# Low-Carbon China: Paradigmatic domestic policies vs. aberrating overseas investments

Clara Himmelbauer, Ines Kusmenko, Lukas Diex

## Abstract

This paper was written as a seminar paper in the Research & Policy Specialization "Economic Development" at WU Wien and discusses the current Chinese climate change mitigation strategies on a regional, national and international level. By adapting its development model, China takes its core environmental-political interests into account and pays attention to national as well as regional aspects. Taking a closer look at the Chinese Five-Year-Plans reveals the country's core interests. The policies discussed in this paper show how paradigmatic the country's development model really is in achieving domestic climate neutrality. However, by processing data provided by the Boston University Global Development Policy Center, we contrast domestic Chinese policies with the behavior of their overseas investment spendings and are therefore able to show where and how the country departs from its climate mitigation standards.

## Contents

# 1. Introduction

China is the world's largest emitter of CO2-emissions (Harrison und Sundstrom, 2010). Partly this is due to the global north's history of outsourcing its production to developing countries. The Chinese growth model on the other hand focuses on industrial production which itself is highly pollutive. At the same time, China is facing severe consequences in the context of the climate crisis, of which its political leaders are highly aware of. However, they follow a different approach in achieving climate neutrality than Western countries. China is aiming at transforming both its society as well as its economic structure to achieve a low-carbon future (Li et al., 2019).

This paper explains the driving concepts of the Chinese approach in terms of economic, social, and political aspects, both on the regional, national and international level. Furthermore, we distinguish between domestic and international development policies to show how these policies differ and how they relate to the Chinese core interests in terms of climate change mitigation. Therefore, we will evaluate the current Five-Year-Plan (FYP) in the context of domestic emission reduction. Thus, we will also present a specific example of how China implements transition policies on a regional level. Additionally, by using two databases published by the Boston University Global Development Policy Center we trace Chinese foreign direct investments (FDIs). Furthermore, we will present one specific example of Chinese FDI, contrasting the domestic one.

The paper is structured as follows: after this first introduction, we will discuss China's motivation for environmental protection and climate mitigation; section (3) will show the relationship of power generation and coal; section (4) explains China's domestic climate policies according to the FYP and presents insights from specific projects; section (5) explains legal requirements for overseas investment and traces Chinese FDIs; in section (6) we will present recent developments and conclude on our findings. Since the length of this paper is quite limited, we will mostly focus on the energy sector in our paper.

# 2. China´s motivation for environmental protection and climate change mitigation

Chinese environmental protection and climate mitigation efforts are not a goal of the Chinese government per sé, but rather a by-product of other goals like economic development, poverty alleviation and social stability (Moore, 2011; Harrison und Sundstrom, 2010). While the European Union's "Green New Deal" aims at decoupling economic growth from the use of natural resources, China is about to undergo a transformation of its society as a whole. By

rethinking the way, a society and therefore its production is organized, China is aiming to construct a sustainable economic growth model, which shall lead to a comparative advantage of its economy on the global market (Moore, 2011). Li et al. (2019) labelled this approach "Authoritarian Environmentalism". It contains two major policy instruments: law and plan. Contrary to western governments, the Chinese authorities are focusing more on the planning instrument than the law side, which is hardly a surprise since China is heavily relying on its FYPs (Li et al., 2019). Examples of implementations of this approach today will be given in section (4).

There are multiple motivations for China's efforts towards sustainability. Studies like Barnett et al (2005) argue that Nort-East China and Tibet are confronted with water shortages, melting glaciers, draining rivers and droughts, which will have severe consequences on agriculture and food security. At the same time, the megalopolises of Guangzhou and Shanghai face high risks of extreme weather scenarios like both floods and droughts. In 2019 alone four million people across the country have been displaced because of environmental disasters (IPCC, 2022).

However, for the remainder of this paper, we will focus on the topic of energy-security which has become one of China's major concerns. The Chinese growth model led to increasing energy consumption and thus China has become dependent on energy imports, as its own resources are very limited. Energy-security includes improvements of energy-efficiency and the expansion of low-carbon technology: While energy-efficiency enhances overall efficiency of the economy, China sees a chance to enhance competitiveness and modernize its industrial sector through green technology leadership (Moore, 2011). Furthermore, the adaption of new green technology on a regional scale is seen as a motor for economic growth and poverty alleviation in rural areas, which fits well into the Chinese vision of an overall transition of both Chinese economy and society (Li & Li, 2020; Moore, 2011). Therefore, China is promoting active policies for regional development by allowing for larger autonomy of provinces, introducing stronger restrictions on air quality for fossil-fuelled power plants, and developing plans for low-carbon zones (DeCOALonize, 2018; Global Energy Monitor & Centre for Research and Energy on Clean Air, 2021; Moore, 2011). Increasing the provinces' autonomy does not undermine the centralization of the Chinese political system because the central government defines the national pollution reduction targets, which are then allocated to provinces, cities, and pollution sources. Furthermore, Chinese state officials incentivize local decarbonisation through a "yardstick competition" where local politicians may receive rewards and advance their careers, if local emissions are reduced effectively. This target responsibility system is one of the major institutional responses to climate governance and allows for regional strategic prioritization of

the two instruments (law and plan) (Li et al., 2019). Despite economic and social goals driving Chinese low-carbon transition, Chinese energy policy is a particular reflection of the alignment of regional climate goals and international climate security as well as economic development (Downs, 2004; Moore, 2011). In doing so, China can rely on past experiences regarding the alignment of economic development and the reduction of urban-rural inequalities. Even tough in 2014 incomes in the northern regions of China were still unevenly distributed and inequalities between rich coastal and poor interior regions have increased, China managed to bring down extreme poverty throughout the country. In each region, the Gini coefficient has fallen below the United Nations waring level of 0.40. (Liu et al., 2019). This was achieved by letting landlocked regions benefit from growth in coastal regions. In the light of globalization, incoming FDI was directed towards coastal regions to maintain and create necessary infrastructure to get involved in global trade. However, products traded in the coastal regions are often provided by the landlocked regions, which are specialized in extracting raw minerals and industrial production. Therefore, the countries' interior regions could also benefit from growth in coastal regions and ultimately bring down poverty (Ying, 2000). The constant extension of the Chinese railroad-network was another contributor to these coastal-landlocked growth spillovers (Zheng et al., 2013). At the same time, wage labor became much more generalized in rural regions, which is changing household-income structures. Furthermore, the 2007 global financial crisis marks a changing point in the structure of income growth. Before, high-income percentiles grow faster, which was reinforced by the concession of receiving property-income since the 2000s. Since the crisis, income growth in the low-income percentiles has taken die lead. Especially public-transfer income has played an important role in the years after 2007 (Luo et al., 2020).

## 3. The relationship to power generation and coal

Given the subordination of climate change to broader (growth-related) goals of the Chinese government, it is unsurprising that, although China's central government committed to the 2060 goal of carbon neutrality, its policies on the pathway to net zero are somewhat inconsistent. The inconsistency is in particular reflected in its energy policy, which is the most crucial sector for climate action as it accounts for up to 90% of China´s carbon emissions (IEA, 2021).

Primary energy demand is still growing, though more slowly. The slowdown has been brought about by stricter regulations on energy efficiency and the restructuring of the national economy towards services and lighter industries, which fits well into China's strategy to modernize the economy (IEA, 2021). The service sector has become the dominant source for GDP growth, its absolute size surpassing the industry sector (IEA, 2021). As a result, Chinese GDP and primary

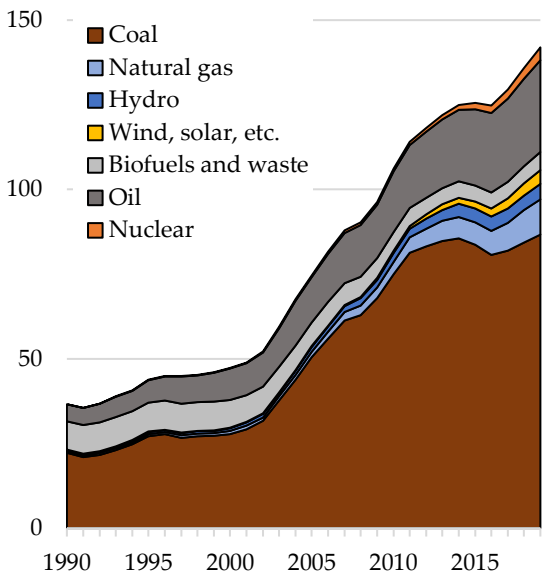


***Figure 1:*** *Total primary energy demand by fuel in China. Source: IEA, 2021*

energy demand started diverging, with the first growing by more than 400% between 2000 and 2020, and the latter growing by roughly 170% over the same period (IEA, 2021). However, the largest share of increase in demand for power is met by coal (IEA, 2021). Figure 1 displays total primary energy demand in China by fuel. It shows the large dependency of China from oil and coal and the still rather marginal role of renewables.

In general, the role of coal-based electricity consumption is a weak point in Chinese climate mitigation, accounting for more than half of the total primary energy production. Furthermore, China is currently consuming more than half of global coal (IEA, 2021). The important role of coal in the Chinese energy sector has historical roots. Coal has been one of the drivers of Chinese upward-development, it has played an important role in the country's transition to a market economy and is still contributing to the boost of economic activities in the Chinese provinces. Therefore, China is having difficulties in targeting coal to combat climate change (Global Energy Monitor & Centre for Research and Energy on Clean Air, 2021; IEA, 2021; Myllyvirta et al., 2020).

As such, China´s domestic construction of coal-fired power plants has experienced a new rise in recent years. Provincial authorities in particular are promoting coal-fired plants to enhance economic growth in their region which is a result of misleading central government incentives (Global Energy Monitor & Centre for Research and Energy on Clean Air, 2021). In contradiction to the 2020 coal plant cap of 1100 GW imposed by the Chinese government, coal restrictions have been loosened in previous years. The first loosening was brought about in 2014 by the shift of coal plant promotion from the central government to provincial authorities, which gave them the opportunity to construct new coal-fired power plants to trigger regional economic growth. It was followed by stricter limits on coal production in 2016. However, as economic growth cooled down in 2019, the Chinese central authority loosened its restrictions again, leading to a boom in the announcement of coal-fired power plants. Further loosening was permitted in the context of Covid-19, where provinces would be allowed to additionally expand coal capacity to overcome the economic decline during the pandemic. Table 1 displays the development of plans in constructing coal-fired power plants in China over the years.

| Status | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|
| Newly Commissioned | 49.4 | 39.5 | 33.5 | 48.9 | 38.4 |
| Newly Permitted | 54.3 | 15.5 | 1.7 | 11.4 | 36.9 |
| Started/resumed construction | 45.6 | 23.8 | 66.6 | 16.6 | 31.5 |
| Newly proposed | 20.9 | 33.5 | 17.9 | 61.5 | 73.5 |

***Table 1:*** *Coal-fired capacity (gigawatts) in China by plant status and year. Source: Global Energy Monitor and Centre for Research and energy on Clean Air, 2021.*

The importance of regional policies in determining Chinas carbon footprint is as well visible in regional discrepancies in CO2 emissions. CO2 emissions are found to be higher in highly industrialized north-eastern China, whereas western-and south-western regions are considered to emit less CO2 (Li & Li, 2020). Given the Chinese regulatory inconsistencies, it is no wonder that the radical cut of coal usage from 81% in 2007 to 57,7% in 2019 is rather driven economically as profitability of China´s excessive coal industry is about to decline with respect to renewables (Myllyvirta et al., 2020).

## 4. China´s national policies for decarbonisation

Throughout the early 2000s, China already started to perceive climate change as a serious threat to their core interests: economic development, which can be interpreted as growth, and social stability (Moore, 2011). While China´s goals for decarbonisation have been rather vague in the last decade, China´s new policy for the next two FYPs becomes more direct and ambitious in terms of specific steps towards its climate reduction goals (IEA, 2021). The 14$^{th}$ FYP (2021-2025) shows a more tangible strategy with more rigorous caps and regulations for coal consumption and strategic imperatives for the decarbonisation of industries, while the 15$^{th}$ FYP (2026-2030) is expected to mark the phasing out of coal (IEA, 2021). The FYPs are the main policy instruments in the Chinese economy, expressed for example in the 14$^{th}$ FYP presenting an overall vision and strategy for the coming years with concrete reduction goals not only for CO2 emissions, but other greenhouse gases as well as sectoraland technology policies. In the 14$^{th}$ FYP, China plans to reach carbon neutrality by 2060, but also imposes binding reduction targets for the near future. China plans to reduce both energy and carbon intensities by 13.5% and 18% respectively until 2025. Over the same period, it plans for a further expansion of non-fossil energy sources in primary energy use to a total of 20% share, mainly in hydropower, wind and solar energy (IEA, 2021).. While the Chinese market for wind and solar power is already the largest on the global scale, it is further projected to grow. Figure 2 shows that electricity from renewable energy sources such as wind and solar is planned to cover the bulk of energy

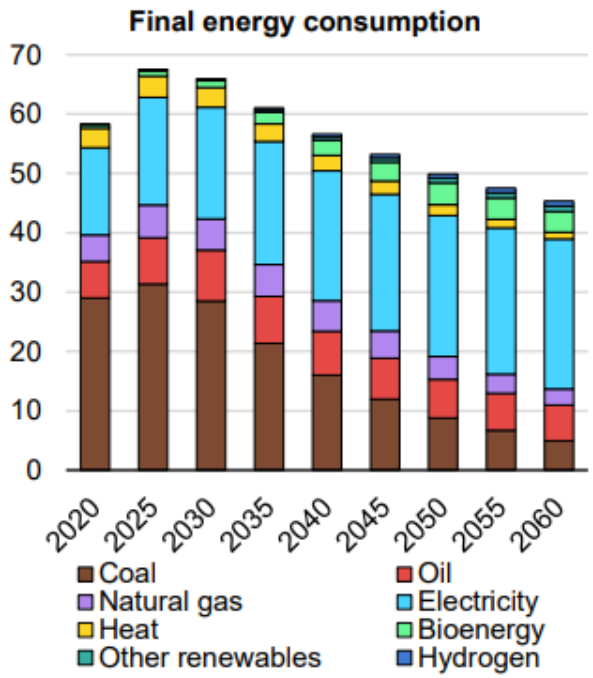


***Figure 2:*** *Projections of final energy consumption of the Chinese industry sector. Source: IEA, 2021.*

consumption of the Chinese industry sector in the future, and that the share of coal in its final energy consumption is about to diminish. The IEA is arguing that industrial energy consumption may decline as China shifts from heavy industry, including steel production, to green technology adoption, which implies that China is aiming at restructuring its industry composition. However, it can be stated that the process would include offshoring activities of heavy industries to geographical regions outside China, which on the one hand fits well into the image of the Chinese technology leadership, and on the other hand reflects our findings in section (5). In combination with its industrial leadership goals, China has already built-up reputation as a frontrunner in renewable energy technology, being the world leader in the production of solar photovoltaic panels and biogas production (IEA, 2021). It aims to prepare its industry for global leadership in the low-carbon sector. As such, China heavily invests in low-carbon energy R&D and expands on its patenting activities (IEA, 2021). Furthermore, Chinese start-ups have become attractive for investment from energy-venture capital. Regional low-carbon development is proposed to be boosted by low-carbon industrial zones. Based on the idea of special economic zones, which were heavily used by China to promote its economic transition to a market economy in the past, the low-carbon industrial zones shall promote regional clusters of high-tech low-emission industries in order to increase energy efficiency (Moore, 2011).

One example for such economic zones is the Suzhou New District (SND) and its circular economy concept. This concept is an approach designed to manage human activities on a sustainable basis by integrating human systems with natural systems, minimising energy and material use and the ecological impacts of human activities (Geng et al., 2009). It aims for creating a platform where companies provide location-based resource trading services, technology and exchange of information (Mathews et al., 2018). SND's industry is geared at the production of IT and electronical products. Figure 3 shortly illustrates the CE initiative regarding urban mining of copper for use by printed circuit board (PCB) manufacturers. This

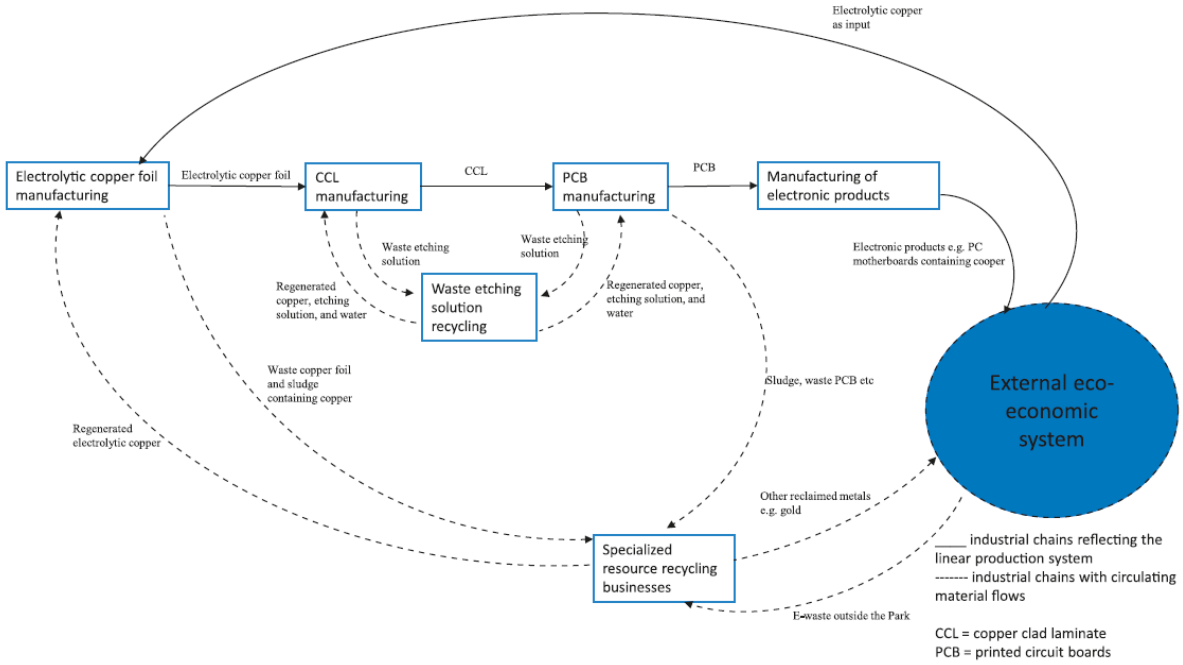


***Figure 3:*** *Circular Economy in the Suzhou New District (SND) Source: Mathews et al 2018*

type of value chain is based on closed-loop linkages, called circularity, and effectively involves "mining" the flows of copper as alternative to mining copper as a virgin resource (Mathews et al., 2018). In 2008, Suzhou New District (SND) was approved as one of the first three National Eco-Industrial Park Demonstration Sites in China. Thereby, institutional support includes the encouragement of state-owned banks to provide loans to CE projects (Mathews et al., 2018). If necessary, also the relocation of companies is a viable means of setting up CEs. The relocation of companies for the purpose of creating largescale eco-industrial parks such as the SND case, features several advantages arising from agglomeration economies like inter- and intra-industry exchange on information, technology or labor force (World Bank, 2009). In 2015, the SND project was reassessed by the National Development and Reform Commission. As a result, the energy intensity of firms in SND dropped by 20 percent. Other measures like chemical oxygen demand and the emissions of sulfur dioxide dropped by 47% and 38% respectively. The utilization rate of industrial waste and the recycling rate of industrial water achieved 95% and 90% respectively. Over the 13 years from 2001 to 2014, the Ministry of Environmental Protection approved the completion of 26 eco-industrial parks, such as SND, and 59 others to be constructed, further highlighting the government's favour for tackling industrial development also on a regional level (Mathews et al., 2018).

Furthermore, the SND comes with huge effort regarding urban planning. The industrial district consists not only of industry players but is also accompanied by urban planning investments ranging from schooling to warehousing in order to offer workers not only jobs but a place to live. When it comes to shaping social coexistence, one might also look at the Dalian eco-city

project. China's 13th biggest city shows how everyday life can change. The city pursued a program to establish two sets of water-pipelines. Un-drinkable water is used for industrial cooling, landscaping and toilet flushing. In terms of residential drinkable-water usage, the municipality implemented a quota management and pricing structure in case of overconsumption, teaching the city's population in considerate consumption. Newly constructed buildings, which will be attached to the dual-pipe-water-system, are required to follow further regulations such as installing energy saving architecture and solar heating systems. Furthermore, the city introduced a waste reporting system to trace and check waste flows. Additionally, a recycling system was implemented, where the monitoring and separation of different kinds of waste already starts at the community level (more less at the entry door of one's home) and ends in re-utilization as a means of energy supply. It has been shown that the amount of waste was reduced by 20%. Such projects are essential contributors to energy-security and therefore also social-stability (Geng et al., 2009). However, these policies are hardly ever implemented in rural and eastern regions. This is especially problematic as climate change impacts are distributed differently among regions but also among generations, income groups, occupations and genders[1]. Nevertheless, there is certain progress in applying such projects also to rural regions and these developments prove to be effective in terms of income-equality. The urban-rural income inequality between 2008 and 2019 strongly decreased, due to the amount of money as well as human resources that are spend on urban planning processes, just like the Suzhou New District or the Dalian eco-city project (Zouh & Shi, 2022).

## 5. Chinese overseas investment

In the present, Chinese overseas investment is mainly concentrated in the Belt and Road Initiative (BRI), a large-scale overseas investment program first proposed in 2013 and reaching over 138 countries (Harlan, 2021). Furthermore, the BRI was labelled as a catalyst for green development by the Chinese government in 2017 (Harlan, 2021; Hou Liquiang, 2018). Most of the projects funded under the BRI are infrastructure projects, such as building roads, railways

[1] In general, the rural population is less developed than urban regions, but due to their different social roles, men and women are affected differently. Especially women in rural areas in developing countries are particularly disadvantaged due to their limited access to resources and justice, limited mobility, and limited voice in decision-making processes. Despite the National Working Committee on Children and Women (NWCCW) existing since 1995 and several up-to-date reports about women in the context of climate change, the Chinese government has not taken care of the specific situation of women. Instead, it is mainly grass-roots organizations of women in urban regions fighting for their involvement in decision-making processes (Zhou and Sun, 2020). However, as the country aims at developing its rural regions, this also includes improving literacy rates, as well as household structures, meaning the division of labor and general encouragements of female labor force participation other than in the care sector or agriculture (Li et al, 2019).

and ports. However, Chinese investment is also conducted into construction, extraction and the power sector. Overseas development finance is mainly provided by two Chinese development Banks, namely the China Development Bank and the Export-Import Bank of China (K. P. Gallagher, 2018). The two development Banks are on the rise of becoming the largest development actors globally, with energy investment sums exceeding the overall sum of energy financing of all Western funded multilateral banks, including the World Bank (K. P. Gallagher, 2018).

There are numerous reasons for China to invest overseas. The main reasons for Chinese foreign direct investment (FDI) are an easier access to resources and raw materials, the integration to Chinese export markets, an opportunity to employ excess capacity and geopolitical support against dominant Western countries. Initially, during the Cold War period, not much investment was yet conducted, and South-South cooperation and ideological interests played a major role to establish diplomatic connections (Agbebi and Virtanen 2017). Subsequently, access to resources and energy has become more important in the early 2000s. In recent years, stagnating growth in mainland China has changed the focus on exporting excess capacity. Furthermore, shifting dirty production processes abroad allows China to mitigate emissions domestically.

Figure 4 provides a regional overview over Chinese overseas investment between 2008 and 2019. The left graph shows the absolute amount invested in a country, whereas the figure on the right-hand side puts this in relation to the respective country's 2019 GDP. China's FDI has been going into most countries of the Global South. There are 8 countries where Chinese FDI from 2008 to 2019 has surpassed 30% of this country's 2019 GDP: Angola, the Republic of Congo, Djibouti, Dominica, Fiji, Kyrgyzstan, Venezuela, and Samoa.

For a better overview on Chinese FDI and the projects realized in each country, we provided the following webapp: https://clara-himmelbauer.shinyapps.io/China_webapp/[2].

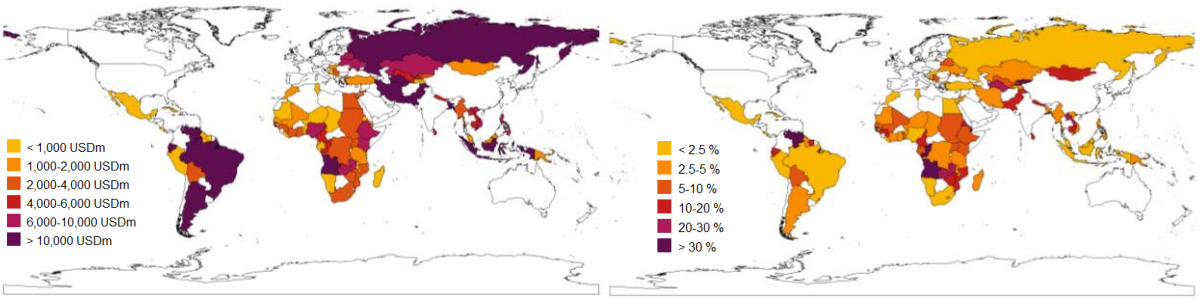


***Figure 4:*** *Chinese Overseas Investment 2008-2019; absolute and in % of 2019 GDP.*

*Sources: Ray, Rebecca, Kevin P. Gallagher, William Kring, Joshua Pitts, and B. Alexander Simmons. "Geolocated Dataset of Chinese Overseas Development Finance."; IMF World Economic Outlook; own representation*

[2] Unfortunately, it takes a few seconds to load when you first open it. Please be patient.

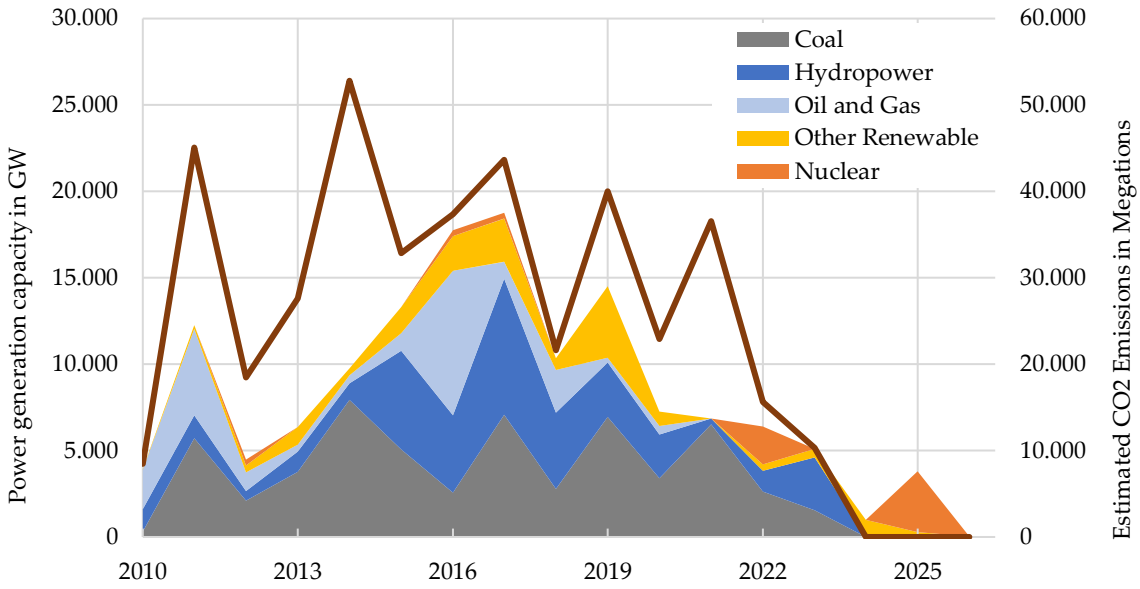


***Figure 5:*** *Power generation capacity commitments outside China with Chinese development finance and foreign direct investment. Future projections start after 2020. "Other Renewable" includes Solar, Wind, Geothermal and Biomass power. Source: Gallagher, Kevin P., Li, Zhongshu, Chen, Xu, Ma, Xinyue (2019); own representation*

As before, we focus on the energy sector. Figure 5 shows Chinese commitments in the construction of power generating capacity over the last decade. Coal power plants are key in its overseas energy investment portfolio, with 40% of total capacity generated by coal (Ma, 2020). As we can see in the figure, there is a close co-movement between emissions and the sum of projects from fossil energy sources. It is estimated that emissions from plants (co)financed by China amount to roughly 3.5% of global CO2 emissions of the power sector outside China. However, over the last decade, the importance of hydropower and renewable energy sources has been on the rise, as they are in the Chinese domestic power generation sector. Figure 6 depicts the capacity of powerplants financed with Chinese development finance outside of China broken down to different regions. It is striking that especially in peripheral regions like Southeast Asia, South Asia, Africa and the Middle East, most financed projects are coal projects.

The main weaknesses of Chinese energy investments abroad seems to mirror on the shortcomings and inconsistencies of domestic politics in China. Gallagher and Qi (2021) find that environmental policies imposed on overseas investments are less strict than on domestically deployed investments. Whereas there are number of environmental restrictions and regulations a company must comply with when investing domestically, the only requirement for overseas investment is that Chinese firms must comply with the receiving country's environmental regulations. Thus, investments into fossil fuel are not restricted abroad, as they are in China. Gallagher et al. (2021) add that while the Chinese authority fails to extend its domestic

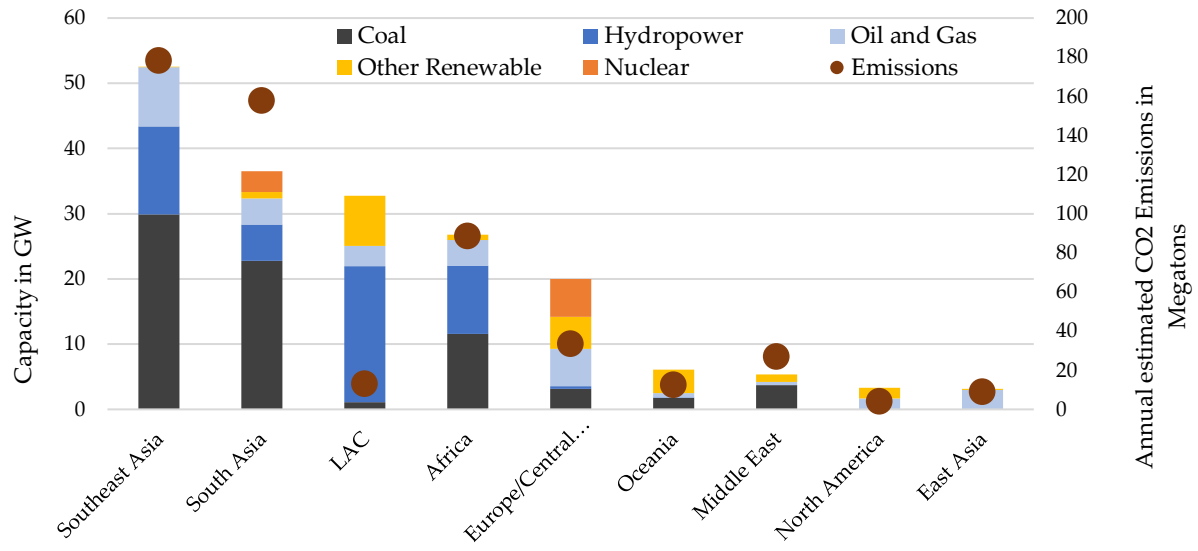


***Figure 6:*** *Regional Energy Source Distribution by Capacity and Estimated Annual 203 Emissions. "Other Renewable" includes Solar, Wind, Geothermal and Biomass power.*

*Source: Gallagher, Kevin P., Li, Zhongshu, Chen, Xu, Ma, Xinyue (2019); own representation*

regulations to overseas investments, neither do the governments of recipient countries put in place stringent environmental policies on Chinese investors.

As a result, Chinese investments do currently not utilize their potential to drive low-carbon transition abroad but deploys mainly brown field investment (Harlan, 2021; World Resources Institute, 2018). Harlan (2021) finds that among remaining green BRI projects, low-carbon infrastructure is mainly constructed in higher-income countries (see Figure 6). Contrarily, in lower income countries, China is mainly active in risk mitigation activities. It follows that these BRI projects are more about 'green-washing' than green development. This fact can also be seen in the databases on Chinese overseas investment. Although China is financing many hydropower projects, they cannot, in general, be classified as "green", since many of them are in critical habitats and have severe environmental and societal consequences (Tan-Mullins et al., 2017). Moreover, Chinese overseas investments spoil outstanding domestic projects like the SND eco-industrial park.

**Infobox 1: Case Study: Lamu Coal power plant**

Recently, media attention was paid to the construction of a coal power plant in southern Kenya. The Lamu Coal power plant was first proposed in 2005 along the coastline near the small city of Lamu (DeCOALonize, 2018). The project was promoted by the Chinese government and several international investors, including General Electric, the African Development Bank and the Chinese ISBC Bank (Muchangi, 2020a). It was part of a larger infrastructure project, namely the Lamu Port-South Sudan-Ethiopia-Transport corridor which should include the construction of a port in Lamu, an airport, railways and highways as well as an oil pipeline (DeCOALonize, 2018).

The power plant was planned to be the first coal plant in Kenya (Muchangi, 2020a). With a production capacity of 1,050MW, it would have been the largest coal power plant in East Africa, increasing Kenya's carbon footprint by up to 700% (Leithead, 2019). In fact, Kenya is one of the forerunners in climate mitigation: renewable energy accounts for two thirds of Kenya's electricity. Still, Kenya has committed to further reduce its carbon emissions by a third until 2030. Additionally, Kenya does not need the power plant to meet its electricity demand over the next decade since it produces enough energy from current production and an expansion of renewables (DeCOALonize, 2018).

The power plant was subject to widespread critique due to potential adverse effects on the local environment, local communities and culture, and health of the local citizens (DeCOALonize, 2018). Moreover, it was expected to disturb the local maritime ecosystem, change water temperature and cause acid rain. Furthermore, the acid emissions of the operating power plant would have affected protected areas. Acid rain during construction would have triggered a tremendous decline of the local economy by impacting the local fishery and agricultural sectors as well as depleting the materials needed for local arts and crafts. Subsequently, the corrosion of historical buildings at the Lamu UNESCO World heritage site, which is the oldest Swahili settlement in the region, and potential destruction of the local coral reefs would further contribute to a decline in tourism.

Pollution was considered a major issue by civil society as regulations appeared to be low. While China imposes strict policies on its own coal-fired plants to avoid pollution and adverse health effects, the power plant in Kenya was allowed to circumvent these regulations, with the permission to emit up to ten times more than would be allowed in China. A lower air quality would have affected more than 400,000 people in the region while the intoxication of ground water may contribute to severe damages to the organ systems and higher mortality among the population.

While the power plant would have adverse effects on the local population, the same holds true for the Kenyan state. The Lamu power plant was planned to be financed by credits, and construction would be done by Chinese contractors, therefore local companies would not profit. (Muchangi, 2020b). However, Kenya would have become exposed to further structural dependencies as it would have needed to import the coal from South Africa (DeCOALonize, 2018; Muchangi, 2020a). Widely shared critique among local citizens led to massive civil unrest, including protests and the organisation of a petition by local communities and civil activists against the project (DeCOALonize, 2018). Finally, the National Environment Management Authority was sued by the civil society group DeCOALonize for not taking into consideration the negative impact of the project on farmlands and the local fishing industry when approving the project by law. In 2019, the National Environmental Tribunal put the project on hold, pointing to the unsatisfactory quality of the environmental assessment and an insufficient information of the public on potentially adverse health effects of the power plant ("Kenya Halts Lamu Coal Power Project at World Heritage Site," 2019).

Consequently, initial investors, such as the Standard Bank of South Africa, General Electric and the African Development Bank, dropped out because of environmental and social risks after the project was put on hold (Muchangi, 2020a). In 2020, the Industrial and Commercial Bank of China - the biggest investor with a share of 60% of the total project costs of $1.2 billion - abandoned the project, leaving the project developer and Kenya´s Centum Investment as the only sponsors (Muchangi, 2020b). Overall, the process of the Lamu project reveals how civil society can rise up against projects which are not in their interests and how financial interests can counteract environmental and civil society interests.

## 6. Recent developments

China declared it would stop financing overseas coal power plants, however, details of the policy remain unclear. Still, the pure announcement showed visible effects, as shortly afterwards the Bank of China followed with an announcement to end its financing of coal

projects from October first (*How China Shapes the World's Coal - BBC Future*, 2022). Therefore, it can be expected that Chinese institutions will abstain from coal financing in the future and align towards more climate-friendly energy investments. However, there are concerns that this will at first lead to more spending in gas instead of renewable sources (The China in Africa, 2022). If Chinese institutions are to withdraw from currently planned but not yet built coal fired plants, it is estimated that 10 gigatons of CO2 emissions could be saved, which equals to 3 months of global CO2 emissions or one year of Chinese emissions (Watts, 2021). Coal-related investments in developing countries are expected to be replaced by low-carbon investments instead, a development that has already started in recent years but is expected to gain additional momentum after Xi Jinping's announcement (Sun, 2021). Given the magnitude of Chinese investments over the last years, China may - in alignment with the image of low-carbon China - become one of the drivers for worldwide low-carbon investment in the future. However, most coal-power plants financed with Chinese FDI have only started operating in recent years and are therefore relatively competitive and are planned to produce energy for the next decades. Therefore, early retirement strategies for these coal-fired power plants are needed (Nedopil et al, 2022).

## 7. Conclusions

Throughout this paper, we discussed aspects of China's core interests in environmental politics and linked it to the country's economic cornerstones. However, by focusing on energy-security and especially by analysing regional, national and international policies we uncovered inconsistencies of Chinese policies, domestically and overseas. While China strives to become a role model in terms of climate change mitigation, the country is greenwashing its national statistics in order to comply with international agreements. Despite the country's ambitious goals embedded in current FYPs, newly built coal mining plants will probably be active for longer years, thereby hindering emission reduction.

Furthermore, we showed how approaches to climate change mitigation can differ. China's unique way of transforming its society by making use of its centralised authoritarian state does allow for more drastic changes in everyday life. At this point we want to point out that there are serious downsides related to "authoritarian envirnomentalism", which we could not cover in this paper, and which are furthermore subject to different fields of political sciences. Nevertheless, the SND eco-industrial park shows that centralisation does not hinder bottom-up development, where certain role models are publicly encouraged to demonstrate possible solutions for different regional needs.

Summing up, China moves into the direction of achieving a leading position in certain areas of climate mitigation. However, one needs to be cautious when evaluating such developments. Low-carbon China is driven by the idea of imperialistic growth, economically and politically, which makes it hard to differentiate between climate change mitigation strategies and expansions of (international) political power as the driving forces behind China's environmental strategy and transition. Additionally, the Global South still has to bear the costs of Chinese growth as the transition to a low-carbon China is concentrated on Chinese territory. However, there is at least one major finding, which should inspire western policy makers. Understanding the economy as being shapable by actors other than market forces does not hinder creativity and entrepreneurship. Circular Economy projects should encourage the global north to rethink the way its production is structured. We believe that structural change, as well as overcoming the capitalist growth imperative and political constraints which often hinder transition projects, are necessary steps to an environmentally sound future.

## 8. References

Agbebi, Motolani, Petri Virtanen (2017). Dependency Theory – A Conceptual Lens to Understand China's Presence in Africa?. Forum for Development Studies. 44 (3). 429-451.

Barnett, T.P., Adam, J.C., & Lettenmaier, D.P. (2005). Potential Impacts of a Warming Climate on Water Availability in Snow-dominated Regions. Nature (438). 303–9.

China (CHN) Exports, Imports, and Trade Partners | OEC - The Observatory of Economic Complexity. (2022, May 17). https://oec.world/en/profile/country/chn.

DeCOALonize. (July 2018). The Impacts on the Community of the Proposed Coal Plant in Lamu:: Who, if Anyone, Benefits from Burning Fossil Fuels? (Perspectives. No. 31). https://wedocs.unep.org/bitstream/handle/20.500.11822/25363/Perspectives31_ImpactCoalPlantLamu_28032018_WEB.pdf?sequence=1&isAllowed=y.

Downs, E. S. (2004). The Chinese Energy Security Debate. The China Quarterly, 177, 21–41. https://doi.org/10.1017/S0305741004000037.

Downs, E., Becker, J., & Degategno, P. (2017). China's Military Support Facility in Djibouti: The Economic and Security Dimensions of China's First Overseas Base. Center for Naval Analyses Arlington United States.

Gallagher, Kevin P., Li, Zhongshu, Chen, Xu, Ma, Xinyue (2019), "China's Global Power Database," Global Development Policy Center, Boston University. https://www.bu.edu/cgp/

Gallagher, K. S., Bhandary, R., Narassimhan, E., & Nguyen, Q. T. (2021). Banking on coal? Drivers of demand for Chinese overseas investments in coal in Bangladesh, India, Indonesia and Vietnam. Energy Research & Social Science, 71, 101827. https://doi.org/10.1016/j.erss.2020.101827

Gallagher, K. S., & Qi, Q. (2021). Chinese Overseas Investment Policy: Implications for Climate Change. Global Policy, 12(3), 260–272. https://doi.org/10.1111/1758-5899.12952

Gallagher, K. P. (2018). China's Global Energy Finance: Poised to Lead. Energy Research & Social Science, 35, 15–16. https://doi.org/10.1016/j.erss.2018.01.001

Geng, Y., Zhu, Q., Doberstein, B., & Fujita, T. (2009). Implementing China's circular economy concept at the regional level: A review of progress in Dalian, China. Waste Management, 29(2), 996-1002.

Global Energy Monitor, & Centre for Research and Energy on Clean Air (Eds.). (2021). China Dominates 2020 Coal Plant Development: Aggressive Pursuit of Coal puts 2060 Carbon-Neutral Goal at Risk. Global Energy Monitor. Briefing. https://globalenergymonitor.org/wp-content/uploads/2021/02/China-Dominates-2020-Coal-Development.pdf

Harlan, T. (2021). Green development or greenwashing? A political ecology perspective on China's green Belt and Road. Eurasian Geography and Economics, 62(2), 202–226. https://doi.org/10.1080/15387216.2020.1795700

Harrison, Kathryn, und Lisa McIntosh Sundstrom, hrsg. 2010. „Chinese Climate Policy: Domestic Priorities, Foreign Policy, and Emerging Implementation". In Global commons, domestic decisions: the comparative politics of climate change, American and comparative environmental policy, Cambridge, Mass: MIT Press, 229–59.

Hou Liquiang. (2018, November 3). Nation will promote green Belt and Road. http://www.chinadaily.com.cn/a/201811/03/WS5bdcee26a310eff30328651b.html

IEA. (2021). An energy sector roadmap to carbon neutrality in China – Analysis - IEA. https://www.iea.org/reports/an-energy-sector-roadmap-to-carbon-neutrality-in-china

IMF (2022). World Economic Outlook Database. https://www.imf.org/en/Publications/WEO/weo-database/2022/April, accessed 13.05.2022.

Intergovernmental Panel on Climate Change (IPCC). 2022. Sixth Assessment Report. Intergovernmental Panel on Climate Change (IPCC). Fact Sheet. https://www.ipcc.ch/report/ar6/wg2/downloads/outreach/IPCC_AR6_WGII_FactSheet_Asia.pdf (22. April 2022).

Kenya halts Lamu coal power project at World Heritage Site (2019, June 26). BBC News. https://www.bbc.com/news/world-africa-48771519

Leithead, A. (2019, June 5). Row over Chinese coal plant near Kenya World Heritage site of Lamu. BBC News. https://www.bbc.com/news/uk-48503020

Li, J., & Li, S. (2020). Energy investment, economic growth and carbon emissions in China—Empirical analysis based on spatial Durbin model. Energy Policy, 140, 111425. https://doi.org/10.1016/j.enpol.2020.111425

Li, X., Yang, X., Wei, Q., & Zhang, B. (2019). Authoritarian environmentalism and environmental policy implementation in China. Resources, Conservation and Recycling, 145, 86-93.

Liu, Q., Wang, S., Zhang, W., Li, J., & Kong, Y. (2019). Examining the effects of income inequality on CO2 emissions: Evidence from non-spatial and spatial perspectives. Applied Energy, 236, 163-171.

Luo, C., Li, S., & Sicular, T. (2020). The long-term evolution of national income inequality and rural poverty in China. China Economic Review, 62, 101465.

Ma, Xinyue (2020). Understanding China's Global Power. GCI Policy Brief. Global Development Center, Boston University.

Mathews, J. A., Tan, H., & Hu, M. C. (2018). Moving to a circular economy in China: transforming industrial parks into eco-industrial parks. California Management Review, 60(3), 157-181.

Moore, S. (2011). Strategic imperative? Reading China's climate policy in terms of core interests. Global Change, Peace & Security, 23(2), 147–157. https://doi.org/10.1080/14781158.2011.580956

Muchangi, J. (2020a, November 18). Lamu coal plant's biggest investor abandons project. The Star. https://www.the-star.co.ke/news/2020-11-18-lamu-coal-plants-biggest-investor-abandons-project/

Muchangi, J. (2020b, November 20). Chinese bank pulls out of proposed Lamu coal-fired power plant in Kenya. Institute for Energy Economics & Financial Analysis. https://ieefa.org/chinese-bank-pulls-out-of-proposed-lamu-coal-fired-power-plant-in-kenya/

Myllyvirta, L., Zhang, S., & Shen, Y. (2020, March 24). Analysis: Will China build hundreds of new coal plants in the 2020s? Carbon Brief. https://www.carbonbrief.org/analysis-will-china-build-hundreds-of-new-coal-plants-in-the-2020s

Nedopil, C., Springer C., Volz U., Yue M. (2022). The Potential for Early Coal Plant Retirement. GCI Policy Brief 014. Global Development Center, Boston University.

Tan-Mullins, M., Urban, F., & Mang, G. (2017). Evaluating the Behaviour of Chinese Stakeholders Engaged in Large Hydropower Projects in Asia and Africa. The China Quarterly, 230, 464-488.

The China in Africa Podcast (2020). State of the BRI and the Messy Politics of a "Just Climate Transition". The China in Africa Podcast. 29.04.2022. https://open.spotify.com/episode/6eBjXRVjygTtwETzAAyESG?si=9osLBbndQtimO8DVhaogHA

World Bank, (2009). World Development Report 2009: Reshaping Economic Geography, Chapter 4: Scale Economies and Agglomeration. 126-145.

World Resources Institute. (2018). Moving the Green Belt and Road Initiative: From Words to Actions. Washington, D.C.

Ying, L. G. (2000). Measuring the spillover effects: Some Chinese evidence. Papers in regional science, 79(1), 75-89.

Zheng, Siqi, und Matthew E. Kahn. 2013. „China's Bullet Trains Facilitate Market Integration and Mitigate the Cost of Megacity Growth". Proceedings of the National Academy of Sciences 110(14).

Zhou, Q., & Shi, W. (2022). How does town planning affect urban-rural income inequality: Evidence from China with simultaneous equation analysis. Landscape and Urban Planning, 221, 104380.

Zhou, Y., & Sun, X. (2020). Toward gender sensitivity: Women and climate change policies in China. International Feminist Journal of Politics, 22(1), 127-149.