Promoting Extractivism as Sustainable Development? An Analysis of Morocco's Renewable Energy Strategy

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Abstract

The importance of renewable energy (RE) in the global economy is increasing. This provides great economic opportunities for developing countries with a high RE potential, but simultaneously risks exposing these countries to an unjust energy transition as a consequence of energy production. Therefore, this thesis investigates the political-economic implications of RE on extractivism, to better understand the potential costs and benefits of RE developments for developing countries. Hence, the research question is; *In what ways does Morocco's renewable energy strategy reinforce patterns of extractivism, and how does energy extractivism reproduce existing power dynamics?* This is examined through a within-case study analysis of Morocco's renewable energy strategy by developing a framework of energy extractivism. It finds that Morocco's energy strategy reinforces patterns of extractivism at two different junctions; Firstly, the international/national level that is formed by an underlying interdependence of (financial) resources and energy that sustain neo-colonial dynamics. Secondly, the national/local level that promotes extractivism as development in peripheral zones by transferring socio-environmental costs to local communities. Energy extractivism reproduces power dynamics through these junctions as it reasserts the influence of the elite on development and maintains social hierarchies at the local and national levels. However, a similar process is not (yet) present at the international level although some patterns of extractivism are. The study is relevant to broader literature on extractivism and RE development since it addresses the roles of both national RE strategies and international structures on energy appropriation. It is critical to assess these potential risks and opportunities early in the energy transition in developing countries before any adverse extractivist effects occur.

Keywords: Extractivism, Energy Strategy, Renewable Energy, Sustainable Development, Morocco

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Chapter 1. Introduction

"The country that owns green, that dominates that industry, is going to have the most energy security, national security, economic security […] and most of all, global respect" (Friedman, n.d.).

As the urgency of the climate crisis continues, the international community intensifies its decarbonization efforts and the transition to renewable alternatives. Growing demand for clean electricity, driven by high-energy consuming countries, is creating new export markets for renewable energy (RE) (Leonard et al., 2022). By 2030, this global market is projected to reach 2 trillion USD, more than double the market size compared to 2020 (GlobeNewswire, 2022). Therefore, RE provides great economic opportunities, particularly for developing countries with a high RE potential, such as the MENA region (Eisgruber, 2013).

Morocco often serves as an example of such a country due to its ambitions to become a regional energy powerhouse, aiming to generate 52% of its energy consumption through renewable sources before 2030 (Alami, 2021). Within the public discourse, Morocco's strategy is celebrated for its efforts in diversifying the country's energy mix (Alami, 2021). However, this strategy has been associated with increased extractivist practices and negative externalities for the local communities where RE projects are constructed (Aoui et al., 2020; Cantoni & Rignall, 2019). Similarly, recent scholarship has alerted to a new mode of extractivism related to the global energy transition (Bruna, 2022). While extractivism widely refers to the removal and export of natural resources as a means of economic development (Acosta, 2013), it has evolved into a political-economic model that structures national production processes along the global capitalist system (Ye et al., 2022). Therefore, energy strategies – that strive to harness the RE potential – and the hierarchical international system, risks exposing developing countries such as Morocco, to an unjust energy transition by perpetuating neo-colonial practices and unequal distribution of socio-environmental costs (Hamouchene, 2016; Okpanachi et al. 2022). This reinforces both national and global power dynamics and legitimizes extractivism as a means to achieve sustainable development in industrialized countries (Voskoboynik & Andreucci, 2021).

This thesis aims to understand the broader consequences of RE projects beyond energy production. It investigates the political-economic implications of RE on extractivism in Morocco,

to better understand the potential costs and benefits of RE projects for developing countries. Hence, the research question of this study is; **In what ways does Morocco's renewable energy strategy reinforce patterns of extractivism, and how does energy extractivism reproduce existing power dynamics?** I will examine these patterns through a within-case study analysis of Morocco's renewable energy strategy (RES) by developing a framework of energy extractivism. The study is relevant to the broader literature on extractivism and RE development since it addresses the roles of both national energy strategies and international structures on the appropriation of RE. It is critical to assess these potential risks and opportunities early in the energy transition in developing countries before any adverse extractivist effects occur.

The paper provides a theoretical contribution to analyzing energy transitions by focusing on the implications of RE developments for sacrifice zones and their effects on power dynamics. It finds that Morocco's RES reinforces patterns of extractivism at two different junctions; Firstly, the international/national level that is formed by an underlying interdependence of (financial) resources and energy that sustain neo-colonial dynamics. Secondly, the national/local level that promotes extractivism as development in peripheral zones by transferring socio-environmental costs to local communities. Energy extractivism reproduces power dynamics through these junctions as it reasserts the influence of the elite on development and maintains social hierarchies at the local and national levels. However, a similar process is not (yet) present at the international level although some patterns of extractivism are.

The paper commences as follows; First, it offers a justification of methodology and case selection. It then introduces the theoretical framework of energy extractivism as an alternative approach to analyzing the global energy transition. After contextualizing Morocco's RES in the context of its economic integration into the global economy, it discusses how extractivism can operate in large-scale RE projects. Next, it analyzes the role of production networks in Morocco's energy sector and investigates RE flows in the context of international trade to understand whether energy extractivism can influence power dynamics in the international system. Finally, concluding remarks will be made on the role of RE strategies in reinforcing patterns of extractivism in Morocco.

Methodology

The thesis explores the role of RE strategies in reinforcing patterns of extractivism in Morocco. It introduces the concept of energy extractivism as an alternative framework to green extractivism, which is concerned with the extraction of physical resources for the energy transition, and applies it to RE production (Bruna, 2022). This approach aims to provide a more nuanced perspective on the global energy transition by considering the implications for sacrifice zones – areas disproportionately impaired by extraction and processing for economic development – where large-scale RE projects are commonly located (Klein, 2014). Due to the ongoing nature of RE strategies in developing countries, Morocco serves as a suitable case study because their strategy has been implemented since 2009 and RE already contributes a relatively large share of Morocco's energy mix compared to other developing countries (Alami, 2021; Brunet et al., 2022). This also reduces the influence of time lags in the analysis between implementation, RE development, and the potential manifestations of energy extractivism, since the strategy had more time to materialize. Furthermore, the paper conducts a within-case analysis of Morocco's RES to develop a comprehensive understanding of whether energy extractivism reproduces existing power dynamics. Although this method is limited to one particular context, it allows for an in-depth analysis of RE strategies and helps identify relevant processes and/or relationships that may otherwise be overlooked (Mills et al., 2010).

The empirical analysis is divided into three components that are identified in the theoretical framework. The Noor Power Station serves as a case study to supplement the analysis of the local implications of large-scale RE projects. It utilizes both ethnographic studies and English-language newspapers to investigate the effects on local communities due to the author's limited access to primary (local) sources. Additionally, the paper relies on peer-reviewed sources for the overall analysis of Morocco's RES. Finally, all data presented in the study is retrieved from reliable and open-access databases, including those administered by the World Bank, Our World in Data, and United Nations Statistics Division.

The author acknowledges that his positionality towards the topic may influence the analysis and implications of the study to some extent. As an environmental justice advocate, I take a critical approach to analyzing the political economy of energy transitions. However, coming from a Western European country, I also recognize that these neo-colonial arrangements benefit my

society and that I cannot adequately portray the implications of RE developments on marginalized groups in Morocco. Regardless, it is an important topic to investigate as I aspire to a career in energy or environmental policymaking. Thus, this topic will give me a more comprehensive understanding of the impacts of sustainability policies on people in sacrifice zones.

Chapter 2. Theoretical Framework: (Renewable) Energy Extractivism

Extractivist Practices in the Global Energy Transition

The global energy transition is subject to extractivist practices that disproportionately affect developing countries due to increasing demand for (natural) resources and RE. Extractivism refers to an economic theory that prioritizes the removal and export of natural resources as a means of economic development (Acosta, 2013). It is often associated with several negative externalities including habitat destruction and impoverished communities (Ye et al., 2020). The underlying dynamics of extractivism can be traced back to the exploitation of resources and labor during the colonial period (Acosta, 2013; Gago & Mezzadra, 2017).

The concept was first introduced by Eduardo Gudynas in 2009, who critiques the neoliberal strategy of privatizing the export of raw materials in Latin America (Burchardt & Dietz, 2014). He defines extractivism as "the appropriation of natural resources in large volumes and/or high intensity" (p. 62), and argues that the concept; 1) is not applicable in relation to the global capitalist system, and 2) only applies to physical resources (Gudynas, 2018). However, both arguments are contested by many scholars (e.g., Chagnon et al., 2022; Radhuber, 2015). For example, Ye et al. (2020) argue that extractivism has evolved from a temporal phenomenon into a political-economic model that structures national production processes along the global capitalist system. They suggest that previously dispersed extractivist activities in peripheral areas are increasingly expanding into other economic sectors such as finance, industrial production and trade (Veltmeyer & Bowles, 2014; Ye et al., 2020). This has resulted in a fundamental role of extractivism in contemporary global economic dynamics, including production networks, factors of production, and nature (Chagnon et al., 2022; Patel & Moore, 2017). For example, Radhuber (2015) suggests that extractive processes are the foundation of all production networks because they depend on the appropriation of nature, and show the co-constitution of social relations, natural environment, and processes of commodification. These extractive processes highlight the underlying power dynamics and inequalities that exist in production networks because they frequently exhibit only strong global integration but local disarticulation (Radhuber, 2015). Therefore, Chagnon et al. (2022) argue that the political-economic manifestation of extractivism is "based on socio-ecologically destructive processes of subjugation, depletion, and non-reciprocal relations, occurring at all levels of practices" (p. 762). Such extractivist socio-economic dynamics extend to

the production of RE, as large-scale projects can perpetuate the development of "sacrifice zones", similar to other forms of extractivism (Klein, 2014, p. 97). This suggests a continuation of core-periphery dynamics in relation to energy transitions.

More recently, 'green extractivism' has been introduced to describe the impacts of climate-related policies on the continuation of extractivist practices. This process is referred to as the "capitalization of nature in the name of the environment", and critiques the discourse on sustainable development (Bruna, 2022, p. 847). The framework has not yet been applied to the context of RE projects. Regardless, some argue that climate policies are used to legitimize and institutionalize efficiency-driven extractivist practices (Voskoboynik & Andreucci, 2021). Similarly, Dunlap (2021) argues that industrial-scale RE not only reinforces societies' exploitative relationships with ecosystems but also illustrates the transformation and growth of the political and capitalist system. He suggests that both fossil fuels and RE create conditions for the prolongation of the consumer society and its ecological modernization at the expense of environmental degradation.

Sustainable Development: Theories of Ecological Development

There is an ongoing debate within environmental sociology about the relationship between economic growth and the environment. This discussion is dominated by the Treadmill of Production theory (ToP) and the Ecological Modernization Theory (EMT). These theories suggest that society is dependent on the biophysical world (Jorgenson & Clark, 2012), but they differ in their understanding of the effects of human activities on the environment.

The EMT argues that the environmental impact of economic growth is likely to diminish over time as more economic prosperity and technology are acquired that can reduce ecological costs (Givens et al., 2019; Jorgenson, 2016a). It proposes a 'business as usual' approach to sustainable development and is associated with the liberal political approach because it offers an optimistic perspective on growth (Givens et al., 2019). This perspective suggests that economic development can be promoted alongside protecting the environment and promoting global justice. The EMT suggests that modernization stimulates an 'ecological rationality' in societies which helps alter certain cultural and institutional attitudes towards sustainable development (Givens et al., 2019; Mol, 2001). This should ultimately result in more attention to environmental concerns and (potential) ecological costs in decision-making on economic development. Therefore, according

to Jorgenson and Clark (2012), developed countries are more likely to decouple their economies from their dependence on the environment than developing countries. However, there is limited empirical evidence to support the EMT hypothesis (Foster, 2012), because it remains difficult to assess causality between economic development and environmental improvement due to many underlying control variables (Burns, 2016; Stern, 2004).

In contrast, the ToP theory argues that the relationship between economic growth and the environment increasingly leads to environmental degradation, regardless of the level of development (Gould et al., 2008; Jorgenson & Clark, 2012). The theory suggests that developed countries are forced to operate in a treadmill-like dynamic due to the constant pursuit of economic growth (Curran, 2017), and provides a neo-Marxist perspective on the consumer society. This critical political approach suggests that the environment is being exploited by the capitalist system while perpetuating inequalities and overconsumption, leading to an increased ecological debt of industrialized countries towards the Global South (Gould et al., 2008). The process is driven by global competition and the concentration of capital, where profits are invested in production methods to increase and intensify the scales of operation (Schnaiberg, 1980). The theory has been criticized for presenting a one-way causal relationship with environmental degradation, and for neglecting actions by governments and firms, particularly in developed countries where environmental regulations are stronger (Burns, 2016; Gould et al., 2008). However, Rice (2009) argues that the ToP has resulted in a transnational organization of production where industrialized countries take resources and energy from the periphery and (re-)locate environmentally harmful production to the Global South. This process has also been associated with increasing green crime in developing countries, such as the killing of indigenous environmental activists (Lynch et al., 2018).

However, both theories contain several shortcomings in addressing the structural relationship between economic growth and the environment, since they fail to account for the influence of international trade structures and the transnational organization of production (Jorgenson & Clark, 2012). Particularly, *how* these (domestic) economic processes can shape environmental/economic (de-)coupling elsewhere.

The Ecological Unequal Exchange theory (EUE) addresses these shortcomings and argues that there are asymmetrical trade relationships between countries. These underlying dynamics suggest

that more powerful countries, in the Global North, may have unequal access to the natural resources and waste absorption capabilities in the Global South (Givens et al., 2019). As a result, communities in developing countries are disproportionately affected by the distribution of environmental costs and benefits, leading to increased environmental impacts and decreased human well-being (Gellert et al., 2017; Horngorg, 2009; Jorgenson, 2016b). Such geographic and temporal components of the EUE theory are widely recognized as environmental load displacement (Hornborg, 2009; Muradian & Martinez-Alier, 2001). This displacement is caused by the material flows within the global commodity chains and is present at every commodity phase, including extraction, production, consumption and disposal (Givens et al., 2019). Jorgenson (2016b) suggests that similar structural mechanisms exist in other fundamental relational dynamics, such as the dependence on FDI and the coercive military influence of developed countries. The theory contributes to our understanding of global socio-environmental inequalities by analyzing the underlying mechanisms driving these core-periphery dynamics (Givens et al., 2019; Hornborg & Martinez-Alier, 2016). However, Sommerville (2022) critiques the EUE theory for misrepresenting the nature of global extractivism and labor exploitation. He argues that the theory inadequately describes certain features of global power inequality and suggests that it confuses ‘exchanges’ with non-reciprocated value transfers instead of market exchanges under supply and demand forces (Sommerville, 2022).

Framework of (Renewable) Energy Extractivism

The debate, on the structural relationship between economic growth and the environment, is particularly relevant to our societies in the context of the global energy transition. This is because the RE domain may exhibit similar neo-colonial extractivist practices, that are perpetuated through the international system. These patterns, which advocate sustainable development, can thus contribute to more environmental degradation and social injustice in developing countries. Therefore, this thesis will investigate the political-economic implications of renewable energy on the patterns of extractivism in Morocco, to better understand the potential costs and benefits of RE projects for developing countries.

In the context of this study, energy extractivism is defined as the appropriation of renewable energy by industrialized countries to meet domestic sustainable development targets while hampering the energy transition in developing countries. An important conceptual difference is

that renewable energy is not a non-renewable or depletable source, like other forms of extractivism. Regardless, it exhibits similar characteristics such as export-oriented production and limited processing. Therefore, this thesis considers both renewable and physical resources as comparable and argues that the theory can be extended.

The theoretical framework combines the components of the Treadmill of Production (ToP) and the Ecological Unequal Exchange (EUE) theory, from an extractivist perspective on economic development. Within this framework, the ToP theory provides a critical analysis of the ever-increasing demand for (renewable) energy that feeds the cycles of production and consumption. Meanwhile, the EUE theory supplements a broader view of world-systems dynamics that acknowledges the unbalanced systemic interactions between industrialized and developing countries (Bunker, 2005). Therefore, this integrated framework considers the unequal ecological burdens – reinforced by the global energy transition – as a manifestation of these extractive political-economic relationships. A similar integrated approach has been proposed by several scholars (see Bunker, 2005; Givens et al., 2019; Ye et al., 2020), but an empirical exploration is lacking. This thesis explores the framework in relation to renewable energy. The framework aims to provide a more nuanced perspective on the global energy transition by focusing the analysis on the underlying international system driving extractivism, rather than just considering the implications for sacrifice zones.

Furthermore, the theoretical framework could offer valuable insights for the discussion on energy extractivism. Firstly, through providing a more comprehensive understanding of the interrelationships between economic development, environmental degradation and international power structures in relation to energy production and consumption. In addition, it considers the socio-political implications of RE projects, including the perpetuation of neo-colonial practices and the unequal distribution of costs and benefits. Table 1 provides an overview of the framework and forms the basis for the empirical analysis in the following chapters.

	Treadmill of Production Theory	Ecological Unequal Exchange Theory	(Renewable) Energy Extractivism
Global Commodity Chain Phases			
Extraction Main characteristic: Extractivist practices	Industrialized countries obtain resources and energy from peripheral countries (Rice, 2009).	Global North has imbalanced access to natural resources (Givens et al., 2019).	Extractivist practices in RE developments.
Production Main characteristic: Drivers of production processes	Production process driven by global competition and concentration of capital (Schnaiberg, 1980). (Re-)locating environmentally harming production to the Global South (Rice, 2009).	Unequal distribution of environmental costs and benefits of production (Gellert et al., 2017).	(Re-)constituting production networks to optimize production and control over RE.
Consumption Main characteristic: Consumption of resources	Theory critiques the consumer society.	Environmental load displacement caused by material flows in global commodity chains (Givens et al., 2019).	Domestic and international (renewable) energy flows.
Disposal Main characteristic: Waste absorption	N.A.	Global North has imbalanced access to waste absorption capabilities in Global South (Givens et al., 2019).	N.A.

Table 1. *Components of the energy extractivism framework.*

Literature Review

The implications of the energy transition in peripheral countries, induced by industrialized economies, are gaining increasing attention in the academic literature (e.g., Bruna, 2022; Voskoboynik & Andreucci, 2022). However, extractivism in relation to (renewable) energy sources remains largely undiscussed due to the continued emphasis on mineral extraction. Therefore, this section builds on the theoretical framework of energy extractivism and evaluates the available literature on its three components. First, it discusses extractivist practices in the context of state involvement and its neoliberal character. Next, it assesses the role of different actors in shaping production networks and, finally, it elaborates on the trade imbalances within energy flows resulting from international trade structures.

Extractivist Practices

Extractivist practices are central to the extractivist development model as they enable the system of resource appropriation. This is particularly the case during the construction and extraction phases, where negative externalities are placed on extraction zones, such as habitat destruction and impoverished communities (Ye et al., 2020). The effects depend on several factors, including product type, extraction technology, and institutional and legal frameworks (Göbel, 2015).

Andrade (2022) highlights the neoliberal characteristic of extractivism and suggests that it transforms alongside the historical patterns of capital development. Previously, the literature viewed extractivism as the result of multinational corporations benefitting from extremely lucrative exploitation of resources and the state's dependence on their technology and investments to collect a share of their profits as rent (Andrade, 2022; Veltmeyer & Petras, 2014). However, her analysis suggests that since the 2000s, extractivism "reflects a broader set of investments and dynamics of capital, beyond the global commodity market and resource-seeking capital" (Andrade, 2022, p. 806). In contrast, Ayelazuno (2014) states that (foreign) investment and global commodity markets remain strongly interlinked in developing countries. He argues that the accumulation of foreign capital, mainly foreign investments, contributes to shaping the integration of African economies into the global economy. Based on the experience of small-scale miners in Ghana, Ayelazuno (2014) draws a comparison between the unjust effects of extractivism, in particular land dispossession, and the primitive accumulation that shaped the agrarian transformation in Western core countries. Using a historical-comparative approach to capitalist development, he

concludes that the primitive accumulation of extractivism is one of the core elements of the continuous exploitation of Africa's natural resources supporting the ongoing development of industrialized countries. Financial investments can therefore perpetuate the dynamics between core and peripheral countries as it shaped the extractivist neoliberal conditions.

Another group of scholars focuses on the role of the state in extractivist practices. Burchardt & Dietz (2014) investigated extractivism in relation to the changing role of the state in the production of primary goods for Latin American countries. They find that extractivism has become institutionalized, based on temporal changes in socio-economic indicators, and that it can pose significant consequences for domestic politics, social relations and territorial orders. However, they insufficiently identify its implications beyond the context of national development. More specifically, the authors only consider extractivism in relation to trade rather than the direct effects of extractivist practices. The empirical findings are supported by Acosta (2013), who subsequently argues that extractivist-based development captures similar elements of the resource curse, including revenue volatility, increased dependence on FDI, and lower human rights performance. Thus, state involvement enables the extractivist-based practices, but it can simultaneously pose challenges to government legitimacy. Overall, these findings indicate that the institutionalization of extractivist practices can lead to several negative consequences that extend beyond the local context. Therefore, this thesis considers a broader interpretation of extractivist practices that encompasses both external and domestic influences (i.e. financial investments and the role of the state) alongside the local implications of negative externalities associated with resource extraction.

Production Networks

The literature holds various theoretical approaches to understanding production phases. However, global production analysis has recently shifted its focus from production chains (i.e. value and commodity chains) to production networks. This occurred in response to developments in the global economy, which is progressively formed through highly fragmented and geographically separated production networks (Radhuber, 2015). According to Henderson et al. (2002), this approach emphasizes that networks "constitute and are re-constituted by the economic, social and political arrangements of the places they inhabit" (p.446). This framework differs from traditional global production analyses because it considers multiple relational structures between different actors, rather than only a linear connotation of "chains" (Henderson et al., 2002). These actors

encompass a broad range of organizational types, including supranational organizations, government agencies, trade unions and social organizations (Henderson et al., 2002; Radhuber, 2015). Therefore, production network analysis emphasizes how global production is embedded within the broader institutional and geographical settings.

Regardless, Smith (2015) suggests that the institutional context remains under-theorized in the study of global production networks. His article explores the strategic and relational role of the state in North Africa to comprehend the dynamics of production networks in macro-regional spaces, focusing on the economic interactions between the EU and Tunisia. He argues that the Tunisian government is actively facilitating European investments and access to the EU market through an export-oriented development strategy, maintaining strong bureaucratic and political control over the Tunisian economy. This indicates that the state is essential in establishing systems of accumulation through 'strategically coupling' of local production systems to international networks. However, Smith oversimplifies the institutional context by focusing solely on the state-centric account of production networks. His analysis does not adequately consider the regulatory elements that enable and actively shape production networks in national and regional contexts, such as the level of (de-)centralization of government agencies and national laws. This is partially supported by Liu & Dicken (2006), who suggest that there are different forms of institutional embeddedness. Using an empirical case study of China's automobile industry, they argue that states can exert material influence through 'active embeddedness'. This can help guarantee the benefits of FDI at local and national levels.

More recently, Coe and Yeung (2019) reiterated the argument of Liu and Dicken (2006) that state involvement can help secure access to and determine who controls these national assets. However, they refute the industry-level analysis, arguing that this approach disregards how the industry dynamics and relevant actors constitute production networks and shape local territorial outcomes. For example, Baker & Sovacool (2017) examine the underlying conflicts between production networks and technological capabilities in the South African solar and wind energy industry. The article concludes that conflicts between commercial interests and economic development requirements prevent the localization of renewable technologies at the national level. This highlights the interplay between national and international interests within production

networks. Such an approach provides insight into how extractivist dynamics operate at a national level, through both institutional and regulatory frameworks.

Energy Flows & Trade

Material flows are the basic principle of international trade because they indicate the movement of resources and products between countries, and can be categorized as energy or commodity transfers. Unequal exchange suggests that there is a disparity in the quantity or value of traded materials that may occur due to differences in bargaining power, price mechanism, or access to capital and technology (Bunker, 1984).

Hornborg (1998) provides an ecological perspective on material flows and suggests that energy transfers are essential to understanding unequal exchange. He argues that energy flows should not be confused with economic values, as market prices obscure the fact that resources are exchanged for products that represent resources already used. He, therefore, proposes that examining the direction of net energy and material flows (i.e. productive potential) may be the only appropriate way to determine if unequal exchange has occurred, without mistakenly equating productive potential with economic value (Hornborg, 1998). Rice (2007) builds on this framework to examine the hypothesis that the disproportionate cross-national use of replenishable natural resources is influenced by international trade. He analyzed the impacts of trade on environmental consumption using an OLS regression for the ecological footprint demand per capita for 2002. The results show that lower-income countries with higher shares of export to industrialized countries exhibit lower levels of environmental consumption. Thus, Rice (2007) argues that the structures of international trade support the disproportionately high levels of material consumption per capita in core countries, which may shape the underconsumption in peripheral countries.

However, unbalanced exchange caused by the demands for material and energy in developed countries extends beyond economic values. Another approach to material flows emphasizes the socio-ecological consequences of trade, drawing from the ecological unequal exchange theory. For example, Huang (2018) argues that this vertical flow of export from developing countries acts as a mechanism whereby developed countries can offset part of their carbon emissions associated with their high consumption levels. He investigated the effects of the 2001 and 2008 economic recessions on this mechanism through a time-series cross-sectional regression analysis. The results suggest that economic recessions in the United States are related to fluctuations in ecological

unequal exchange, and support Rice's (2007) conclusion on the influence of international trade structures on consumption patterns (Huang, 2018). Similarly, Alonso-Fernandez and Regueiro-Ferreira (2022) emphasize the environmental impacts of material flows on producing countries. Their analysis focuses on the effects of extractivism and ecologically unequal trade on the environment in Latin America. Using a consumption-based approach to material flow analysis, the scholars argue that extractive economies are trapped in a vicious circle caused by uneven price dynamics of exports and imports (Alonso-Fernandez & Regueiro-Ferreira, 2022). Consequently, these countries are compelled to gradually increase the volume of resource extraction and, as a result, absorb an accumulating amount of environmental burden.

Thus, while the literature acknowledges the neocolonial nature of material flows within consumption patterns, limited attention has been paid to the energy component of material flows. With the ongoing energy transition, (renewable) energy flows will likely play an increasingly important role in international trade. Hence, this thesis looks at material flows in the context of RE consumption to better understand whether these underlying conditions also apply to energy flows.

Chapter 3. Background

This section examines Morocco's economic integration into the global economy to understand its position as a semi-periphery country. It contextualizes how these features have shaped the country's renewable energy strategy (RES) and how it can reinforce core-periphery dynamics.

Integration into the Global Economy

Following independence in 1956, French and Spanish colonial legacies had structured important economic industries along extractivist production networks. The economy was limited to the production of low-value commodities, such as food processing and phosphate mining, and remained largely dependent on export-led economic development (Miller, 2013). In 1973, King Hassan II enacted the economic policy of "Moroccanization", which resulted in the transfer of foreign-owned enterprises and agricultural land to political loyalists and the state (Cherkaoui & Ben Ali, 2007). The policy increased the share of Moroccan-owned industrial enterprises from 18% to 55%, contributing to Morocco's annual growth rate of 7.3% in the period 1973-1977 (Miller, 2013). However, throughout the 1990s, Morocco underwent a series of economic reforms as part of its structural adjustment program with the World Bank and IMF to correct macroeconomic imbalances and market mechanisms (Miller, 2013). Deregulation and privatization policies in certain economic sectors were aimed at attracting FDI and reducing government debt, increasing reliance on foreign capital and export-oriented production (Miller, 2013). Regardless of these policies, the *makhzen* (political and economic elites loyal to the monarchy) continued to control important economic sectors through the centralization of power (Miller, 2013).

Today, Morocco is Africa's fifth-largest economy and is classified as a lower middle-income country. While the services sector accounts for roughly half of GDP, exports make up a third of GDP and are dominated by raw materials and low-value goods (Central Intelligence Agency, 2023; World Bank, 2021). These include agricultural products, phosphates and semi-processed goods such as textiles and phosphate products. Meanwhile, the agricultural sector remains vital as it employs 33% of the workforce and constitutes 14% of GDP (Central Intelligence Agency, 2023; World Bank, 2019). Therefore, Morocco maintains a semi-peripheral position in the global economy with limited high-value manufacturing and raw material processing industries. This is

further evidenced by the country's structural unemployment and financial dependence on foreign markets (Miller, 2013). The European Union is Morocco's largest trading partner with 56% and accounts for 64% of exports, despite efforts to reduce economic dependence on Europe (European Commission, n.d.). Similarly, the majority of imports and investments in 2019 came from the European Union, particularly from former colonial rulers (European Commission, n.d.). Therefore, Morocco's integration into the global economy is partly characterized by path dependence mechanisms which structured low-value industries along capitalist production networks – such as raw materials – towards developed countries. Economic diversification efforts have contributed to strengthening the resilience of Morocco's economy while promoting economic development (International Monetary Fund, 2020).

Renewable Energy Strategy

Another element of Morocco's economic diversification efforts is reducing energy dependence on fossil fuels, as the country currently imports more than 95% of its energy needs (Laaroussi et al., 2021). Meanwhile, population growth and consumption per capita are projected to substantially increase energy demand by 2030 (MEME, 2009). Therefore, in 2009, the government announced an ambitious energy strategy to diversify Morocco's energy mix. The strategy leverages the country's abundance of RE potential for national energy security and economic development. The objective is to generate 52% of Morocco's energy consumption from renewable sources before 2030 (Alami, 2021). The government strives for a total RE capacity of 10 GW, consisting of solar (4.5 GW), wind (4.1 GW) and hydropower (1.3 GW) (International Trade Administration, 2022).

The RES covers five strategic directions that guide policy- and decision-making in the energy sector, including the deployment of reliable and competitive technological choices, the promotion of private investments and regional power grid integration (Schinko et al., 2019). Sustainable development is an important cornerstone to achieving the targets, focusing on the socio-economic and environmental impacts of RE projects (MEME, 2009). These strategic directions outline the implementation of the RES and constitute two important components to achieving the objectives. Firstly, the strategy requires extensive cooperation with foreign actors to achieve Morocco's energy transition. There is a dependence on foreign partners for access to technology, expertise to operate power plants and financial resources (Hamouchene, 2016). According to the Ministry of Energy, Mines, and Environment, investments of approximately 30 billion USD is required to

finance the strategy (Schinko et al., 2019). Secondly, the proactive role of the state in monopolizing parts of the energy sector through bureaucratic arrangements (Hamouchene, 2016). The RE sector is controlled by the privately-owned Moroccan Agency for Sustainable Energy (MASEN) which develops energy projects under an agreement with the Moroccan government (Cantoni & Rignall, 2019). In addition, legislative and regulatory amendments aim to improve the management of RE projects by the private sector, while ensuring the safety and viability of the national power grid (MEME, 2009). In this context, the National Office of Electricity and Drinking Water (ONEE) is responsible for the transmission and distribution of electricity. However, the strategy carries an implicit risk of reinforcing core-periphery relations and reproducing extractivism due to its dependence on foreign actors and monopolistic control (Hamouchene 2016).

Chapter 4. The Economics of Energy Extraction

This section investigates the implications of extractivist practices in relation to RE projects. It takes a local angle to understand the activities in the periphery and focuses on the Noor Power Station as a case study of how extractivism can operate in energy projects. The analysis also considers the national and international dimensions of extractivist practices at the local and domestic level in Morocco. It argues that accumulation by dispossession is legitimized through pre-existing colonial institutional arrangements to secure access to project sites. These locations are considered 'unproductive' by decision-makers, disregarding their socio-cultural and agricultural importance for local livelihoods for the pursuit of capitalist development. Moreover, the dependence on international finance and technology permits the exploitation of RE by foreign actors and the transfer of financial risks to the state.

Noor Power Station

Extractivist activities within the energy sector can take different forms and their impact can vary greatly depending on project-specific and localized conditions such as resource type, population density and extraction technique (Göbel, 2015). Therefore, to understand the implications of extractivist practices regarding RE projects, this chapter focuses on the Noor Power Station (NPS) as a case study of how extractivism can operate in Morocco. The NPS is the largest concentrated solar power (CSP) plant in the world and is of significant importance within Morocco's energy strategy, both as a source of national prestige and electricity generation, as the plant has a capacity of 500MW (Rignall, 2016). This large capacity is particularly relevant considering that large-scale RE projects are prioritized over more small-scale decentralized methods of energy production, such as local energy communities (MEME, 2009). Likewise, as previously mentioned, solar energy constitutes Morocco's main planned source of RE. Therefore, the NPS not only plays a central role in achieving the country's energy objectives but also in comprehending the (possible) manifestations of extractivism within energy projects with similar characteristics.

The NPS is located near the city of Ouarzazate, in the southeast of the country, and is one of the poorest and most water-stressed areas in the Tafilalet region (Jawad, 2015). The solar plant was welcomed for the development opportunities it offered to the local communities in this deprived peripheral zone of Morocco (Hanger-Kopp et al., 2016). The project was developed by

MASEN, which outsourced the construction and operational management to the Saudi company ACWA Power, on 3,000 hectares of former communally owned land (Hamouchene, 2016). The construction consisted of four phases, with the Noor I commissioned in early 2016 and the final phase completed in June 2018.

Access to International Finance and Technology

The Moroccan government largely relies on access to international finance and technology to ensure the development of RE projects. For instance, the NPS project is widely supported by international finance institutions, including the World Bank, European Investment Bank, and African Development Bank, which collectively provide loan packages worth nine billion USD (Hamouchene, 2016). The government guarantees MASEN's private loans for large-scale project developments in case of financial difficulties. Yet, this shifts the financial burden onto citizens rather than the private companies which is especially significant considering the country's over-indebtedness (Hamouchene, 2016). International institutions additionally set conditions for granting project-specific loans. The World Bank, for example, promotes the use of Public-Private Partnerships (PPP) through their support programs to deliver public services using private actors while sharing the associated risks (Hanieh, 2015). The energy production rights of the NPS were sold through a public bidding process to ACWA, which became responsible for the development of the solar farms and electricity generation for MASEN over a 25-year period (Salime, 2021). Foreign companies benefit from such partnerships as it provides easy access to energy production markets while limiting the agency of governments and local companies in establishing the domestic energy market (Hanieh, 2015). This is evident by the unbalanced distribution of shares in the NPS, in which ACWA has a 75% stake (International Energy Agency [IEA], 2019). According to Hamouchene (2016), these partnerships have been costly for the Moroccan population, as since the 1990s, private companies have benefitted from favorable contracts that enabled large profits but high electricity costs for customers.

Moreover, the choice of technology illustrates how access to foreign expertise can contribute to the development of the RE market. MASEN selected to use CSP technology over photovoltaic (PV) solar panels, despite the novelty of large-scale CSP implementations and increased associated technological costs (Laaroussi et al., 2021). The technology employs 12-meter-high parabolic mirrors that track the sun's movement and capture radiation, which is then converted into steam

and electricity through a turbine (Laaroussi et al., 2021). It has several advantages over PV technology, since the melted-salt energy storage system allows electricity generation up to three hours after sunset, and avoids exposure to fluctuations in sunshine (Laaroussi et al., 2021). From the government's perspective, the underdevelopment of CSP technologies has great potential to develop new markets, stimulate job creation, and technology transfer (Laaroussi et al., 2021). Access to technology, through foreign expertise and partnerships, can thus contribute to the overall development of the market, but also to regional socio-economic development, provided there is sufficient knowledge transfer between ACWA and MASEN.

However, another substantial difference between the technologies is the extractive use of fresh water, since CSP technology requires around 200 times more water for cooling and cleaning systems than PV (Cantoni & Rignall, 2019). This amounts to an annual consumption of 3 million cubic meters of water, which is especially significant considering that the NPS is located in a semi-arid region where water resources are already scarce (Aoui & Rignall, 2020). Meanwhile, rainfall is expected to decline by 20-30% due to climate change, adding additional constraints to agricultural and drinking use in the high-stress region (Alami, 2021). Therefore, access to international finance and technology can shape the extractivist dynamics of the RES by setting the project-specific conditions of large-scale RE developments.

Role of the State

Irrespective of the position of private companies in developing large-scale projects, the state remains closely involved throughout different stages to ensure the realization of its RES. During the development stage, the state secured the 3,000-hectare site using a legal procedure it inherited from the French colonial period to formally acquire inalienable collective lands (Hamouchene, 2016). This was achieved through a 1919 government decree that recognized collective ownership of land through tribal confederations under the authority of the central government (Cantoni & Rignall, 2019). Currently, approximately 15 million hectares of collective land are administered by the Department of Rural Affairs of the Ministry of Interior as a consequence of the decree (Salime, 2021). Due to this arrangement, local residents were neither informed nor consulted prior to the sale of their communal lands to MASEN (Aoui & Rignall, 2020). The colonial-originated legal procedure, therefore, enables accumulation by dispossession through converting collectively-owned land into a specific type of property ownership that permits project development (Rignall,

2016). Since this acquisition method is legal in Morocco, it is not highlighted in the social impact assessments required by international finance institutions (Aoui & Rignall, 2020).

However, this disregards the circumstances of the land purchase, which show the extractivist tendencies surrounding the project's development (Fairhead et al., 2012). Firstly, the area was sold to the state under the notion of its 'emptiness' and 'unproductiveness' that was used to legitimize the price of one Moroccan dirham (around 0.10 USD) per square meter (Hamouchene, 2016). Not only is this ten times less than the purchase price of land in Ouarzazate, but it also ignores the dependence of approximately 8,300 people from nine rural towns on the area for oasis agriculture and extensive pastoralism (Rignall, 2016). Thus, the 'unproductive' status was given by decision-makers who prioritized the pursuit of capitalist development over protecting livelihoods. Secondly, rather than giving the local communities agency for revenue allocation, the 30 million dirham (about 3 million USD) was deposited into a local development fund of the Ministry of Interior (Hamouchene, 2016). Although the funding is designated for infrastructure projects, improving job opportunities and developing the villages, it is unclear whether these investments primarily benefit the residents themselves or the NPS project (Salime, 2021). Nonetheless, Laaroussi et al. (2021) conclude that implementing RE projects can foster both local and national economic development. Based on their impact study of the Noor I, they suggest there is a substantial improvement in regional infrastructure, availability of services and a moderate gain in agricultural productivity (Laaroussi et al., 2021). This has increased the living standards of residents and stimulated skill transfers. Nevertheless, there is a certain degree of economic exclusion of small and medium-sized firms due to the competition from foreign firms and their more qualified workforce (Laaroussi et al., 2021). Another impact study also found that RE projects in Morocco create limited, and often low-skilled, income-generating activities since the solar installations do not establish a strong connection with the regional economy (Brunet et al., 2022). Therefore, while the development of the NPS improved the region's economic productivity and created spillovers to residents in some sectors, it neglected the project's extractivist tendencies that enabled accumulation by dispossession for the purpose of capitalist development.

Moreover, the state guarantees financial support for electricity production throughout the operation phase due to their technological preference for the NPS. This is because the production costs of energy with CSP technology are 3.5 times higher than for PV at the location site (Bellini,

2017; Hamouchene, 2016). Under the PPP agreement, MASEN buys the electricity at the fixed price of production costs (1.62 dirhams) and sells it to the power grid at a net loss (Hamouchene, 2016). Therefore, while the project does contribute to diversifying Morocco's energy mix, its profitability and benefit to the economy resulting from this agreement are severely limited. In fact, since the commissioning of Noor I in 2016, the project registers an annual deficit of 80 million euros financed by the state treasury (Kasmi & Hamouchene, 2022). According to Mustapha Bakkoury, president of MASEN, Noor I will operate at a loss for at least ten years until the gap between buying and selling prices disappears because of inflation (Hamouchene, 2016). Yet, this is mainly based on speculation about future expected sales prices for energy. To offset the losses, the government secured a 200 million USD loan from the World Bank to cover the deficit for the next five years, further increasing its reliance on multilateral lending and outside assistance (Hamouchene, 2016).

Extractivist Practices in Energy Projects

The analysis suggests that patterns of extractivism are present in the NPS and are reinforced by the activities of both state and international actors. On the one hand, the RES supports access to international finance and technology because it enables the deployment of reliable and (semi-)competitive technological choices (Schinko et al., 2019). Despite the limited use of CSP systems in large-scale projects, they can provide stable access to electricity up to three hours after sunset and offers an opportunity for national development through knowledge creation (Laaroussi et al., 2021). On the other hand, this comes at the expense of restricted agency over the development of the domestic RE market due to the dependence on foreign actors for investments and RE production (Schinko et al., 2019). The NSP is primarily funded through international loan packages (nine billion USD) backed by government guarantees, while economic benefits are reserved for ACWA, which operates the plant under the PPP agreement. Meanwhile, to cover the project's accumulating deficit, the government has taken out another loan at the taxpayer's expense (Hamouchene, 2016). This reinforces extractivism in RE projects, as resource exploitation primarily serves foreign actors, while its risks are (increasingly) displaced on the state. Thus, also shifting the financial burden of the energy transition onto its citizens.

In addition, extractivism is imposed at the local level through pre-existing colonial institutional arrangements that legitimize accumulation by dispossession to secure access to project sites. The

land for the NSP was labelled as ‘empty’, based on capitalist notions of economic productivity, neglecting the area’s socio-cultural and agricultural importance to local livelihoods (Rignall, 2016). The expropriation prevents consultation of residents throughout the process and ostracizes their agency over collective land, development investments and environmental concerns. Therefore, under the government decree of 1919, communities with insecure land rights are at risk of being expropriated to facilitate the provision of RE to urban centers and economic development. According to Cantoni & Rignall (2019), this increases the centralization of economic and political power as governments and investors tighten their grip on capital investments and the power derived from RE schemes. The implications of this are driving extractivist practices in RE projects like the Noor Power Station.

Chapter 5. The Politics of Energy Extraction

This section analyzes the role of production networks in Morocco's energy sector. Contrary to the previous section, it focuses on the activities in the country's core and takes an institutionalist approach to the RES. After outlining some of the institutional and regulatory conditions of the RE framework at the national level, it considers the impact of these production networks on the RE production level for local communities. It shows that the current production networks contribute to extractivism by (re-)constituting formal and informal arrangements in a way that optimizes both RE production and elite control over the energy sector.

Production networks are shaped by different economic, social and political arrangements that display how production is embedded in broader institutional and geographical settings (Henderson et al,, 2002). Chapter 4 showed the central position of the state in enabling extractivism in the NPS. According to Ye et al. (2020), extractivism is further "characterized by monopolistic control […] that is exerted by, and through, an operational centre" (p. 160). The monopolistic control of the energy sector is constructed through institutional and regulatory frameworks that create market conditions (Baker & Sovacool, 2017). Therefore, this Chapter focuses on the social and political arrangements embedded in the broader societal relations between the state, businesses and civil society, which interact at the 'operational centre'. This helps explain how production networks in Morocco's energy sector have been (re-)constituted as part of the RES to facilitate monopolistic control. These production networks consist of multiple relational structures between different actors and largely originate from historical and bureaucratic conditions (Henderson et al., 2002). Therefore, the purpose of this section is to understand the role of production networks in energy extractivism and how it operates in the domestic energy sector.

Production Networks in the RE Framework

In order to stimulate the development of the RE market, Morocco introduced several actors in 2008 that accompany the existing institutions in the energy sector, ranging from the promotion of energy efficiency to research and energy production (IEA, 2019). It provided a regulatory framework to refocus the country's institutional apparatus towards RE, as well as appeal more to large-scale project developers and investors (Cantoni & Rignall, 2019). Prior to 2008, the state-owned ONEE had complete control over the generation, transportation and distribution of electricity (Bentaibi &

Pape, n.d.). Under the amended energy framework, it became responsible for the development of hydroelectric and wind energy in addition to the electricity generation from fossil fuels (IEA, 2019). Meanwhile, MASEN was established in 2010 as a limited liability company with public shareholders to implement the Moroccan Solar Plan, as part of the RES (Cantoni & Rignall, 2019). However, in 2016 there was another institutional reform ordered by King Mohammed VI that resulted in the transfer of all RE assets from ONEE to MASEN (Cantoni & Rignall, 2019). Completed in 2021, the reform tasked the company with the development of all forms of RE, while ONEE received a 25% stake in MASEN (IEA, 2019). The reform effectively created a monopoly on the RE market and reduced ONEE's position in the RE framework to electricity transportation. This formally extended MASEN's duties across the entire RE value chain, incorporating resource assessment and generation capacity planning together with ONEE, and promoting a national RE industry (IEA, 2019). According to the IEA report (2019), MASEN's institutional framework offers "a 'one-stop shop' for private project developers, bringing together permitting, land acquisition and financing aspects" (p. 80). The company itself described the reform as the "redistribution of prerogatives between the various relevant stakeholders, based around the ONEE-Masen duo, [giving] greater visibility to projects […] and […] guarantees improved coordination and consistency" (MASEN, n.d., Enhanced synergies). The institutional framework, therefore, helps shape Morocco's RE production networks by reconstituting its structures and improving its efficiency.

In addition, the regulatory framework was amended in 2009 under Law 13-09, opening part of the electricity market to competition from independent producers (Carafa et al., 2016). The law permits private entities to develop RE projects and supply electricity to large consumers, in addition to guaranteeing access to the electricity grid (Hochberg, 2016). However, the law is ineffective in liberalizing the energy market and asserts the monopolistic position of prominent energy institutions. Since the implementation in 2011, only nine RE projects have started, yet, the very high- and high-voltage markets are already saturated due to the absence of large off-takers (IEA, 2019). Meanwhile, new independent energy projects lack the benefit of guaranteed offtake, since in the case of overabundance or network limitations, priority dispatch is reserved for existing plants with long-term purchase agreements (IEA, 2019). To remove these barriers for independent producers, the government passed Law 40-19 in May 2022, which aims to improve market access (Richoufftz & Coune, 2020). It introduces a reserved grid capacity for developers that is pre-

allocated among sites, as well as a 'call for expression of interest' procedure (Richoufftz & Coune, 2020). However, it remains uncertain whether a sufficient RE market and grid capacity will be available for independent producers outside the call for projects scheme (Richoufftz & Coune, 2020). This depends on ONEE/MASEN's capacity planning and could harm liberalization efforts in the energy sector.

These institutional and regulatory conditions in the RE framework largely favor government-affiliated organizations by limiting the role of independent producers in the energy transition (Carafa et al., 2016; Joffé, 2009). This is attributed to the continued influence of the *makhzen*, who constitute the most important production networks in Morocco's economic development (Miller, 2013). Regarding the energy sector, Figure 1 shows MASEN's ownership structures. Despite being registered as a private-owned enterprise, the company is owned exclusively by state-controlled entities representing either the interests of the government (ONEE & Ministry of Finance), the monarchy (Hassan II Fund) or both (SIE). This indicates that the RE production network is likely controlled by the *makhzen,* which helps to understand certain decision-making outcomes described previously, but also why policy recommendations by foreign actors were dismissed (Cantoni & Rignall, 2019). For example, the advice to include small-scale decentralized electricity generation in the RES, by opening the low-voltage level to independent producers (Cantoni & Rignall, 2019). Similarly, since its founding, MASEN has been led by Mustapha Bakkoury, former Secretary General of the royalist Authenticity and Modernity Party (Cantoni & Rignall, 2019). Therefore, the production networks in the Moroccan RE market are primarily based on organizations and institutions that are linked through the informal social network of the elite. The operational centre, as described by Ye et al. (2020), is based on social and political arrangements that are visible in formal institutions and help maintain the status quo.

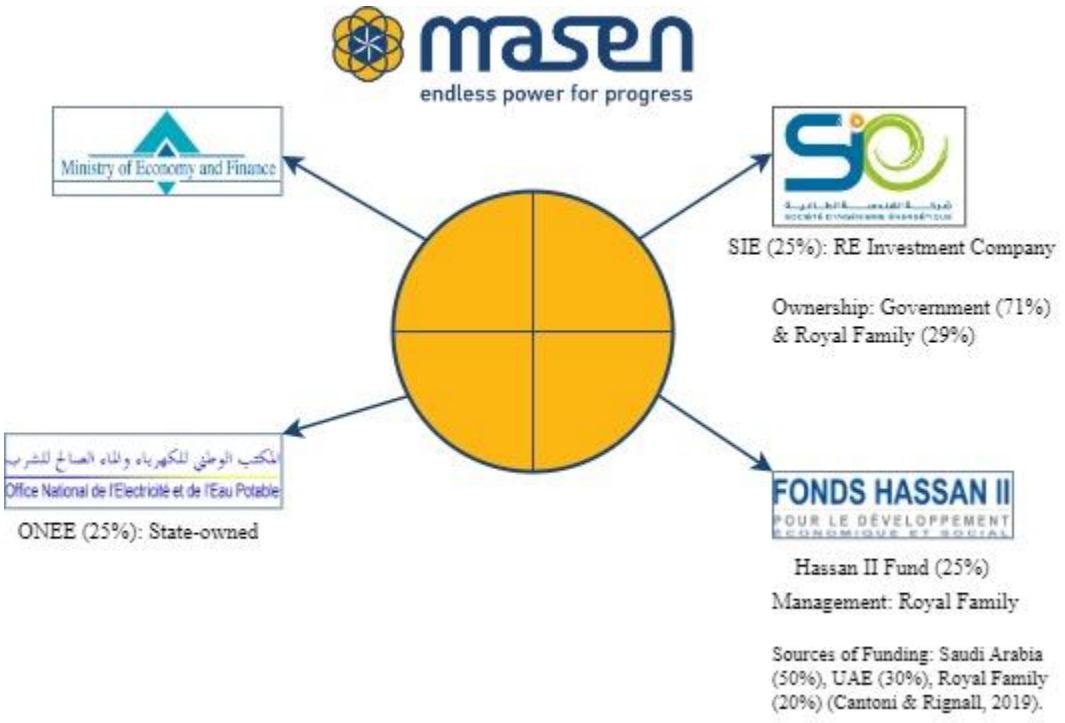

Figure 1. *Ownership Structure of MASEN. Information derived from Redouane et al., 2018.*

This is further evident beyond the RE framework in the civil society sector as the government has soft bureaucratic control over their activities and has the authority to sanction and dissolve associations (Ryser, 2019). It prevents these organizations from challenging state power and serves as an intermediary between central authorities and local communities (Haddad et al., 2022). However, these structures between civil society and authorities often reflect traditional local power structures that are supported by clientelism and neo-patrimonial social relations (Ryser, 2019). As a result, they limit public participation in the energy transition (Haddad et al., 2022). Thus, the RE production network is embedded in the historical and bureaucratic conditions that influence current relational structures between societal actors and is rooted in both national and local power dynamics. These structures in the context of energy extractivism will be further explored in the next section.

Production Networks and the Noor Power Station

The impact of these production networks is noticeable at the RE production level, as they promote extractivism as development for the local communities. This is achieved through a 'green modernization' discourse at the national level, which is strongly tied to national identity and the

desire for development, and aims at increasing support for project developments (Haddad, 2022; Hanger-Kopp et al., 2016). In this position, MASEN functions as a 'proximity welfare state' because of its role in shaping local development alongside energy production (Salime, 2021). These economic interventions intend to "strengthen the capabilities of the social fabric […] to make it a tool for development" for local residents (MASEN, n.d., Local development). This type of development is called *désenclavement*, the 'opening up' of a region, and is commonly interpreted by residents as an opportunity for modernization (Salime, 2021). In the Ouarzazate region, small-scale farming projects have improved the position of women and contributed to agricultural development (Ryser, 2019). However, similar projects have also changed people's relationship with the physical environment and many believe that development decisions are being forced on them (Salime, 2021; Ryser, 2019). While residents and civil society organizations can propose initiatives for funding, the majority of recipients have close ties with local governments and state authorities (Haddad et al., 2022). This has led to distrust of civil society organizations as some individuals have accumulated wealth through these collaborations (Ryser, 2019). These arrangements indicate the control of production networks over regional development. Resistance to land acquisition for the NPS was also quickly suppressed by sparking competition among residents over promised short-term jobs during the construction phase (Aoui et al., 2020; Hall et al., 2015). However, only 30% of the 2,000 jobs created were filled by the local population (MASEN, n.d., Local development). Similarly, the farming projects generated few market opportunities and resulted in demonstrations over limited employment possibilities that were resolved by offering few temporary menial jobs at the plant, such as cleaning mirrors (Aoui et al., 2020; Salime, 2021). Therefore, the community's desire for economic opportunities is used as a means to preserve both local stability and energy production.

Moreover, the production networks in the energy framework impede the distribution of electricity to local communities surrounding the NPS and exacerbate energy inequality in the region. Energy inequality broadly refers to access to affordable and reliable energy and hinders efforts for a just transition by perpetuating social inequalities (Okpanachi et al. 2022). Rural electrification programs have successfully connected over 99% of Moroccan households to the national grid since the 1990s, but these programs have not yet connected the majority of villages in the Ouarzazate region or other project sites (Haddad et al., 2022; Salime, 2021). Additionally, electricity costs make up a significant part of household finances in the economically deprived

region due to the reliance on prepaid electricity cards, which can only be re-charged in Ouarzazate City, rather than being connected to a more affordable and secure energy supply from the national grid (Haddad et al., 2022). Therefore, the production networks aimed at securing the distribution of electricity simultaneously reproduce inequality by failing to connect local communities to the national grid, despite close geographical proximity to the energy production.

Hence, production networks that strive for regional development to enable energy production, simultaneously reduce the agency of residents over this development. Instead, the development serves the interests of elites and fits into the modernization paradigm advocated by the government, without addressing the structural needs for inclusive development of the areas surrounding RE projects (Haddad, 2022). Many of the economic and educational prospects in the Ouarzazate region have failed to materialize due to the exclusion of residents from jobs and the absence of development initiatives that could have provided transferable skills which benefit the local economy (Aoui et al., 2020). Rather, the primary concern for the production networks is ensuring electricity for urban consumers, not addressing the energy inequality that could contribute to a more just energy transition (Okpanachi et al. 2022). Therefore, the promise of development advocated through the RE production network is mainly used as a tool to gain unrestricted access to local resources and cheap labor to construct RE projects. These networks contribute to energy extractivism because they constitute Morocco's economic, social and political arrangements in a way that optimizes the production of RE and *makhzen* control of the energy sector (Carafa et al., 2016; Joffé, 2009).

Chapter 6. International Energy Flows

This section investigates RE flows in the context of international trade to understand whether extractivism extends beyond Morocco's domestic RE industry. Contrary to the previous sections, it focuses on the interaction between the RES and the international market by taking a neo-colonial perspective on RE consumption patterns. It shows that becoming an energy exporter is an important objective behind the RES, over addressing Morocco's structural reliance on fossil fuels. The section argues that the strategy's export-oriented approach could reinforce core-periphery dynamics by establishing neo-extractive production networks. At the same time, it can improve Morocco's position in the international system by utilizing its new status as energy producer for economic development and energy diplomacy. However, we cannot yet conclude on the presence of extractivist patterns in the international RE market since the global energy transition is still ongoing.

International trade structures disproportionately favor industrialized countries by displacing the socio-ecological costs of extraction and production to developing countries and shaping global consumption patterns (Huang, 2018; Rice, 2007). The previous chapters already indicated that Morocco's RE projects exhibit extractivist elements that externalize the socio-environmental consequences of RE resource extraction to local communities. Meanwhile, the elite control the production networks in the energy sector, optimizing the production of RE through both bureaucratic and informal arrangements. These two commodity phases ensure the supply of renewable electricity to consumers and thus contribute to the energy transition. Therefore, this Chapter focuses on the RE consumption patterns by analyzing RE flows in the context of international trade. It helps explain whether extractivism extends beyond Morocco's domestic RE industry and manifests itself in the international system. Particularly, how energy extractivism can influence or reproduce the existing power dynamics in the international community.

Energy Export Strategy

Economic diversification is a key rationale behind the RES alongside reducing the country's energy dependence on imported fossil fuels and meeting growing domestic electricity demands (MEME, 2009). However, the strategy is also framed by the monarchy as an export-oriented policy that can help liberalize the Moroccan economy by increasing the role of private actors

(Hamouchene, 2016). While Morocco strives to become a regional energy powerhouse, it remains unclear whether the strategy prioritizes energy exports or domestic consumption (Alami, 2021). Yet, the underlying intentions of the strategy show the ambitions to become an energy exporter. According to De Arce & Lorca (2012), the RES is specifically designed to be "mostly aligned with the EU's energy trinity of energy security, competitiveness and environmental sustainability" (p. 9). This not only ensures easier access to the European energy market but also makes Morocco more attractive for FDI. The export-oriented approach matches the green modernization discourse advocated by the government as it presents an opportunity for economic development and international prestige by positioning Morocco as a global leader in clean energy (Haddad et al., 2022). Likewise, Morocco has joined several regional and international RE initiatives, such as the International Renewable Energy Agency and Solar Plan for the Mediterranean, which further profile the country (Hamouchene, 2016). The strategy thus offers a path to improve its position in the international system by utilizing its potential as an energy producer for economic development.

This is noticeable in Morocco's growing electricity exports (United Nations Statistics Division [UNSD], n.d.). However, the market remains subject to large price fluctuations, making it difficult to assess unequal exchange in the energy sector (Hornberg, 1998; UNSD, n.d.). Therefore, energy flows provide an alternative to the economic value interpretation of trade as it indicates the movement of RE within and between countries and thus where the consumption takes place. Regardless of the aim to reduce its dependence on fossil imports, Morocco currently imports over 95% of its energy needs (Laaroussi et al., 2021). Meanwhile, the share of primary energy – energy before it is converted into electricity, heat, or transport fuels – from fossil fuels has only reduced by 3% (to 92.4%) since 2009 (Ritchie et al., 2022). This suggests that the strategy is unsuccessful in reducing the dependence on imports and can be explained by two factors; firstly, domestic consumption is rising faster than the increase in RE production, requiring a greater quantity of primary energy import to meet demand. Per capita energy consumption has increased to 7,158 kWh (+31%) between 2009-2021 and is projected to increase further over the next decade (IEA, 2019; Ritchie et al., 2022). Secondly, Morocco is exporting more renewable electricity to other countries instead of using it for domestic consumption and lowering the share of non-renewables in the primary energy mix. Although approximately 20% of Morocco's net electricity production comes from renewables – taking energy transmission losses into account – the share of RE in total final energy consumption has decreased by around 4% since 2009 to 10.7% of final energy

consumption (Ritchie et al., 2022; UNSD, 2022). This suggests both an increase in production and a decrease in the share of RE consumption in the Moroccan economy. Even though there is no official data on the export percentage of total RE production, based on net production and final domestic consumption in 2019, this would be approximately 56% (Ritchie et al., 2022). Hence, the energy flows show a moderate focus on energy export over addressing Morocco's own structural and increasing, reliance on fossil fuels for domestic consumption. However, the strategy's underlying intentions support the energy transition of foreign – more developed – countries through the international energy market over domestic households and industries.

Energy Extractivism: Hierarchies in the International (Energy) System

Core-periphery relationships in the international system reproduce the underlying power dynamics in international trade by reinforcing patterns of extractivism for RE (Kasmi & Hamouchene, 2022). This contributes to unequal exchange, as the flow of cheap energy from the Global South to industrialized countries hinders both the energy- and a just- transition in developing countries (Okpanachi et al. 2022). In a recent interview with Jadaliyya, Dr. Hamouchene, a leading researcher and activist on climate and trade justice, stated that "the current uneven transition happening mainly in the Global North is predicated on the ongoing extraction of some minerals and rare earth metals […] for manufacturing solar panels, wind turbines, […] and electrical batteries. […] We are facing the same system but with a different source of energy – from fossil fuels to green energy – while the same global energy-intensive production and consumption patterns are maintained and the same political, economic, and social structures that generate inequality and dispossession remain untouched" (Kasmi & Hamouchene, 2022, para. 27-28). This suggests that the neo-colonial relations between developing and developed countries are being perpetuated in the global energy transition. He further critiques the European Green New Deal and the Desertec 3.0 project, which will guarantee export of green hydrogen from the MENA region to Europe, for maintaining prevailing authoritarian political dynamics and the imperialistic international order (Kasmi & Hamouchene, 2022).

In the case of Morocco, the infrastructure is being created to facilitate this neo-colonial process of exportation. Rather than investing in electricity generation for domestic use, a large portion of FDI is instead invested in electricity transmission to European countries (IEA, 2019). For example, the UK is investing in the Xlinks Marine Cable that will connect Moroccan transmission

infrastructure to the British electricity grid, via a 10GW submarine power cable (Hamann, 2022). This transmission cable will be able to provide seven million British households with clean electricity by 2030 and cover around 8% of the UK's electricity needs (Hamann, 2022; Rahhou, 2022). The energy infrastructure developments align with the export-oriented approach of the RES, which also promotes this process through its dependence on foreign financing. European investors secure the supply of electricity from RE projects to their national grids in exchange for their investments (Rignall, 2016). These power relations create neo-extractive production networks, which are reflected in the coupling of electrical infrastructure with developed countries, and subjugates Morocco to an energy producer role (Allan et al., 2021; Hamouchene, 2016).

On the other hand, the RES also serves as a source of soft power for the Moroccan government and forms the core of its foreign policy in Africa (Allan et al., 2021). In fact, according to Bennis (2019), Morocco has increasingly positioned itself as a middle-power country by strengthening its leadership role in regional African organizations while maintaining strong connections with Western countries. This middle-power position is further underlined in the RES through the close cooperation with industrialized countries in realizing the strategy, together with Morocco's focus on South-South cooperation for RE development (MASEN, n.d.). This suggests that the energy strategy is not only a means of economic development but also aims at strengthening Morocco's status in the international system, utilizing the promise of energy as soft power (Allan et al., 2021). In addition, it helps to legitimize the occupation of Western Sahara, as the European and West African energy markets will become partially reliant on electricity production from this region (Allan et al., 2021). ONEE provides technical support and expertise to electricity infrastructure projects across West Africa, helping to not only secure planned RE export but also diplomatic support from historically pro-Sahrawi countries for the occupation of Western Sahara (Allan et al., 2021). For example, Nigeria has softened its stance on the disputed territory through investments such as the planned Nigeria-Morocco gas pipeline that will connect most countries in the region to Nigerian gas (North Africa Post, 2019).

Therefore, the RES serves to improve Morocco's position in the international system by utilizing its potential as an energy producer for both economic development and energy diplomacy (Allan et al., 2021). These underlying intentions of the RES are reflected in the existing and planned energy flows to foreign markets. Particularly, in the electrical infrastructure developments

aimed at integrating national grids and increasing electricity exports without reducing the county's dependence on fossil imports. This export-oriented approach could reinforce core-periphery dynamics between countries by establishing neo-extractive production networks with Europe but also has significant implications for the Sahrawi right to self-determination through an international dependence on electricity production from the region. Energy diplomacy efforts could curb overreliance on the extractive energy infrastructure to industrialized countries and secure access to other regional markets (Allan et al., 2022). However, it is too early to conclude on extractivist patterns in the international RE market, since the global energy transition and the implementation of Morocco's RES is still ongoing.

Chapter 7. Conclusion

This paper investigated the role of renewable energy strategies in reinforcing patterns of extractivism in Morocco. It aimed to provide a more nuanced perspective on the implications of RE developments for sacrifice zones and their effects on reproducing power dynamics, by introducing a framework for energy extractivism.

The empirical analysis has shown that the green modernization discourse, advocated by the government through RE developments, primarily serves the interests of the elite rather than providing much-needed opportunities for economic development in the deprived regions where RE projects are located. Instead, the promise of development is mainly used to gain access to local resources and cheap labor to construct RE projects, while production networks are structured to optimize both the production of RE and *makhzen* control of the energy sector. Throughout this process, local communities are ostracized from their communal lands by colonial institutional arrangements that legitimize accumulation by dispossession. The implications of this are driving extractivist practices in RE projects like the Noor Power Station. Likewise, it promotes extractivism as development by imposing development decisions on local residents. These initiatives usually support access to the region for capitalist development and preserve traditional local hierarchies without addressing the structural needs for inclusive development in these areas. Lastly, the reliance on international finance and technology allows for the exploitation of RE by foreign actors, while transferring the financial risks to the state. Long term, this can reinforce core-periphery relations by creating neo-extractive production networks with industrialized countries and subjugating Morocco to an energy producer role in the international system.

Therefore, the results suggest that Morocco's renewable energy strategy reinforces patterns of extractivism at two different junctions; Firstly, the international/national level that is formed by an underlying interdependence of (financial) resources and energy that sustain the neo-colonial dynamics of unequal exchange in the international system. Secondly, the national/local level that promotes extractivist practices as development in peripheral zones by transferring the socio-environmental costs to local communities, while the (economic) benefits are absorbed by the elite. Meanwhile, energy extractivism reproduces existing power dynamics through these junctions as it reasserts the influence of elites on development, supported by clientelism and neo-patrimonial social relations, and maintains power structures at the local and national level. The emphasis on

large-scale RE production allows the government to exert complete control over energy production processes. These (imbalanced) power relations have penetrated the local level where energy projects are located. However, a similar process is not (yet) present at the international level although some patterns of extractivism are. Developments in energy infrastructure point to the risks of energy extractivism in international trade due to the neo-extractive relationships that underline Morocco's export-oriented approach. This partly depends on developments in the international RE market and the success of Morocco's energy diplomacy in strengthening the country's status as a middle-power country.

In practice, this means that while the global energy transition is still ongoing, the patterns of extractivism are already present in Morocco's energy sector. These patterns are mainly an extension of pre-existing power dynamics rather than a new mode of extractivism resulting from the energy transition. Long term, the extractivist elements of energy strategies could lead to an extractivist development model in Morocco as originally identified by Gudynas in Latin America, if the effects on the national level are not carefully managed and the export-oriented approach increases dependence on RE exports. However, this is not yet the case due to the limited role of RE production in the global economy. In any case, energy extractivism is a useful framework for analyzing the energy transition, because it examines the neo-colonial practices and unequal distribution of costs and benefits within energy flows, instead of exclusively considering energy as a commodity. Thereby providing a more comprehensive understanding of the interrelationships between economic development, environmental degradation and international power structures in relation to energy production and consumption. Still, the framework is limited in its operationalization of the consumption phase, since it only considers a one-way flow of RE from producer to consumer country in the analysis, but not the possibility of a reciprocal RE exchange with industrialized countries, as is the case for Morocco. This makes it difficult to measure (renewable) energy flows in countries' consumption patterns. Moreover, the study's external validity is limited, as it only investigated Morocco's energy strategy in relation to energy extractivism. Hence, empirically, the findings cannot be generalized to other renewable energy strategies in developing countries. While one can merely speculate that similar patterns could occur as a result of RE strategies, many of the manifestations of extractivism are also context specific.

Therefore, future research should focus more on RE project developments rather than energy strategies, since many strategies have not yet materialized on a large scale, and conduct a cross-country case comparison to better understand energy extractivism processes in the energy transition. Overall, the findings support the conclusion of Cantoni and Rignall (2019) on the techno-politics of RE. Renewable energy strategies may therefore incentivize the centralization of economic and political power as governments and investors tighten their grip on capital investments and the power derived from RE schemes. This could impede the efforts for a just transition if the adverse extractivist effects of RE production are not critically evaluated early in the global energy transition. Thus, the country that "owns green" may not guarantee prosperity to all its citizens, as is commonly suggested within the public discourse, particularly not to those located in sacrifice zones. On the contrary, the energy transition is likely to perpetuate the current neo-colonial power dynamics into the foreseeable future.

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