to another province which, however, requires coordination between different provinces and cities that is not yet in place. As previously explained, coal workers tend to have low mobility due to several social, cultural reasons and economic constraints, which considerably decreases their chance of finding new employment.

Most interviewees also strongly emphasised the disparities in compensations between workers from SOEs and those from private firms. Indeed, the compensation and relocation programs are much more secure and common for workers in state-owned coal mines as it is supported by national or provincial policies.

In the formulation of the policies, the code of re-employment opportunities, such as training, promotion of employment, and re-employment services, was the most retrieved from the policy analysis out of all codes. As described in Chapter 4, numerous services are available to workers of all types to improve employment assistance, ensure social stability, strengthen policy support, improve the policy of subsidies for vocational training, and strengthen the education and training of coal mine personnel. The interviewees were more aware of the difficulties in the implementation of these policies, but the high frequency of this component shows that the government understands the importance of promoting re-employment opportunities on a socio-economic level. Regarding the definition of decent work and distributive justice, the formulation of the policies clearly recognises various vulnerable actors and offer solutions on different perspectives. Inevitably, numerous socio-economic difficulties persist in the implementation of such policies, but service improvements are constantly being developed to enable this labour force to re-enter the workforce and maintain adequate living conditions.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

5.2.1.4 Equality of Opportunity and Treatment

In the definition of 'decent work', it is included that all men and women should benefit from equal opportunities and treatment in the workplace. Considering that the mining sector is largely dominated by men in China, the gender perspective will be analysed in the 5.4 Justice as Recognition section. This section will focus on the largest disparity issue mentioned in the policy documents. Indeed, with reference to distributive justice and equality of opportunity, a real urban-rural divide still persists on a national and provincial level.

The State Council Decree no. 42 (2017) 'Supporting Shanxi to Deepen Reform and Promote Energy and Economic Transition' emphasises the need to 'adhere to equality of rights, equal opportunities and equal rules, and abolish unreasonable provisions on all forms of non-public economy'. As a matter of fact, through distributive justice, acknowledging differences in vulnerabilities among coal workers and providing appropriate treatment are essential to expect a just decarbonisation of the coal industry. In the policy analysis conducted, the most mentioned area in enforcing equal opportunities is related to the divide between rural and urban workers. According to Interview B, (May 18, 2021), rural workers, mostly coming from private companies, often search for temporary and informal jobs and are, therefore, less likely to receive proper protections after their laid-off, in comparison to employees from state-owned enterprises. Moreover, rural residents are also most likely to undergo relocation programs due to changes in the power sector, such as building solar parks, which can severely affect their livelihoods.

On a national level, the coal is not for rural use as it is consumed by provinces with higher powering needs, such as Eastern Provinces. However, despite being a high carbon intensive province, Shanxi's GDP is still lower than the national average, and far below the well-developed provinces in the East Coast. The high production of coal in Shanxi has inevitably tremendously increased pollution levels over the past decades,

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

where Eastern urbanised provinces benefit from it. This clearly shows how the rural-urban divide still persists in China and, recently, a huge population outflow is being witnessed in provinces like Shanxi. Indeed, according to a Professor at James Cook University, young people and workers are very likely to migrate to other cities to seek opportunities, especially after being laid-off. Despite their low mobility, the amount of migration that is occurring in China is phenomenal, according to this Professor. There are millions of people migrating from the rural sector to the urban areas seeking opportunities in the manufacturing industry, which ultimately is more valuable for the country than the primary industry. According to the Professor, this reason may be why the government has not counteracted this migration wave as much as expected. Indeed, according to Interview B, (May 18, 2021), this huge population outflow exacerbates existing inequalities because human capitals are fleeing these areas and creates a long-term issue between provinces.

In order to encourage rural workers to stay in their provinces, numerous policy support packages discussed in Chapter 4 are available to them. Additionally, a special attention is brought up in the documents to emphasise the need to promote the integration of urban and rural development. As a matter of fact, in the State Council Decree no. 42, the government mentions the engagement to 'further promote the construction of a new socialist countryside, make good efforts to protect traditional villages, promote the extension of basic public services to rural areas, comprehensively improve rural production and living conditions, and build happy homes and beautiful liveable villages.'. It also refers to improving the system of equal employment for urban and rural workers to receive 'equal public employment services and inclusive employment policies'. Rural residents' needs and unique situations are clearly displayed in the Decree, considering employment transfer, employment services, policy support, as well as giving priority to family farms, professional large households, and farmers' cooperatives to promote the employment of poor rural households. To develop rural countries, the document insists in 'vigorously developing characteristic county

economies, charming towns, rural tourism and rural service industries, and creating space for rural workers to transfer employment in the near future', as well as 'cultivating and developing local characteristic labour service brands, expand organized labour export, and promote the transfer of rural labour force to employment'.

Likewise, during the 11th Five Year Plan, Shanxi's Provincial Government committed to coordinate urban and rural employment and further improve the employment environment for farmers and create more employment opportunities for them by promoting interregional labour cooperation, improving management and service measures and forming a system of equal employment for both urban and rural workers.

"The formation of information guidance as a leader, vocational training as the basis, cooperation between regions, schools and enterprises as a link between the new mechanism of labor export, to guide the smooth and orderly transfer of surplus rural labor force. We will vigorously carry out the export of rural labor services in poor areas and implement employment poverty alleviation. We will vigorously develop the county economy and actively expand the employment space in rural areas."

Shanxi Provincial Decree no. 21 (2007)

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

The need to introduce integrative policies throughout Shanxi's decarbonisation is necessary to minimize risks and ensure social sustainability. As demonstrated in this section, the most predominant issue presented in the policies regarded the rural-urban divide that is quite singular to Shanxi's province. Indeed, this northern landlocked province has a large proportion of rural coal miners who have less access to opportunities due to their low mobility and the competitiveness in urban high developed provinces. Understood as a national and long-term issue, the government has formulated policies in the aim to promote employment opportunities for rural workers in their provinces. The coal mine sector is highly regarded in this issue as it is being progressively phase-out and the laid-off coal labour force represents an important asset

that must be recognised and supported. In connection to distributive justice and the definition of decent work, the promotion of equal opportunities between rural and urban workers is recognised and addressed in the formulation of policies.

5.2.2 Right to Adequate Standards of Living

Another important component of distributive justice regards the right to adequate standards of living, Article 25 of the Universal Declaration of Human Rights:

"Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control."

Universal Declaration of Human Rights, (1948)

In the context of Shanxi's decarbonisation and the ramifications of the coal workforce, this article is relevant while considering the 'right to adequate standards of living in the event of unemployment'. Undeniably, while facing unemployment, affected individuals should equally benefit from unemployment security. The next section explores formulated policies available to coal workers to support them through unemployment.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

5.2.2.1 Unemployment Security

The policy analysis has shown multiple different financial support packages available to coal workers from state-owned enterprises in the form of subsidies, unemployment insurance assistance, and improvement of the social security system discussed in more details in Chapter 4. In the aim of alleviating poverty, documents like

the State Council no.42 emphasises the need to transform and upgrade financial support in Shanxi.

The 'unemployment security' was the second-most retrieved code in the analysis, including all sorts of aid furnished to laid-off coal workers throughout unemployment. Forms of financial support are available to numerous types of workers, differing from age, family situations, or disabilities. On this level, a just decarbonisation seems to be met when regarding the formulation of these policies. However, an important point that was discussed earlier in the re-employment opportunities regards the private sector. Indeed, according to Interview B, (May 18, 2021), coal workers from private companies, depending on their employers, do not receive this kind of proper protection after being laid-off. Compared to coal workers from state-owned enterprises, workers from private companies do not receive this governmental support. Interview A, (May 13, 2021) explained that the coal industry was seen as a highly lucrative business and mine owners became significantly wealthy. According to him, the general society perception of private mine companies shows that, mixed with this wealth and potential corruption, such companies must pay themselves if a phase-out is enforced. In this case, all interviewees agree that coal workers from private companies would be hit the hardest if their employers decide not to support them through unemployment.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

"Among these private companies, many of the employees are actually rural workers who are trying to seek temporary or informal jobs in this area. When they are laid off, they don't have this kind of proper protections like employees from state owned enterprises, who receive quite generous compensations and also rescue schemes."

Interview B, (May 18, 2021)

Nonetheless, numerous interviewees implied that, as of today, private mine companies are almost non-existent in Shanxi. As a matter of fact, Interview C, (May 26, 2021) referred to a project initiated with a group of experts in Shanxi where they realised

that almost all the coal mines and factories are SOEs now. Historically, numerous private coal companies existed and emerged when coal demand peaked but in recent years, private-owned coal mines, which are often smaller, merged with bigger ones, which are SOEs. Today, dominant coal mines and factories are SOEs. The reasons for such coalitions were mostly due to the closure of smaller and outdated coal fired-power plants that were more polluting, less efficient and did not follow updated security criteria. According to a Project and Partnership Officer at the French Agency of Development, there was a significant restructure of Shanxi's coal industry in 2011, where all mines whose capacity under 1.2 million tons of coal per year were forced to close or to be acquired by bigger societies.

It is clear that policies supporting coal workers faced with unemployment due to the coal phase-out are formulated and existing. However, the interviews brought attention to the private sector perspective and the effects on workers from private companies. Despite the almost non-existence of private coal companies as of today, the right to adequate standards of living in the event of unemployment should be enjoyed by workers from any type of companies, which goes beyond the coal industry. In regard to this thesis, the large majority of laid-off coal workers receive adequate support from the government throughout unemployment which supports a just decarbonisation.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

5.3 PROCEDURAL JUSTICE

5.3.1 Right to Participation

Within procedural justice, the right to participation or right to expression brings attention to the coal workers' right to express their views and voice their opinions regarding policy processes and decision making. Indeed, procedural justice focuses on the formulation and formulation of participatory and including policies. The right to

participation is the 19th Article of the Universal Declaration of Human Rights is described as:

"Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers."

Article 19, Universal Declaration of Human Rights

Out of all three categories, procedural justice was the one with the fewest codes retrieved from the policy documents. Regarding the right to participation, policies should include the importance to include workers and affected stakeholders in decision making. Surely, while considering unemployment insurance for instance, the receivers of such funds should be able to voice their opinion and specific needs. It is only through this process that their socio-economic needs can be recognised into maintaining adequate living conditions throughout unemployment and re-employment. A few policy decrees referred to the right to participation and the importance to 'fully listen to the opinions of workers'.

"In the process of programming, enterprises should carry out democratic procedures in accordance with the law, establish consultation and communication mechanisms for workers at all levels, fully listen to the opinions of workers, and guarantee workers' right to know, participate, express and supervise."

Ministry of Human Resources and Social Security, Decree no. 32 (2016)

Right to participation can be associated with the promoted operation of labour unions. According to Interview C, (May 26, 2021), labour unions do exist in China at the firm level and serve as a break between the government and the workers. According to him, it is a very efficient way for workers to share their views and work with the government to discuss issues such as replacement plans for each affected individual or compensation schemes.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

"They develop this customized kind of plan to help the workers and create appropriate support. This is the kind of mechanism where they listen to the voice, complaints and other requests from the coal workers to be heard and addressed."

Senior Economist, World Bank

From a procedural justice perspective, the few available quotes in policy documents regarding right to participation exist but are limited. Labour unions seem to show some kind of efficiency as a platform used to voice concerns and needs, although they all fall into the All-China Federation of Trade Unions (ACFTU), a national institution which directly reports to the CCP and its sub-levels, as independent labour unions are illegal in the country (L&E Global, 2021). Taking into consideration the support policy packages described in Chapter 4, numerous different actors are recognised, and their issues and needs are addressed through adequate policy support. Participatory policy processes could be one of the reasons for this high involvement in recognising needs of laid-off workers. Such processes must be continuous as needs and concerns evolve over time which is why improvements of current systems must be constant to achieve a just decarbonisation.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

5.3.2 Right to Access Information

The second right part of procedural justice is the right to access information. In order to participate appropriately in policy processes, affected actors must be able to access adequate information in relation to the policy implemented. Regarding the coal phase-out, coal workers should be able to know when they will be laid-off, under which conditions, what will be offered to them, how to access such support, and what their options are on a longer term. Like the right to participation, the right to information is based on Article 19 of the Universal Declaration of Human Rights.

In several policy documents such as the 'Notice of the General Office of the Shanxi Provincial People's Government on speeding up the work of the coal industry to resolve excess capacity' (2016), the last sections would be dedicated to adequate publicity and society's guidance. In this Provincial Decree, the responsibility to promote the right to access information is given to the municipal governments and also provincial coal group companies:

"*Municipal people's governments and provincial coal group companies should, through the press, radio, television, the Internet and other media, widely and deeply publicize the significance of resolving coal overcapacity, respond to social concerns in a timely manner, patiently and meticulously do a good job of settling the ideological work of workers, do not avoid problems, do not inflame contradictions, strive for workers to understand and actively participate in the timely promotion of advanced experience practices, and strive to form a good atmosphere of public opinion.*"

Shanxi Provincial Decree no. 114 (2016)

Moreover, the 'Implementation Opinions of the People's Government of Shanxi Province on Promoting Employment' (2019) reinforces the aspect of information accessibility regarding policy support availability which is more focused on governmental action.

"*All localities and departments should carry out extensive policy publicity activities, and promptly announce to the society the policy list, application procedures, subsidy standards, service organizations and contact information, supervision and complaint calls, and go deep into the enterprise to promote policies, understand difficulties, and do a good job of assistance.*"

Shanxi Provincial Decree no. 2 (2019)

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

With reference to the formulation of these policies, the need for appropriate access to information required for participation is recognised. Through labour unions previously discussed and the accessibility and publicity platforms, coal workers have access to information regarding their employment and social support available to them in the event of unemployment. Codes retrieved from the procedural justice category were limited but still mentioned. Quotes concerning participation or information were always retrieved in the last section of the policy documents, representing a standardised structure and its standardised recognition. This shows that procedural justice is an understood term within provincial and national policies formulation, supporting a just decarbonisation.

5.4 JUSTICE AS RECOGNITION

5.4.1 Freedom from Discrimination

The last category used from the environmental justice framework is justice as recognition. It involves issues of misrecognition and aims to determine who is valued and recognised throughout policy processes. In this particular context, all demographics of coal workers, regardless of their age, gender, or vulnerabilities, should be valued and supported. In previous sections, issues of recognition regarding the rural and urban divide or the private sector were mentioned. This section will focus on the different demographics of coal workers that may be misrecognized or more vulnerable to the transition. Through the human rights-based approach, this analysis is based on Article 2 of the Universal Declaration of Human Rights:

Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status. [...]

Article 2, Universal Declaration of Human Rights

5.4.1.1 Age Perspective

The first predetermined dimension of potential misrecognition relates to age. In the case of coal workers, older workers are more vulnerable to the coal phase-out considering their low mobility and the difficulty to find reemployment. As explained in Chapter 4, older laid-off coal workers have access to numerous insurances and options. The main service discussed by all interviewees is the early-retirement system where workers whose retirement age is in less than five years from the age of lay-off can withdraw from the enterprise early and benefit from various types of insurance during the time of retirement (Shanxi Provincial Decree no. 3, 2005).

From the formulation of the policies, older workers' needs are considerably recognised through basic old-age insurance, basic living expense compensations, medical insurances, or social insurance premiums. The enterprise' responsibilities are clearly defined with respect to what kind of compensations and insurances they must cover in case of closure or bankruptcy. Nevertheless, as discussed before, such compensations seem to only protect workers from state-owned enterprises.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

"Among them, for state-owned special hardship enterprises, the local government adopts a variety of financing channels to protect their basic livelihood, according to the local average social wage of 60% of the previous year as the contribution base to pay social insurance premiums. During the period, if an enterprise goes bankrupt or is restructured, it shall be implemented in accordance with the relevant policies of the state and the province."

Shanxi Provincial Decree no. 3 (2005)

Among older workers, rural older workers were also recognised through a rural old-age insurance established during the 11th Five-Year Plan which aimed to protect rural older communities, as well as improving management services and levels

of protection in the countryside. As previously explained, a significant part of the coal workforce is older considering the early 1990's demand rise. Those workers who entered the workforce during this time, due to their low mobility, have more likely stayed in the coal industry during all this time. Faced with current policy phase-outs, these older workers have not had other kinds of work experience and aiming to be re-employed is a real challenge. Such social insurances are a necessity, and the introduction of the early-retirement system shows the understanding that these workers have a low chance of being re-employed, despite not having reached the retirement age yet. Such a system may be more realistic than only implementing compensations and re-employment opportunities in the urge to find these workers a new job. Such recognition is important to enable a just decarbonisation and maintain adequate living conditions.

5.4.1.2 Gender Perspective

Considering a coal phase-out, gender can play a role on how vulnerable an individual can be. According to Interview C (May 26, 2021), the majority of coal workers is older and are males. The male-dominance in this industry is due to the work being considerably tedious, manual, and hazardous. The interviewee adds that this is the case, not only in China but also in coal-dominated European countries like Germany or Poland.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

For the reason of being a male-dominated industry, the gender issue is rarely mentioned. In the policy documents retrieved, zero codes in relation to gender were found, apart from maternity insurances as a general system of labour policy and subsidies. In the World Bank loan, 'Shanxi Energy Transition and Green Growth Development Policy Operation', not yet approved, women's issues are recognised with regard to increasing the coverage of green energy and ensuring positive social impacts. In society, according to Interview B (May 18, 2021), women usually face bigger

pressure to raise the child of the family and may face additional difficulty in maintaining adequate standards of living after a lay-off or during an energy transition. Despite women not being largely represented in the coal industry, policy support focusing on women's living conditions should be formulated to prevent livelihood disparities in any industries.

5.4.1.3 Workers with Employment Difficulties

In the policy documents, workers with 'employment difficulties' are defined by being difficult to place, of old-age, being a zero-employment family member, suffering from low insurance, long-term unemployment, and minimum living security, being a migrant worker, or a worker with disabilities or work-related injuries. The term 'employment difficulties' is defined differently from documents to documents but in most cases, it regards workers who are older, disabled, or are part of a low-security family.

As described in previous chapters and sections, numerous policy support packages are available to workers in difficulties, with respect to their age or family situation. The term 'employment difficulties' includes all potential vulnerabilities to provide employment support and unemployment insurances.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

"For special hardship enterprises, the government shall pay three social insurance premiums for old-age pension, medical care and unemployment in accordance with the original financing channels and prescribed standards, and for laid-off workers who are living in difficulties, they shall enjoy the minimum living security of urban residents in accordance with the provisions."

Shanxi Provincial Decree no. 3 (2005)

"From January 1, 2019 to December 31, 2020, people with employment difficulties and zero-employment family members will be given a living allowance subsidy during the training period."

Shanxi Provincial Decree no. 2 (2019)

According to the documents, this unemployment security can be received if the individual applies 'for identification of persons with employment difficulties'. This means that laid-off workers who may encounter employment difficulties due to the reasons listed previously can apply and register at their public employment service institutions and thus receive compensation and financial aid if they are eligible.

"Unemployed persons can register for unemployment at public employment service institutions in their place of residence, and apply for local employment and entrepreneurship services, employment support policies, and preferential tax policies for entrepreneurship and employment of key groups. Among them, workers who are older, disabled, and subsistence allowance families can apply for identification of persons with employment difficulties in their permanent residence and enjoy employment assistance."

Shanxi Provincial Decree no. 2 (2019)

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

The commonly used term 'employment difficulties' in policy documents shows that vulnerable actors are recognised throughout this transition. It is understood that not all laid-off workers will be affected similarly and there are inherent inequalities of opportunities that must be addressed in policy formulation. Compared to other industries, the coal workforce is particularly affected by employment difficulties considering their general lower mobility, older age, and lower educational levels. Such a recognition is crucial to the proper transition out of coal when a tremendous amount of people will lose their employment. With reference to what was analysed in the formulation of the documents, it is clear that workers with employment difficulties are

recognised in respect to the human rights-based approach used and the definition of justice as recognition.

5.5 CHAPTER SUMMARY

In conclusion, the three types of environmental justice are respected to different extent among the support policies available to laid-off coal workers. As demonstrated in Table 6, distributional justice is the category with the most retrieved codes, especially through the codes of 'social integration' and 'unemployment security' that are largely represented in the documents. Certain codes such as 'social protection for families', 'age' and 'equality of opportunity' could be associated with the 'employment difficulties' code which included such terms in its definition.

Table 6: Predetermined Codes and Categories in Policy Analysis

Categories	Codes
Distributional Justice (174)	Right to decent work - Fair wage (7) - Social Protection for Families (9) - Social integration/Re-employment Opportunities (81) - Equality of opportunity (18) Right to adequate standards of living - Unemployment Security (64)
Procedural Justice (11)	Right to participation (4) Right to information (9)
Justice as Recognition (57)	Freedom from discrimination - Age (25)

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

	- Gender (2) - Employment difficulties (30)

The analysis gives a clear understanding that Shanxi's policies mention the keywords respecting the just decarbonisation concept in the context of laid-off coal workers. In connection to distributive justice, the right to decent work helped understanding that numerous policies are available to workers seeking re-employment. As a matter of fact, opportunities of training, entrepreneurship promotion, training subsidies, diversification of employment are available and promoted in the province. The right to adequate standards of living and the unemployment security code helped determine the policy subsidies available to different types of laid-off coal workers. It was concluded that multiple different options are available to workers seeking unemployment security such as insurances and subsidies. Nevertheless, the interviews revealed that workers from private enterprises were not supported, and all policy support analysed accounted for workers from SOEs. Such information is relevant to the understanding of what a just decarbonisation means. In the particular context of Shanxi, other interviewees shared that private coal enterprises do not exist anymore in the province as they have merged with bigger SOEs in recent years. Regarding other disparities, the 'equality of opportunity' code revealed that rural workers' needs and issues were recognised and additional support was distributed to them in understanding of their low mobility.

Procedural justice was the category with the least codes retrieved as expected. Such differentiation can be understood as this category does not require an extensible description in comparison with other categories that require clear enunciations of the policies offered. Despite being limited, aspects of procedural justice are not inexistant and levels of recognition are presented. Certain documents and interviewees expressed the importance of labour unions and platforms for participation and information accessibility regarding the coal phase-out.

While it focused on different demographics, justice as recognition aimed to determine if misrecognized actors were valued. In this category, the codes used focused on age, gender and employment difficulties which symbolised actors most vulnerable to finding re-employment. Likewise distributive justice, policies supporting such actors were extensively described, apart from the gender perspective in consideration of the male-dominance in the coal industry. A strong attention was given to supporting elderly as a significant part of the coal workforce is older. By this standpoint, the term 'employment difficulty' is largely recognised in policy documents and was defined as regrouping all individuals with difficulty of re-employment such as elders, people with disability or work-related injuries or zero-employment family members. As stated, such recognitions are necessary to expect a just decarbonisation that respects and understands workers' needs and addresses them through adequate and sustainable policy support packages. The policy analysis conducted in this chapter solely covered the policies' formulation rather than the implementation of these policies. To triangulate date and further extend this work, it would be recommended for future research to conduct an analysis on the actual implementation of these policies by interviewing coal workers to understand their actual experience with support policies. This analysis allows the comprehension of what the central and provincial governments are formulating on a policy level, in relevance with which individuals are recognised, the extent of support, and what ideologies are followed. Understanding the workers' experiences with such policies would allow a deeper and more representation of Shanxi's decarbonisation.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

CHAPTER 6: CONCLUSION, DISCUSSION, AND RECOMMENDATIONS

CHAPTER OUTLINE

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

6.1 CONCLUSION

This thesis aimed to determine how just are China's policies for Shanxi's decarbonisation in the context of its 2060's pledge for national carbon neutrality. The analysis was divided into three sub-questions allowing a more detailed focus onto specific areas and issues.

The first section focused on Shanxi's coal industry and the ramifications of the coal phase-out, brought by the national carbon neutrality pledge, on coal workers' livelihoods. The analysis found that Shanxi is economically considered a coal-dependent province and, faced with national pressure to decrease carbon emissions, Shanxi and its coal workers will be severely impacted by the progressive closure of mines. Despite such pledges, national coal consumption is still increasing in consideration of the growing demand for energy. While managing the demand, sustaining national energy security, and minimizing socio-economic costs, provinces heavily reliant on the coal industry like Shanxi will need to consolidate coal mines, diversify its economic mix, and support impacted individuals. Indeed, the unit of analysis of this thesis, coal workers, are faced with forced unemployment which has been increasing over the past years in the province. The analysis found that coal workers in Shanxi are particularly vulnerable due to their tendency to be located in rural areas and to be of older age.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

The second sub-question introduced the policies available to support laid-off coal workers in Shanxi, as well as policy concepts regarding China's governance. The content analysis of Provincial Decrees found that coal workers may benefit from various types of unemployment security and re-employment opportunities. As formulated, laid-off coal workers have access to numerous types of insurances and subsidies based on their needs. This embodies 'person with employment difficulties' which includes zero-employment family members, older people, and persons with disability or work-related injuries. Regarding re-employment opportunities, the province

has undertaken significant steps in providing vocational skills training, diversifying employment, encouraging entrepreneurship, transferring labour, and improving the social security system to expand its distribution coverage. Such efforts are understood through the lens of numerous political ideologies embodying China's environmental and social governance. As a matter of fact, an important section of its policy documents is dedicated to its guiding ideology which makes reference to Xi Jinping's thought or Ecological Civilization. The policy concept of fragmented authoritarianism is also analysed in the context of this thesis, through China's state-owned enterprises and downward power delegation. Such frameworks emphasise the country's stance on the need for an 'energy revolution' and the importance to decarbonise while minimizing socio-economic costs.

At last, the thesis used the concept of environmental justice and the human-right based approach to analyse the formulated policies with respect to their levels of justice. The three types of environmental justice – distributional justice, procedural justice, and justice as recognition – were assigned human rights in the context of Shanxi's coal phase-out and the coal labour force. The analysis found that levels in distributional justice, including mentions of 're-employment opportunities' and 'unemployment security', were retrieved to a higher extent. As specified in Chapter 4, numerous available policies revolve around insurances, training opportunities, and subsidies. Nevertheless, interviews reported that only workers from state-owned enterprises benefit from such aid, contrary to workers from private mines who entirely depend on their employers. This area of potential injustice then revealed that private mines are now practically non-existent in Shanxi in consideration of mine consolidation and the closure of small mines with lower capacity. The content analysis also found several mentions of 'equality of opportunity' regarding the significant rural-urban divide, discussed in Chapter 3. The interviews and policy analysis, concerning procedural justice, referred to few mentions of labour unions, participatory approaches,

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

and policy publicity. Lastly, justice as recognition was respected through the frequent mentions of the term 'persons with employment difficulties', which comprises but is not limited to low-security families, elders, and people with disabilities or work-related injury. However, apart from maternity insurances, it did not mention any gender related issues in consideration of the male-dominance in the coal industry. In a qualitative sense, it was concluded that all levels of environmental justice were respected and recognized to a certain extent, as none of them were entirely inexistant in policy documents.

To answer the main research question, this thesis found that the keywords associated with the concept of just decarbonisation are, indeed, mentioned in the policy documents analysed to understand Shanxi's decarbonisation and the available support policies available to laid-off coal workers. Shanxi follows the central government's targets in introducing de-capacity policies, consolidating small-sized coal fired-power plants, and implementing various policy support packages for laid-off workers. In consideration of its considerable coal workforce to be laid-off and the province's economic dependence on coal, Shanxi has a clear plan for reducing coal capacity and supporting laid-off coal workers throughout this energy transition. Indeed, while Shanxi is promoting innovation and entrepreneurship in the province, laid-off coal workers have access to insurance, training opportunities, subsidies, and social security services throughout unemployment and re-employment. To understand the implementation of such policies and determine the actual level of environmental justice in Shanxi's decarbonisation, more research is needed on the experience of workers directly. This policy analysis reveals the documents in place for a just decarbonisation, but it remains unknown if the policies are effectively and actively implemented.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

It is clear that the coal phase-out in each Chinese province will not occur in similar ways, as they differ in coal reserves and coal production capacity. As the largest producer of coal in the country, Shanxi will have to decarbonise slowly to alleviate

socio-economic costs and progressively transform the province into an innovative hub embodying substantial Chinese political ideologies such as ecological civilisation.

6.2 DISCUSSION

6.2.1 Findings Interpretations

The study's findings were relatively expected when considering China's continuous efforts regarding carbon reduction policies and socio-economic growth over the past decades. It is clear that the country is aware of the importance of decarbonising in an appropriate way. As a matter of fact, policy documents emphasise the need to sustain energy security, standards of living, and economic stability, especially in coal-dependent provinces like Shanxi.

While the first two sub-questions were relatively descriptive, it presented Shanxi as a coal-dependent province that, going through a progressive coal phase-out, must adequately implement policies to support the transition and affected actors. The conceptual lens of fragmented authoritarianism formed a framework on China's political governance in terms of its fragmented SOEs model that almost all coal mines belong to. While fragmentation co-exist everywhere, most especially in a country as big as China, such a concept must be taken into consideration while analysing such policies, as well as the importance to not isolate Shanxi's provincial governance from the central government. The third sub-question allowed the questioning of China's desirable 'just decarbonisation'. As a matter of fact, through the environmental justice framework and the human rights-based approach, this thesis found that all aspects of justice chosen for this study were, to different extent, formulated and recognised in the policy documents. As stated in the Research Methods section, the qualitative expectations of this study were that areas of distributive justice, such as right to decent work and right to adequate standards of living, and justice as recognition would be more respected than areas of

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

procedural justice. Such a claim was made on the idea that China's power relations are relatively strong and do not allow for considerable bottom-up actions involving participatory approaches. The results found that, indeed, procedural justice was the least mentioned category in comparison with distributional justice and justice as recognition whose codes such as unemployment security, re-employment opportunities, and persons with employment difficulties were the most retrieved. Such a differentiation was explained due to the fact that aspects of procedural justice, such as right to participation and right to access information, do not require such an extensive interpretation in comparison with the other categories describing full policy processes. As a matter of fact, procedural justice codes were most often retrieved in the last sections of policy documents while emphasising policy publicity and labour unions promotion. To confirm this interpretation, several interviewees supported the points that labour unions were commonly used to report claims and concerns to policy makers, despite not being very much involved in community-organised actions. It is important to note that the analysis found that bottom-up collective actions were relatively infrequent in the country which does not allow for an extensive interpretation of procedural justice. Through its authoritarianism regime and the absence of independent labour unions, the country's political system limits the heavy promotion of participatory approaches.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

6.2.2 Theoretical Implications

Findings from all three sub-questions relate to a great extent to the literature frame. Indeed, the understanding of Shanxi as a coal-dependent province, backed by interviewees, is strongly supported by the research conducted by Qiao, Chen, et al (2019). This study emphasises the importance that coal holds in a province's economy as a core source of income and employment. It is clear that the content analysis conducted on policy documents and the interviews support the point that an economic

coal-dependence is an important factor to consider while introducing carbon reduction policies. Interview G, (June 23, 2021) highlighted that a total phase-out may never occur in a 'coal-dependent' province like Shanxi, but the province may, instead, be used as support to sustain energy security by carrying certain levels of coal production. Even though the country committed itself to carbon neutrality, it does not imply that carbon neutrality will happen in all provinces. Interviewee H, (June 23, 2021) added that the country is strongly differentiating provinces with low and high coal reserves. Indeed, the strategy embodies a reduction in coal production in provinces with low coal reserves and a concentration of coal production in provinces with high coal reserves. The literature review of this thesis did not consider such claims as it was stated that coal will have to urgently switch out in consideration of the inevitability to maintain such an industry due to its uncleanliness and unsustainability (Weng, Zhang, 2017). The matter of energy security is a substantial aspect of the transition that renewable energy cannot yet fully support.

Regarding the steps towards reducing coal use and the reasons for such an ambition, the findings were highly consistent with the literature. As a matter of fact, the closure or consolidation of small and outdated mines is one of the main measures implemented at the moment, supported in the literature by a research conducted by He, Lin, Zhang et. al. (2020). As such action plans are publicly published, the methods of carbon emission reduction are considerably clear. Likewise, in consideration of the reasons for pledging carbon neutrality, the findings focused on environmental, economic, and political factors. Such results, based on the interviewees and several policy documents, are consistent with the literature which acknowledge the pollution ramifications of coal, the economic opportunity for an environmental-friendly market, and the self-reliance aspect and international standing as political advantages (Shen, Xie, 2017). In terms of markets, the mention to the national ideology of 'Xi Jinping's thought' was also consistent with the claim of Fang, Zhang, Long et al. (2019) that a new

economic era, embodying a higher focus on quality over quantity and speed of production symbolising Deng Xiaoping's theory, was introduced in the country.

With reference to the conceptual framework of environmental justice, the literature emphasised that vulnerable communities are very likely to be unrepresented and excluded from policies (Jenkins, et al., 2018). While Sovacool et al (2019) argued that the energy justice framework further concentrates onto low-carbon technologies introduction rather than fossil fuels phase-outs, the findings of this thesis found that the Chinese government and Shanxi province have introduced thorough and meticulous policies supporting a large range of individuals in the coal sector with different vulnerabilities. The interviewees supported such intentions claiming that coal workers from state-owned enterprises, indeed, are receiving support throughout unemployment and re-employment. The range of support found in this thesis includes but is not limited to older workers, workers with disabilities or work-related injuries, migrant workers, rural workers, or low-security families. In a research conducted by He, Lin, Zhang et. al. (2020), it is highlighted that China has formulated policies to promote re-employment of coal workers and financially support them throughout unemployment such as subsidies, employment guidance, job transfers, skills training, entrepreneurship promotion and consultations. It could, thus, be argued that the just decarbonisation concept, as defined in this thesis, is presented as an acknowledged policy concern in China through the diverse options available to address the coal phase-out's ramifications on the coal workforce. Nevertheless, the literature review emphasised that green employment is supposedly available to a greater extent, supported by a study led by the UK's Energy Research Centre (UKERC) that claimed that there were more jobs in the renewable sectors than the fossil fuel sector. The thesis' findings were inconsistent with this statement as interviewees argued that green employment is generally temporary and may only require few workers after instalments for maintenance.

Apart from certain points, the thesis's findings were consistent with the existing literature and brought new areas of discussions with respect to the

environmental justice concept within the frame of Shanxi's decarbonisation. By connecting environmental justice and fragmented authoritarianism, this thesis formed the concept of just decarbonisation which, as applied to China, is distinct from the concept of 'just transition'.

6.2.3 Contribution and Significance of Findings

By contributing to the body of knowledge, this thesis introduced the concept of 'just decarbonisation' in the context of Shanxi's coal phase-out. The findings and the 'just decarbonisation' concept helped understand what is occurring on a policy level in Shanxi, as well as the levels of justice existing for the coal workforce faced with unemployment. As the study determined that laid-off coal workers are, indeed, supported throughout unemployment and re-employment, such results are considerably relevant in the context of today's urgent climate concerns.

As one of the largest coal producing provinces in the world's largest coal producing country, Shanxi's decarbonisation will certainly have effects on global pollution levels. As a matter of fact, if Shanxi were a country, it would be the world's second largest producer of coal (BP Statistical Review of World Energy, 2019; Shanxi Statistical Yearbook, 2018). Considering the level of importance, it is crucial for the province to reduce coal use in a way that will minimize socio-economic costs. The findings of this thesis, then, brings relevance in considering a just decarbonisation in such a part of the world. To the extent to what is being formulated in policy documents, a just decarbonisation in Shanxi allows for a great consideration to what could be imitated in other parts of the world. As climate change has become a worldwide recognised issue to urgently address, the question of *'how to address it'* becomes relevant. This is more especially significant in a country like China that remains the largest carbon emitter and has pledged to become carbon neutral. Indeed, the findings

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

brings more coherence into the practicality of China's 2060's carbon neutrality pledge in consideration of the formulated targets and aspects of justice and social equity. It showed that China's future 5YPs are clearly organised to meet such targets while aiming to minimize possible social costs that are taken into consideration in the support policies.

As this thesis contributes to international development studies, elements revolving around climate change and decarbonisation are particularly relevant considering their poor level of understanding, especially in China. This thesis offers one instance of policy processes with regard to reducing coal use while regarding affected actors. By focusing on laid-off coal workers, the study found that reducing carbon emissions and recognising socio-economic impacts is possible on a policy level. It is necessary to comprehend that considering social ramifications on an energy transition is essential to the proper achievement of carbon neutrality pledges. Such claims are not only valid in China but also in other countries of the world aiming for similar goals. Indeed, as countries aim to develop a new kind of economy relying on a cleaner and more sustainable energy mix, threats to energy accessibility and affordability, or employment are very likely to occur if they are not closely monitored. The road to achieve carbon neutrality and considerably reduce coal use is still significantly long for China but continuous efforts, innovation and international cooperation will certainly contribute to substantial advances in balancing environmental protection, economic growth, and social equity.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

6.3 RECOMMENDATIONS

6.3.1 For Chinese policymakers

To accelerate the transition while securing people's standards of living, interviewees emphasised that international cooperation is necessary to reach carbon neutrality, as no single country can achieve such a transition by itself. As a matter of

fact, creating international partnerships targeting the coal phase-out would enable countries to share experiences and strategies, support just-decarbonisation programmes, boost global leadership and cooperation, and increase the regional scope of the coal phase-out through renewable energy connectivity (He, Lin, Zhang et. al., 2020). As a matter of fact, in the context of sustainable development, energy connectivity can be used as a tool to enhance regional cooperation by integrating power systems across national boundaries and significantly increasing its renewable or low-carbon energy share. This system can help enable regions with higher demand to access lower cost generation from countries with higher renewable energy resource potential. Likewise, increased regional connectivity offers new markets to regions with greater demand. In the context of China, the coal-to-gas reforms have demonstrated numerous challenges as communities in Northern provinces could not afford gas during the winter and suffered from regular power shortages. In this case, while investment in renewables must continue but is not yet enough to sustain the considerable energy demand, energy connectivity could help China phase-out from coal and import gas that is currently very limited in the country and therefore, very expensive. Such a system could greatly benefit China and reduce the cost of gas or other forms of cleaner energy for communities and industries. Indeed, it can provide an opportunity for the country to find energy stability and security while addressing its energy needs.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

It is clear that the country is not yet capable of completely phasing-out coal if energy security is compromised. To sustain China's colossal energy demand in the future, the country must substantially intensify and broaden its renewable investment to carry on its expansion and availability in the country. Through implementing distributed systems, providing incentives to investors, and promoting technological innovation, the renewable energy share could significantly increase in China. Through this lens, coal subsidies and the construction of new coal mines should be largely limited to allow the integration of renewables. While renewable cost has significantly declined and its electricity has achieved grid parity, coal use should be drastically

reduced in the case where renewable alternatives are available (He, Lin, Zhang et. al., 2020).

Such measures should evidently be implemented while securing people's living standards, including workers and communities relying on these commodities. China must continue its efforts in identifying vulnerable individuals affected by the transition. This identification must allow for greater funding and compensation, in accordance with the individual's needs and its particular situation. Such efforts are crucial in consideration of China's ecological civilisation ideology and its visions for a 'Beautiful China' that respects people's living conditions, contributes to a clean environment, and promotes economic growth and innovation.

6.3.2 For further research

6.3.2.1 Support policies implementation

In consideration of the limitations of this research, this study solely focused on the formulation of the policies rather than their implementations on-the-ground. Analysing the formulation of policies allows for the comprehension of certain levels of recognition that the Chinese government may have in deciding to formally include specific issues in its policies. Due to language barriers and the COVID-19 pandemic, evaluating areas of justice concerning the policies' implementation is beyond the scope of this study. Indeed, this thesis would recommend further research to examine the levels of justice associated with the actual implementation of the policies studied in this paper. Such a research could be conducted through interviewing or surveying coal workers to understand their livelihoods and the beneficiaries of the support policies to determine the extent of financial support received, quality of training, rate of re-employment, employment assistance, and accessibility of programmes. An important area revealed by several interviews revolve around training in where numerous challenges still remain regarding the different skill sets required to be adequately

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

transferred to a new industry. Researching, on the implementational level, the opportunities and challenges of such training programs would bring light into understanding workers' transition into new types of employments. The environmental framework and the human rights-based approach could be used similarly to analyse areas of justice available to laid-off coal workers. Likewise, interviewing government officials could bring another perspective to the understanding on how policy making is conducted and the approaches used to identify vulnerabilities and solutions. Moreover, it would be insightful to interview labour unions and the extent of their involvement and participation in decision making. While this thesis confirms that Shanxi is generally leading a 'just decarbonisation' relative to the formulation of its policies, exploring their implementations would allow further insights into the realities of laid-off coal workers' livelihoods throughout unemployment and re-employment. The proposed research question of this research recommendation is:

- How just is Shanxi's decarbonization of its coal industry is regard to the implementation of policies supporting laid-off workers?

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

6.3.2.2 Rural-urban migration as a strategy

A more specific theme relevant to this research could focus on rural-urban migration. Precisely, as discussed in this thesis, this type of migration has greatly increased over the past years considering the significant development and urbanisation of eastern provinces, where employment opportunities are fostering. While this thesis did not focus on formulated policies outside of Shanxi, it was mentioned by several interviewees that rural workers having difficulties to find employment locally would decide to move, or be sent by an agency, to a more urbanised province. It would then be relevant to research the effectivity of such a strategy with respect to these workers' livelihoods and their experiences. Such an analysis could compare age-differentiated impacts in consideration of a younger population who may be more apt to leave their

hometown and an older population who may have to leave their family behind. Such push and pull factors may be used as points of analysis to comprehend the rising migration wave. At last, the effectivity of such a strategy should be analysed to determine if migrant workers are able to find equivalent or better opportunities in urban areas of if they face new conditions of insecurity. The proposed research question of this research recommendation is:

- How effective is China's rural-to-urban migration as a strategy to address rural unemployment with respect to workers' livelihoods and well-being?

6.3.2.3 Provincial and local governments' capacity

While focusing on Shanxi province, a second recommendation for further research would revolve around determining the capacity and resources that the provincial government possesses to adequately deliver the stated policies in this thesis. Chapter 4 describes the four main categories of policies available to support workers who are not migrating out of the province. While the province is committing to greatly promote employment, entrepreneurship, and innovation, such motivations require a considerable number of resources to be implemented. Indeed, while the province must receive adequate funding and resources to implement training and provide subsidies, the concept of fragmented authoritarianism could also bring relevance into understanding how provinces acquire capacity and resources to support workers. Through a fragmented system, determining the availability of such assets is particularly relevant to understand the adequate implementation of such support policies. Contrary to the first suggested research, this recommendation would regard the operational aspect of the policies through the lens of the provincial government rather than focusing on coal workers and the social aspects of benefiting from such policies. The proposed research question of this research recommendation is:

- How disposable are resources and operational capacity to Shanxi's provincial government regarding the adequate delivery of policies supporting laid-off coal workers?

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

APPENDIXES

APPENDIX A - Codes and Categories

Categories	Distributional justice	Procedural justice	Justice as recognition
Codes	Right to decent work (ILO definition) - Fair income - Social Protection for families - Social integration (re-employment opportunities) - Equality of opportunity Right to adequate standards of living - Unemployment security	- Right to participation - Right to access to information	Social recognition/Freedom from discrimination - Age - Gender - Employment difficulties

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

APPENDIX B - Linkage between codes and specific words from document analysis

Codes	Related words in document analysis	Notes
Fair income	'Wage', 'salary'	-
Social protection for families	'Zero-employment family members', 'low-security families', 'family'	-

Social integration (re-employment opportunities)	'Training', 'employment promotion', 'entrepreneurship', 'vocational education', 're-employment services'	-
Equality of opportunity	'Equal public employment', 'fair access', 'rural development'	Throughout the analysis, the aspect of 'equality of opportunity' has demonstrated to be greatly directed towards rural development which is why it was added to this section to assist the analysis.
Unemployment security	'Insurances', 'social security', 'subsidies'	-
Right to participation	'Labour unions', 'participation', 'express opinions'	-
Right to access information	'Right to know', 'information sharing', 'policy publicity'	-
Age	'Old-age', 'elders'	Focus on elderlies due to their higher vulnerability
Gender	'Women', 'maternity insurance'	-
Employment difficulties	'Disability', 'old-age', 'low-security families', 'migrant workers', 'people with work-related injuries',	'Employment difficulties' is a term frequently used which comprises numerous elements such as older people, migrant workers, families in difficulty, people with disability, etc. It is used to present policy support available to these groups of people.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

APPENDIX C - List of Interview Questions

Academia focused questions

Sub-question 1: Shanxi's coal industry and coal workers' livelihood

1. How economically important is the coal industry in Shanxi?

   Follow-up: Would you refer to Shanxi as a coal-dependent province? *'Coal Production', 'Coal Reserves', 'Employment'*

2. How has the coal industry evolved in the past decade? 'Guiding Ideology'
3. What are the main factors resulting in the (enforced) coal phase-out in Shanxi?

   Follow-up: Would you say the coal phase-out is necessary in consideration of China's objectives? *'Phase-out causes'*

4. What are the benefits and threats for coal workers' livelihood regarding this transition? *'Employment', 'Workers' laid-off', 'Fair Wage'*

   Follow-up: How accessible are 'green jobs' in Shanxi? Would they provide higher standards of livelihood compared to coal mining? *'Work Safety', 'Employment'*

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Sub-question 2: Available policies and policy concepts to support coal workers

5. What kind of policies are being implemented to phase-out coal?

   Follow-up: What are the major goals and targets set in the region regarding coal phase-out?

6. What kind of policies are being implemented to support laid-off coal workers?

   Follow-up: *'Re-employment Opportunities', 'Unemployment Security', 'Social Protection' (families), 'Equality of Opportunity' (rural/urban)*

7. What demographics of coal workers are the most vulnerable during this phase-out? 'Age', 'Gender', 'Employment Difficulties'

Follow-up: Are they being represented in policy support packages?

Sub-question 3: Predictions and sustainability of these policies on a justice aspect

8. Regarding coal workers' support and the actual implementation of formulated policies, would you predict a 'just decarbonisation' that would protect workers' rights and provide adequate policy support packages through unemployment and re-employment?
9. How likely is that coal will be completely phased-out by 2060?
    1. What are some possible future scenarios for Shanxi's coal industry?

Follow-up: Clean coal technologies vs. zero coal?

Lending Institution focused questions

1. Could you briefly describe what the project 'Shanxi Energy Transition and Green Growth Development Policy Operation' is about?

Sub-question 1: Shanxi's coal industry and coal workers' livelihood

2. How economically important is the coal industry in Shanxi?

Follow-up: Would you refer to Shanxi as a coal-dependent province? How needed is this project? 'Coal Production', 'Coal Reserves', 'Employment'

3. How has the coal industry evolved in the past decade? 'Guiding Ideology'
4. What are the main factors resulting in the (enforced) coal phase-out in Shanxi?

Follow-up: Would you say the coal phase-out is necessary in consideration of China's objectives? 'Phase-out causes'

5. What are the benefits and threats for coal workers' livelihood regarding this transition? *'Employment', 'Workers' laid-off', 'Fair Wage'*

Follow-up: How accessible are 'green jobs' in Shanxi? Would they provide higher standards of livelihood compared to coal mining? 'Work Safety', 'Employment'

Sub-question 2: Available policies and policy concepts to support coal workers

6. What type of policies are being implemented to support laid-off workers? 'Re-employment Opportunities', 'Unemployment Security', 'Social Protection' (families), 'Equality of Opportunity' (rural/urban)

   Follow-up: How accessible are such services to affected actors (e.g., training, subsidies)?

7. How important are policy support packages for laid-off workers within the project? Is it a big aspect of the project?
8. How specific are the support policies regarding different demographics and vulnerabilities? Are different needs and vulnerabilities recognised and displayed within the support packages? 'Age', 'Gender', 'Employment Difficulties'
9. Are coal workers directly involved in the policy processes regarding their issues? How participatory is it? 'Right to Participation', 'Right to information'
10. Which indicators are being used to evaluate success in supporting coal workers and reintegration into the workforce?

    Follow-up: What is the current baseline and target in those indicators?

Sub-question 3: Predictions and sustainability of these policies on a justice aspect

11. Did the World Bank participate in similar projects/grant funding in the past?
    1. If yes, were these targets reached in the past? How successful were those projects?
12. Regarding coal workers' support and the actual implementation of formulated policies, would you predict a 'just decarbonisation' that would protect workers'

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

rights and provide adequate policy support packages through unemployment and re-employment?

Government (Shanxi Provincial Bureau) focused questions

Sub-question 1: Shanxi's coal industry and coal workers' livelihood

1. How economically important is the coal industry in Shanxi?

   Follow-up: Would you refer to Shanxi as a coal-dependent province? 'Coal Production', 'Coal Reserves', 'Employment'

2. What are the general demographics in Shanxi's coal industry (age, sex, educational level)?
3. How has the coal industry evolved in the past decade? 'Guiding Ideology'
4. What are the main factors resulting in the coal phase-out in Shanxi?

   Follow-up: Would you say the coal phase-out is necessary in consideration of China's objectives? 'Phase-out causes'

5. What are the benefits and threats for coal workers' livelihood regarding this transition? *'Employment', 'Workers' laid-off', 'Fair Wage'*

   Follow-up: How accessible are 'green jobs' in Shanxi? Would they provide higher standards of livelihood compared to coal mining? 'Work Safety', 'Employment'

Sub-question 2: Available policies and policy concepts to support coal workers

6. What kind of policies are being implemented to phase-out coal?

   Follow-up: What are the major goals and targets set in the region regarding coal phase-out?

   Follow-up: Is it shared to the public? Where is it accessible? 'Right to information'

7. What type of policies are being implemented to support laid-off workers? 'Re-employment Opportunities', 'Unemployment Security', 'Social Protection' (families), 'Equality of Opportunity' (rural/urban)

   Follow-up: How accessible are such services to affected actors (e.g., training, subsidies)?

8. How specific are the support policies regarding different demographics and vulnerabilities? Are different needs and vulnerabilities recognised and displayed within the support packages? 'Age', 'Gender', 'Employment Difficulties'

Sub-question 3: Predictions and sustainability of these policies on a justice aspect

9. Are coal workers directly involved in the policy processes regarding their issues? How participatory is it? 'Right to Participation'
10. Which indicators are being used to evaluate success in supporting coal workers and reintegration into the workforce?

    Follow-up: What is the current baseline and target in those indicators?

11. How likely is that coal will be completely phased-out by 2060?

    1. What are some possible future scenarios for Shanxi's coal industry?

       Follow-up: Clean coal technologies vs. zero coal?

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

APPENDIX D - Translation Comparison: Google Translate and Chinese Natives (Chinese to English)

Chinese-English Translation Conducted by Chinese Natives (English Speaker)	Chinese-English Translation on Google Translate
Article 7 Social insurance subsidies. The range of people who enjoy social insurance	Article 7 Social insurance subsidies. The range of people who enjoy

subsidies includes: those with employment difficulties and college graduates. (1) Social insurance subsidies for persons with employment difficulties. For working units (direct translation) or employers that recruit people with employment difficulties and pay their social insurance, as well as units that place people with employment difficulties through public welfare positions and pay their social insurance, basic pension insurance, basic medical insurance and unemployment insurance are subsidised proportionately according to the amount actually paid, excluding the part that should be paid by individuals with employment difficulties.	social insurance subsidies includes: those with employment difficulties and college graduates. (1) Social insurance subsidies for persons with employment difficulties. For units that recruit people with employment difficulties and pay social insurance premiums, and units that place people with employment difficulties and pay social insurance premiums through public welfare positions, the basic pension insurance premiums, basic medical insurance premiums and basic medical insurance premiums actually paid for those with employment difficulties should be paid. Unemployment insurance premiums are subsidized, excluding the part that should be paid by individuals with employment difficulties.
A certain amount of social insurance subsidies shall be given to persons with employment difficulties after they have paid their social insurance premiums, the subsidised amount shall not exceed 2/3 of their actual paid premiums. The period of social insurance subsidies for persons with employment difficulties can be extended to retirement for persons with employment difficulties who are less than 5 years away from the legal retirement age, and the remaining persons shall not exceed 3 years (based on the age when they are initially approved to enjoy social insurance subsidies)	A certain amount of social insurance subsidies shall be given to the social insurance premiums paid by persons with employment difficulties after flexible employment. In principle, the subsidy standard shall not exceed 2/3 of their actual payment. The period of social insurance subsidies for persons with employment difficulties can be extended to retirement for persons with employment difficulties who are less than 5 years away from the legal retirement age, and the rest shall not exceed 3 years (subject to the age when they are initially approved to enjoy social insurance subsidies).

(2) Guide enterprises to formulate employee placement plan (hereinafter called the plan). All localities shall guide and urge relevant enterprises to strengthen the disclosure of the processes, and formulate and implement the plan in accordance with relevant national laws, regulations and policies. The plan should clearly involve the situation of employees, the method of employee diversion and resettlement, the handling of labor relations, the payment of economic compensation, the repayment of arrears of wages and social insurance premiums, the sources of funding for employee placement, and the promotion of reemployment.	(2) Guide enterprises to formulate employee placement plans. All localities shall guide and urge relevant enterprises to strengthen the disclosure of factory affairs, and formulate and implement employee placement plans in accordance with relevant national laws, regulations and policies. The employee resettlement plan should clearly involve the situation of employees, the method of employee diversion and resettlement, the handling of labor relations, the payment of economic compensation, the repayment of arrears of wages and social insurance premiums, the sources of funding for employee resettlement, and the promotion of reemployment.
In the process of designing the plan, the enterprise must perform democratic procedures in accordance with the law, establish a consultation and communication mechanism for employees at all levels, fully listen to the opinions of employees, and protect employees' rights to know, participate, express and supervise. The plan shall be announced and implemented after being discussed and approved by the employee representative assembly or all employees in accordance with the regulations. If the plan is incomplete, the funding guarantee is not in place, and the plan is not approved by the employee representative assembly or all employees, it shall not be implemented.	In the process of formulating the plan, the enterprise must perform democratic procedures in accordance with the law, establish a consultation and communication mechanism for employees at all levels, fully listen to the opinions of employees, and protect employees' rights to know, participate, express and supervise. The employee resettlement plan shall be announced and implemented after being discussed and approved by the employee representative assembly or all employees in accordance with the regulations. If the employee resettlement plan is incomplete, the funding guarantee is not in place, and the employee resettlement plan has not been discussed and approved by the employee representative assembly or all employees, it shall not be implemented.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

(5) The emphasis on publicity and guidance. All related local departments should attach importance to the policy interpretation and ideological and political works. The functions of grass-roots party organizations and labor unions should be fully exerted. To further publicize the significance and urgency of cutting overcapacity, publicize the policy of redistributing and allocating the personnel, and guide the redistributing and allocating personnel to understand the situation and change the ideas so they can participate in the reformation positively with the better understanding and supporting. For increasing the positive publicity, a number of advanced cases of the personnel settlement work should be introduced to the public for exerting exemplarity. In order to construct a benign atmosphere of consensus, the related local departments should strengthen the guidance of the consensus of personnel settlement work, promptly respond the social concerns, interpret the work in patient and meticulous, no dodging question and no intensifying the conflicts, and guide the social expectation correctly.	(5) Pay attention to publicity and guidance. All localities should attach importance to policy interpretation and ideological and political work, give full play to the role of grassroots party organizations, labor unions, etc., in-depth publicize the importance and urgency of resolving excess capacity, publicize the policy of diversion and placement of employees, and guide the diversion and placement of employees to understand the situation and change their concepts, To better understand, support and actively participate in reforms. It is necessary to increase positive publicity, promote a group of advanced models of employee resettlement work, and play a demonstrative and leading role. It is necessary to strengthen the guidance of public opinion in the work of employee placement, respond to social concerns in a timely manner, patiently and meticulously interpret, not to avoid problems, not to intensify contradictions, correctly guide social expectations, and strive to create a good atmosphere of public opinion.
(11) Ensuring the basic livelihoods of people in poverty. Comprehensively according to the poverty degree of family, local consumption degree and other conditions, offer the temporary living subsidies to the unemployed personnel in poverty who meet the conditions. The families meet the condition of Minimum Living Standard Security will be arranged in the Minimum Living Standard Security System timely following the stipulated procedures. The ones who meet the conditions of temporary relief will offer the interim aids to them	(11) Guarantee the basic livelihood of the people in difficulties. For eligible laid-off and unemployed persons with living difficulties, temporary living allowances will be given, and the subsidy standard will be comprehensively determined according to the degree of family difficulties and the level of regional consumption. Families that meet the minimum living standards shall be included in the scope of the minimum living allowance in a

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

following the stipulated procedures. Helping the poor get rid of poverty by synthetic strategies.	timely manner in accordance with the prescribed procedures. Those who meet the conditions for temporary assistance shall be given temporary assistance in a timely manner in accordance with the prescribed procedures. Through comprehensive measures, help the needy people get out of their difficulties.
(14) Strengthen policy publicity and services. All regions and departments should carry out extensive policy publicity activities, promptly announce policy lists, application procedures, subsidy standards, service agencies and its contact information, supervision and complaints hotline to the public. Insight into enterprises to promote policies and understand their difficulties for better assistance. Establish and improve the real-name registration system of enterprises with operating difficulties, laid-off and unemployed workers, then update the information into information management system of public employment services. Further optimize and streamline the process, to ensure that the policies benefit the target object timely and comprehensively. (All relevant departments, units and municipal people's governments should be responsible for corresponding duties.)	(14) Do a good job in policy publicity and services. All localities and departments should carry out extensive policy publicity activities, and promptly announce to the society the policy list, bidding process, subsidy standards, service agencies and contact information, supervision and complaint hotlines, and go deep into the enterprise to promote policies, understand difficulties, and do a good job of helping. Establish and complete real-name registration ledgers for enterprises in difficulties and laid-off and unemployed persons, and incorporate them into the public employment service information management system in a timely manner. It is necessary to further optimize the process, streamline the certification, and ensure that various policies benefit the enjoyment objects in a timely, comprehensive and convenient manner. (All relevant departments, units and municipal people's governments are responsible according to the division of responsibilities)
(20) Strengthen the organization of laid-off workers in re-employment service center. To those centers with heavy work	(20) Strengthen the organization and leadership of laid-off workers leaving the center. Where laid-off workers

pressure, new work team should be set up including group leaders from governmental re-employment department and laid-off workers from department of labor and social security, finance, asset management (economy and trade), and labor union in which has heavy work pressure. All works should be push forward actively and steadily through the ways of systematic management, collective work, classified allocation, etc. to solve the problem of laid-off workers in enterprises with operating problems. Labor and Social Security Department should be responsible for the verify and identify of laid-off workers' identity, working years, labor relations termination, compensation payment, etc. and social security renewing. Financial Department should be responsible for enterprises financing, government subsidy funds verification, identification, distribution, etc. The State-owned Assets Management Department should be responsible for the identification of enterprise's production and operation, supervise wage arrears affairs, cash enterprise assets, etc. Labor Union should be responsible for reflecting the opinions and requirements of staffs, assisting the Party and government in the staffs' ideological education and comfort.	leave the center with a heavy task, a government leader in charge of reemployment should be established as a team leader, and a laid-off worker leaving center working group composed of labor security, finance, state-owned assets (economics and trade), and trade unions should be established in accordance with the active promotion and steady implementation of the work group. In principle, we should adopt methods such as sorting and queuing, collective office, centralized resolution, and individual focus, and focus on solving the problem of laid-off workers leaving the center of enterprises that have no hope of turning losses and suspending production. The labor and social security department is responsible for the verification and confirmation of the status of laid-off employees, the length of service, the termination of labor relations, and the payment of economic compensation standards, and the continuation of social insurance relations; the financial department is responsible for the verification and confirmation of corporate fundraising, government subsidy funds, and appropriation; the state-owned asset management department is responsible for work The identification of the production and operation status of the enterprise, the supervision of the enterprise to clear the relevant debts owed to employees, the realization of enterprise assets, etc.; the trade union organization is responsible for reflecting the opinions and requirements of the employees, and assisting the party and government in

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

	the ideological education and stabilization of the employees.
(3) Improve the social security and reemployment service system for coal enterprise employees. 1. Further improve the social security system, and working towards implementing the "Decision of the State Council on Improving the Basic Pension Insurance System for Enterprise Employees" (Guo Fa (2005) No. 38), improve the basic pension insurance policy for urban enterprise employees, expand the coverage of pension insurance, and gradually solidify personal accounts and improve Provincial-level overall planning. Further improve the basic medical insurance system for urban employees, through implementing the "Regulations on Work Injury Insurance" in accordance with the principle of "enterprise self-funding, appropriate assistance from the government", and solve the problem of participating in medical insurance for employees and retirees of state-owned coal enterprises with difficulties.	(3) Improve the social security and reemployment service system for coal enterprise employees. 1. Further improve the social security system. Conscientiously implement the spirit of the "Decision of the State Council on Improving the Basic Pension Insurance System for Enterprise Employees" (Guo Fa (2005) No. 38), improve the basic pension insurance policy for urban enterprise employees, expand the coverage of pension insurance, and gradually solidify personal accounts and improve Provincial-level overall planning. Further improve the basic medical insurance system for urban employees, implement the "Regulations on Work Injury Insurance" in accordance with the principle of "enterprise self-funding, appropriate assistance from the government", and solve the problem of participating in medical insurance for employees and retirees of state-owned coal enterprises with difficulties.
Include all employees of coal enterprises, including farmers (or migrant workers?), into work-related injury insurance, and adopt a method of taking one sum (of money) from the enterprise, one sum from the local finance, and one sum from the central fiscal transfer payment, so as to gradually solve the problem of including the "old work-related injuries" of coal mining enterprises in the overall planning of work-	Include all employees of coal enterprises, including migrant workers, into work-related injury insurance, and adopt a method of taking one piece from the enterprise, one piece from the local finance, and one piece from the central fiscal transfer payment, so as to gradually solve the problem of including the "old work-related injuries" of coal mining enterprises in the overall

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

related injury insurance. Improve the unemployment insurance system, and give full play to the function of unemployment insurance to protect the basic life of the unemployed and promote reemployment.	planning of work-related injury insurance. Improve the unemployment insurance system, and give full play to the function of unemployment insurance to protect the basic life of the unemployed and promote reemployment.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

REFERENCES

Abnett, K., Twidale, S. (2021). EU proposes world's first carbon border tax for some imports. Reuters, https://www.reuters.com/business/sustainable-business/eu-proposes-worlds-first-carbon-border-tax-some-imports-2021-07-14/.

Aiken, Milam (2019). An Updated Evaluation of Google Translate Accuracy. Studies in Linguistics and Literature ISSN 2573-6434 (Print) ISSN 2573-6426 (Online) Vol. 3, No. 3, 2019 www.scholink.org/ojs/index.php/sll

Akermi, Triki (2017). The green energy transition and civil society in Tunisia: Actions, motivations and barriers, Energy Procedia 136 (2017) 79-84.

Allen, F., Qian, M. (2005). Law, finance, and economic growth of China, L. Financ. Econ. 77 (1), 57-116.

Andrews-Speed, P. (2004). Energy Policy and Regulation in China. Kluwer Law International, The Hague.

Audin, J (2020). The Coal Transition in Datong: An Ethnographic Perspective. Made In China: The Work Of Arts.

Australian Human Rights Commission (n.d). Human rights based approaches. Australian Human Rights Commission, https://humanrights.gov.au/our-work/rights-and-freedoms/human-rights-based-approaches#:~:text=A%20human%20rights%20based%20approach,barriers%20to%20realising%20their%20rights

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

BP Energy Outlook (2019). Insights from the Evolving transition scenario – China, BP Energy Outlook. https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2019-country-insight-china.pdf.

BP Energy Outlook (2019). Insights from the Evolving transition scenario – European Union, BP Energy Outlook. https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2019-region-insight-eu.pdf.

BP Statistical Review of World Energy (2019). BP Reports 68th Edition. https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf

Bridle, Kitson, Duan et al (2016). At the Crossroads: Balancing the financial and social costs of coal transition in China. International Institute for Sustainable Development, https://www.jstor.org/stable/resrep14775.5.

Carter, N. (2007). "Green political Thought." The Politics of the Environment, Chapter 3: 41-81.

Carter, N. (2007). "Sustainable development and ecological modernisation." The Politics of the Environment, Chapter 8: 207-237.

CEIC (2021). China Number of Employee: Coal Mining & Dressing from Dec 1998 to Apr 2021. National Bureau of Statistics, China Premium Database's Labour Market – Table CN.GB: No of Employee: by Industry: Monthly.

Center for Strategic and International Studies (2020). Just Transition Concepts and Relevance for Climate Action – A Preliminary Framework. Climate Investment Funds. https://www.climateinvestmentfunds.org/sites/cif_enc/files/knowledge-documents/justtransition_final.pdf

Chan, K., & Zhang, L. (1999). The Hukou System and Rural-Urban Migration in China: Processes and Changes. The China Quarterly, 160, 818-855. doi:10.1017/S0305741000001351

China Dialogue (2020). China's new carbon neutrality pledge: What next? China Dialogue. https://chinadialogue.net/en/climate/chinas-new-carbon-neutrality-pledge-what-next/.

China Internet Information Center (n.d.). "Three Represents" CPC Theory. China Internet Information Center. http://www.china.org.cn/english/zhuanti/3represents/68735.htm

China's National Energy Administration (2019). Solar PV installed capacity by province. China's National Energy Administration, The State Council of the People's Republic of China.

China's National Energy Administration (2019). Wind capacity (GW) by province. China's National Energy Administration, The State Council of the People's Republic of China.

China Statistical Yearbook (2019). Coal Balance Sheet, National Bureau of Statistics China. http://www.stats.gov.cn/tjsj/ndsj/2019/indexeh.htm.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

China Statistical Yearbook (2019). Total Consumption of Energy and its Composition, National Bureau of Statistics China. http://www.stats.gov.cn/tjsj/ndsj/2019/indexeh.htm.

Chinese Academy of Social Sciences' Institute of Urban and Environmental Studies and the Research Institute for Global Value Chains (2017). 'Research on the employment impact of the "cut overcapacity" policy on the coal industry'. China Coal Consumption Cap Plan and Policy Research Project.

Crane, K., Mao, Z (2015). Costs of Selected Policies to Address Air Pollution in China. RAND Corporation.

Cui (2020). China's 2060 carbon neutrality target: opportunities and challenges, China Dialogue Report 2020.

Deakwon, Son (2017). Xi Jinping Thought Vs. Deng Xiaoping Theory. The Diplomat. https://thediplomat.com/2017/10/xi-jinping-thought-vs-deng-xiaoping-theory/

Decena, K. (2020). China's Shanxi province to close more small coal mines – Argus Media. S&P Global. https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/china-s-shanxi-province-to-close-more-small-coal-mines-8211-argus-media-58915820.

Deval, P., Murray, T. (n.d.). Health & Environmental Effects of Air Pollution, Department of Environmental Protection, Commonwealth of Massachusetts, Executive Office of Energy & Environmental Affairs. https://www.mass.gov/doc/health-environmental-effects-of-air-pollution/download#:~:text=Air%20pollution%20can%20damage%20crops,(such%20as%20harsh%20weather).

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Dong, F., Zhang, Y., Zhang, X., et al (2021). Exploring ecological civilization performance and its determinants in emerging industrialized countries: A new evaluation system in the case of China. Journal of Cleaner Production 315 – 128051. https://doi.org/10.1016/j.jclepro.2021.128051.

Fang, Zhang, Long et al. (2019). How can China achieve its Intended Nationally Determined Contributions by 2030? A multi-criteria allocation of China's carbon emission allowance, Applied Energy 241 (2019) 380-389. https://doi.org/10.1016/j.apenergy.2019.03.055.

Frankfurt School-UNEP Centre (2019). Global Trends in Renewable Energy Investment 2019, United Nations Environment Programme. https://wedocs.unep.org/20.500.11822/29752.

Geels, F. W. (2002). "Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study." Research Policy 31(8–9): 1257-1274.

Geels, F. W. (2014). "Regime Resistance against Low-Carbon Transitions: Introducing Politics and Power into the Multi-Level Perspective." Theory, Culture & Society 31(5): 21-40.

Hao, F. (2017). 2.3 million Chinese coal miners will need new jobs by 2020. China Dialogue. https://chinadialogue.net/en/energy/9967-2-3-million-chinese-coal-miners-will-need-new-jobs-by-2-2/.

He, Lin, Y. Zhang, Larangeira, et al. (2020). Enabling a Rapid and Just Transition away from Coal in China. One Earth 3. https://doi.org/10.1016/j.oneear.2020.07.012.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Hernandez, Zaveri (2019). Venturing the Definition of Green Energy Transition: A systematic literature review, Institute of Data Science at Maastricht University.

Hsieh, H., Shannon, S. (2005). Three Approaches to Qualitative Content Analysis. Qual Health Res 2005; 15; 1277, DOI: 10.1177/1049732305276687.

Huang, P., Liu, Y. Renewable Energy Development in China: Spatial Clustering and Socio-Spatial Embeddedness. Curr Sustainable Renewable Energy Rep 4, 38–43 (2017). https://doi.org/10.1007/s40518-017-0070-8

Hubbard, Paul (2017). 'Fragmented authoritarianism' and state ownership. East Asia Forum. https://www.eastasiaforum.org/2017/01/23/fragmented-authoritarianism-and-state-ownership/.

International Energy Agency (2018). CO2 emissions by energy source, China (People's Republic of China and Hong Kong China) 1990-2018. CO2 Emissions from Fuel Combustion | Documentation.

International Energy Agency (2018). CO2 emissions by sector, China (People's Republic of China and Hong Kong China) 1990-2018. CO2 Emissions from Fuel Combustion | Documentation.

International Labour Organization (n.d). Decent work. The ILO's Decent Work Agenda, International Labour Organization. https://www.ilo.org/global/topics/decent-work/lang--en/index.htm.

Jenkins, K., et al. (2018). "Humanizing sociotechnical transitions through energy justice: An ethical framework for global transformative change." Energy Policy 117: 66-74.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Jiankun, Ye, Zheng, (2019). Synergizing action on the environment and climate: Good practice in China and around the Globe, United Nations Environment Programme.

Kahrl, F., Williams, J., Ding, J.H., Hu, J.F. (2011). Challenges to China's transition to a low carbon electricity system. Energy Policy 39, 4032–4041.

Ke, W., Wang, K. (2020). Impact of Gas Control Policy on the Gas Accidents in Coal Mine. Processes 2020, 8, 1405; doi:10.3390/pr8111405.

Kuhn, B. (2016). Sustainable Development Discourses in the P.R. China. Journal of Sustainable Development, 9(6), pp. 158-167. Retrieved from http://www.ccsenet.org/journal/index.php/jsd/article/view/64807.

Kuhn, Berthold (2019). Ecological civilisation in China. DOC Research Institute. https://doc-research.org/2019/08/ecological-civilisation-china-berthold/.

Larsen, K., Pitt, H. et al (2021). China's Greenhouse Gas Emissions Exceeded the Developed World for the First Time in 2019. Rhodium Group. https://rhg.com/research/chinas-emissions-surpass-developed-countries/#_ftn1.

Li, B. (2018). Emerging selective regimes in a fragmented authoritarian environment: The 'three old redevelopment' policy in Guangzhou, China from 2009 to 2014. Urban Studies, Vol 55(7) 1400-1419.

Li, Peng (1996). Report on the Outline of the Ninth Five-Year Plan (1996-2000) for National Economic and Social Development and the Long-range Objectives to the Year 2010 (Excerpts) Fourth Session of the Eighth National People's Congress. http://www.china.org.cn/95e/95-english1/2.htm

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Lin, K., Cai, F., Li, Z. (1998). Competition, policy burdens, and state-owned enterprise reform. Am. Econ. Rev. 88, 422427.

Lin, K.J. et al (2020). State-owned enterprises in China: A review of 40 years of research and practice. China Journal of Accounting Researcg 13 31-55, https://doi.org/10.1016/j.cjar.2019.12.001.

McCauley, Heffron (2018). Just transition: Integrating climate, energy and environmental justice. Energy Policy 119 (2018) 1-7.

Middleton, C. (2016). "Sustainable Electricity Transition in Thailand and the Role of Civil Society." Human and Environmental Security and Peace, Vol 10, Chapter 39: 831-851.

Ming, Xia (n.d.). Political Governance. New York Times Archives. https://archive.nytimes.com/www.nytimes.com/ref/college/coll-china-politics.html

Ministry of Human Resources and Social Security (2015). Notice of the Ministry of Human Resources and Social Security of the Ministry of Finance on the issuance of the Interim Measures for the Administration of Employment Assistance Funds, MHRSS no. 260.

Ministry of Human Resources and Social Security (2016). Ministry of Human Resources and Social Security National Development and Reform Commission and other seven departments on the resolution of excess capacity in the steel and coal industry to achieve relief from hardship in the process of staff placement, MHRSS no. 32.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

L&E Global (2021). Trade Unions and Employers Associations in China. L&E Global, https://knowledge.leglobal.org/employers-associations-and-trade-unions-in-china/.

Ministry of Human Resources and Social Security (2015). 'Notice of the Ministry of Human Resources and Social Security of the Ministry of Finance on the issuance of the Interim Measures for the Administration of Employment Assistance Funds', MHRSS no. 260.

Ministry of Human Resources and Social Security (2016). 'Ministry of Human Resources and Social Security National Development and Reform Commission and other seven departments on the resolution of excess capacity in the steel and coal industry to achieve relief from hardship in the process of staff placement', MHRSS no. 32.

Ngan, H.W. (2010). Electricity regulation and electricity market reforms in China. Energy Policy 38, 2142–2148.

National Bureau Statistics of China (2019) 'Average Wage of Employed Person in Urban Non-Private Units and Related Indices'. http://www.stats.gov.cn/tjsj/ndsj/2019/indexeh.htm.

National Bureau Statistics of China (2019). 'Registered Unemployed Persons and Unemployment Rate in Urban Area by Region'. http://www.stats.gov.cn/tjsj/ndsj/2019/indexeh.htm.

National Health Commission of the People's Republic of China (2017). China issues plan to control occupational diseases. National Health Commission of the People's Republic of China. http://en.nhc.gov.cn/2017-01/04/c_72767.htm.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

National Health Commission of the People's Republic of China (2020). Survey on black lung disease to help prevent occupational hazards. National Health Commission of the People's Republic of China. http://en.nhc.gov.cn/2020-05/14/c_80150.htm

Oxford English Dictionary (n.d.). Definition of 'civil society'. Oxford Language.

Phillips, Tom (2016). The Cultural Revolution: all you need to know about China's political convulsion. The Guardian. https://www.theguardian.com/world/2016/may/11/the-cultural-revolution-50-years-on-all-you-need-to-know-about-chinas-political-convulsion

Qiao, Chen, X. Dong, K. Dong (2019). Has China's coal consumption actually reached its peak? National and regional analysis considering cross-sectional dependence and heterogeneity. Energy Economics 84 (2019) 104509. https://doi.org/10.1016/j.eneco.2019.104509.

Reuters (2020). China's Xi targets steeper cut in carbon intensity by 2030. Reuters. https://www.reuters.com/world/china/chinas-xi-targets-steeper-cut-carbon-intensity-by-2030-2020-12-12/

Rohde RA, Muller RA (2015). Air Pollution in China: Mapping of Concentrations and Sources. PLoS ONE 10(8): e0135749. https://doi.org/10.1371/journal.pone.0135749

Schmidt, C. (2004). The analysis of semi-structured interviews. A companion to qualitative research, 253, 258.

Shanxi Provincial Bureau (2006). Situation in Shanxi Province: Economic Overview. Shanxi Provincial Bureau. http://www.shanxigov.cn/gb/zgsx/sq/jjgk/ny/index.html

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Shanxi Provincial People's Government Office (2005). Opinions of the Shanxi Provincial People's Government on further speeding up the re-employment of laid-off workers, Provincial Decree no. 3.

Shanxi Provincial People's Government Office (2007). Notice of the General Office of the Shanxi Provincial People's Government on the Issue of the 11th Five-Year Plan for the Development of Labor and Social Security in Shanxi Province. Provincial Decree no. 21.

Shanxi Provincial People's Government Office (2007). The Shanxi Provincial People's Government issued a notice on the overall implementation of the pilot project on sustainable development policy measures for the coal industry in Shanxi Province. Provincial Decree no. 9.

Shanxi Provincial People's Government Office (2008). Notice issued by the General Office of the Shanxi Provincial People's Government on the pilot implementation of the transition policy for coal-fired enterprises in Shanxi, Provincial Decree no. 77.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Shanxi Provincial People's Government Office (2016). Shanxi Province's "13th Five-Year" Comprehensive Energy Development Plan, Provincial Decree no. 67.

Shanxi Provincial People's Government Office (2017). Implementation of the State Council's Action Plan to Support Shanxi Province to Further Deepen Reform and Promote Resource-based Economic Transformation and Development, Provincial Decree no. 49.

Shanxi Provincial People's Government Office (2017). Shanxi Provincial People's Government on the current and future period of entrepreneurial employment to do a good job in the implementation of the opinion, Provincial Decree no. 50.

Shanxi Provincial People's Government Office (2019). Implementation Opinions of the People's Government of Shanxi Province on Promoting Employment, Provincial Decree no. 2.

Shanxi Provincial People's Government Office (2019). Notice of Shanxi Energy Bureau on Printing and Issuing the Working Plan of Shanxi Province for Advancing Coal Consumption Reduction and Equivalence Substitution, Provincial Decree no. 753.

Shanxi Statistical Yearbook (2018). Total Production and Consumption of Energy and its Composition. Shanxi Statistical Yearbook.

Shen W. (2016). A New Era for China's Renewable Energy Development? External Shocks, Internal Struggles and Policy Changes, Evidence Report 196, Rising Powers in International Development, Institute of Development Studies.

Shen, Xie (2017). The Political Economy for Low-carbon Energy Transition in China: Towards a New Policy Paradigm, New Political Economy. https://doi.org/10.1080/13563467.2017.1371122.

Sheng, Wang (2020). Shanxi expects 15 percent reduction in energy consumption per unit of GDP in 2020. Global Times. https://www.globaltimes.cn/content/1208289.shtml.

Shleifer, A., Vishny, R. (1994). Politicians and firms, Quart. J. Econ. 109 (4), 994.1025.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Sovacool, B. K. and M. H. Dworkin (2015). "Energy Justice: Conceptual insights and practical applications." Applied Energy 142: 435-444.

Sovacool, B.K., Martikainen, M., Hook, A. et al (2019). Decarbonization and its discontents: a critical energy justice perspective on four low-carbon transitions. Climatic Change 155, 581–619. https://doi.org/10.1007/s10584-019-02521-7

Szulecki, Claes (2019). Towards Decarbonization: Understanding EU Energy Governance, Politics in Governance, Vol. 7, Issue 1, pg. 1-5. 10.17645/pag.v7i1.2029.

The State Council of the People's Republic of China (2017). Supporting Shanxi to Deepen Reform and Promote Energy and Economic Transition, State Council Decree no. 42.

TUBS (2011). Location of province Shanxi in China, Adobe Illustrator.

UK's Energy Research Centre (2014). Low Carbon Jobs: The evidence for net job creation from policy support for energy efficiency and renewable energy, UKERC.

UNFPA, UNICEF (2018). Domestic migrants in China (2018): trends, challenges and recommendations. NBS / UNFPA / UNICEF Joint Data Project.

Universal Declaration of Human Rights (1948). Universal Declaration of Human Rights, United Nations General Assembly.

Walker, Gordon (2012). Environmental Justice: Concepts, Evidence and Politics. Routledge.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

Wang, Z., Liu, H. (2020). Beautiful China Initiative: Human-nature harmony theory, evaluation index system and application. Journal of Geographical Sciences, 30(5) – 691-704. https://doi.org/10.1007/s11442-020-1750-7.

Wei, W. (2003). 'Current Issues of China's Coal Industry: The Case of Shanxi'. Proceedings of the 15th Annual Conference of the Association for Chinese Economics Studies Australia (ACESA).

Weng, Zhang (2017). The role of energy efficiency improvement and energy substitution in achieving China's carbon intensity target, Energy Procedia 142 (2017) 2786-2790. 10.1016/j.egypro.2017.12.422.

Wong, D. (2020). What to Expect in China's Five Year Plan? Decoding the Fifth Plenum Communique. China Briefing. https://www.china-briefing.com/news/what-to-expect-in-chinas-14th-five-year-plan-decoding-the-fifth-plenum-communique/

World Bank (2019). Shanxi Energy Transition and Green Growth Development Policy Operation, World Bank Loan (P170663).

World Bank, China Coal Information Institute Energy Sector Management Assistance Program (2008). 'Economically, socially and environmentally sustainable coal mining sector in China', The World Bank Report. https://documents1.worldbank.org/curated/en/902071468023456326/pdf/471310WP0CHA0E1tor0P09839401PUBLIC1.pdf.

Wu, Y., Schuster, M., Chen, Z., Le, Q., Norouzi, M., Macherey, W., & Dean, J. (2016). Google's neural machine translation system: Bridging the gap between human and

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

machine translation. Retrieved July 8, 2019, from https://arxiv.org/pdf/1609.08144v1.pdf

Xu, M., Stanway, D. (2021). China says EU's planned carbon border tax violated trade principles. Reuters, https://www.reuters.com/business/sustainable-business/china-says-ecs-carbon-border-tax-is-expanding-climate-issues-trade-2021-07-26/

Yao, Kevin, Meng, Meng (2016). China expects to lay off 1.8 million workers in coal, steel sectors. Reuters. https://www.reuters.com/article/us-china-economy-employment-idUSKCN0W205X

Yi, Shi (2021). China pledges to control coal power. China Dialogue. https://chinadialogue.net/en/climate/china-pledges-to-control-coal-power/

Yu, Cui, McJeon et al. (2020). Five Strategies to Achieve China's 2060 Carbon Neutrality Goal, Energy Foundation China, School of Public Policy.

Yu, Hu, Li, Chen (2020). Does the development of renewable energy promote carbon reduction? Evidence from Chinese provinces, Journal of Environmental Management 268 (2020) 110634. https://doi.org/10.1016/j.jenvman.2020.110634.

Zhang, H. (2019). Antinomic policy-making under the fragmented authoritarianism: Regulating China's electricity sector through the energy-climate-environment dimension. Energy Policy 128 (2019) 162-169.

จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

VITA

NAME	Lucile Laloue Charriaut
DATE OF BIRTH	27 November 1999
PLACE OF BIRTH	Bordeaux, France
INSTITUTIONS ATTENDED	Stamford International University Chulalongkorn University
HOME ADDRESS	Ideo Q Chula Samyan, 660 Rama IV Road, Maha Phruttaram, Bank Rak, Bangkok, 10500

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY