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Sustainability and Structural Injustice: *Mapping Uyghur Forced Labour in the Global Supply Chain of a Danish Solar Energy Company*

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SUPERVISOR: MARLENE SPANGER

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Abstract

Concurrently with the global green transition, the demand for solar power and solar energy has never been higher. This development is predominantly viewed in a positive light and as a general environmental success. Meanwhile the supply chain behind solar energy hides a complex reality characterised by social injustice such as systematic exploitation of the Uyghur people of the Xinjiang province.

With a point of departure at the company European Energy, this thesis seeks to investigates, how Danish actors in the solar industry, is connected to global capitalistic structures that facilitates reproduction and labour exploitation.

The thesis operationalises a Marxist theoretical framework, with particular focus on concepts such as surplus value, exploitation, appropriation and accumulation by dispossession. This is operationalised to analyse the global supply chains of solar energy. Methodologically, the analysis is grounded in a qualitative case study and a critical document analysis of publicly available reports such as ESG reports, NGO's investigations, Media coverage and academic research.

The analysis shows that the supply chain of European Energy contains obvious links to sub-suppliers in Xinjiang who are of linked to regions associated with systemic forced labour practices, which puts in to question the company's responsibility and social sustainability. Despite thorough supplier code of conduct policies, the analysis shows that financial risks and capital accumulation is prioritised over social responsibilities in affected areas.

The thesis concludes that exploitation of labour in the green transition is part of the structural logic of capitalism and not particularly a deviation. Thereby, the notion of sustainability as a holistic venture that considers environmental, social and economic factors is challenged.

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Introduction

For years, the global awareness and knowledge on the health of the planet has been steadily increasing. The population of the west has been informed, educated and advised on how to act, think and behave with the globe's health in mind. Thinking and acting green has become the new norm, and a core principle and value for a great number of people. Reports show that two thirds of the population are willing to change their lifestyle to better suit the environment (OECD, 2023). Awareness and urgency to change behaviour were made all the more relevant in the midst of the gas crisis in the start of the 2020's, when gas prices rose, and the general population found that their electricity bill would spiral uncontrollably and become unaffordable. For the people of Great Britain that meant a 54% increase in the price cap in April of 2022 (UK Parliament, 2025). This trend continued into 2023, in which Latvia and Romania endured the greatest increase in gas prices, with 139% and 134% increase respectively (World Economic Forum, 2023). The gas crisis was a significant contributing factor in the record setting growth in solar energy, which in 2023 increased with 62.8GW, an expansion of staggering 53% (Hemetsberger, W., Acke, D. & Schmela, M., 2024).
In the Green Transition, this spike in solar energy can only be regarded as a positive. Energy is becoming greener and more environmentally sustainable.

However, while the rapid growth in renewable energy is a positive development in the Green Transition, it also brings to light other aspects of transitioning that have become more and more dominant in the sustainable agenda. 'Just Transition' encapsulates all aspects of sustainability, whether it be environmental, economic and especially social sustainability with the ILO defining Just Transition as *Greening the economy in a way that is as fair and inclusive as possible, to everyone concerned, creating decent work opportunities and leaving no one behind* (UNDP, 2022). Just Transition is thereby the idea that the green transition is not only environmentally focussed but can only be fulfilled if societal and economic sustainability follows suit, and that a green transition can only be entirely green if everyone is included in transitioning.
Specifically, including all with respects to rights, and development of social standards are vulnerable when scaling and increasing investments in green energy sources. Including social sustainability in the green transition is difficult, as a lot of the core minerals used in renewable energy are extracted in vulnerable or conflict riddled areas. The Democratic Republic of Congo (DRC), which is ridiculed by civil war, and home to some of the world's largest raw mineral reserves, supply as much as 70% of the world's cobalt and lithium (Global Conflict Tracker, 2025 & IEA, 2022: 5). The mines in which cobalt and lithium are extracted, are at the interest of some parties in the civil war, hence the mines become an intrinsic part of the conflict itself. Furthermore, the mines are known to engage in child and forced labour (IEA, 2022: 40). As lithium and cobalt are both core minerals essential to the production of

batteries, the green transition becomes only that, green. The social and economic implications are neglected in the name of greener energy sources.

Central to Just Transition is a focus on the use and abuse of conflict minerals. Conflict minerals are minerals whose systemic exploitation and trade contribute to human rights violations in the country of extraction and the surrounding areas (Hofmann, H., Schleper, M.C. & Blome, C., 2015: 115). Unfortunately, this matter is relevant when addressing a lot of the minerals extracted for the use in renewable energy components, with minerals such as cobalt, lithium, nickel, silicon and quartz all being extracted in either the DRC or People's Republic of China (PRC) (IEA, 2022: 120).

A great amount of conflict minerals extracted and processed in China are stemming from the same area, the Xinjiang province of west China. Xinjiang is the provider of 35% of the world's polysilicon and 32% of the worlds Metallurgical-grade silicon, both key components in the production of solar panels (End Uyghur Forced Labour, 2023). The Xinjiang province is notorious for its cheap production of a lot of materials used in everyday life of almost everyone on earth. Xinjiang is known for its production of textile, components to the car industry and materials used in renewable energy. However, the province is also central when addressing conflict minerals, as the extraction and production of these products is completely intertwined with forced labour (Murphy, L. & Elimä, N., 2021: 9).

The people who are exploited for capital gain in the region, are the native Turkic people, the Uyghur people, who, with their Islamic background, set themself apart from the rest of China. The Uyghur people have been systematically persecuted by the Chinese Communist Party (CCP) for some time, with earliest reports of policies and programs being implemented in 1983 with the formation of the Xinjiang Production and Construction Corps (XPCC), a paramilitary corporate conglomerate operating in Xinjiang with the only purpose of developing the province through the use of forced labour (Murphy, L., Elimä, N. & Tobin, D., 2022: 4, 13). Their responsibilities include acting as the regional government, paramilitary organisation, media empire, bureau of prisons, educational system, and one of the world's largest state-run enterprises (Murphy, Elimä, & Tobin, 2022: 4). The main agenda of the XPCC is to mitigate terrorism and extremism that the CCP have analysed is prevalent in the region. To address this risk, the CCP has implemented ‘educational camps’, in which the Uyghur people are educated in the ideology of the CCP, to develop their economic situation and contribute to the common goal of the PRC.

However, these camps are not with vocational or educational goals in mind, rather detention and internment (Murphy & Elimä, 2021: 9). These camps are the most significant, but not the only tool in the systematic dehumanization and persecution of the Uygur people, and the attempt to destroy the Uyghur culture completely. Started by removing important Uygur intellectuals, such as university professors, to destroy the cultural distinctiveness and assimilate the people into Chinese culture. This was followed by policies specifically targeting the cultural distinctiveness of Uyghur people, such as no long beards, veils or hijabs/burqas. Furthermore, mosques were forbidden and destroyed, some even

being turned into parking lots or public restrooms (Lenberg, L., 2022). In addition, twice, the CCP has introduced policies that prohibit specific names be given to Uyghur children.
These policies further establish the government's propaganda towards the Uyghur people, in which they are described as lazy, selfish and unproductive. Terms that are used to further dehumanise the Uyghur people and feed the propaganda machine and normalise the treatment of the Uyghur people (Murphy, & Elimä, 2021: 11).

A continuous persecution towards Uyghur people has resulted in an estimate of 2.6 million Uyghur being placed in the CCP's forced labour program, either within Xinjiang or in other regions of China (Murphy & Elimä, 2021: 9). This is only achievable on the back of targeted policies, dehumanisation and effective propaganda. The CCP has identified the Xinjiang region as important to secure development of export to the west based on the minerals and material that can be produced, and intrinsic in securing national security (Murphy & Elimä, 2021: 17). To bolster the economy and create products that are cheap enough to maintain the dominant share on several competitive markets, the CCP is offering financial incentives to businesses moving to Xinjiang such as significant tax reductions (Murphy & Elimä, 2021: 17).

With many industries directly or indirectly sourcing their material from Xinjiang, and the continuously increasing focus on social sustainability, it becomes difficult to understand when social sustainability is given priority, and how far companies will go in the name of profit.
As previously explained, Just Transition is exactly that, a focus on human rights, in the development of green technologies and in the green transition. With many components of solar panels being sourced in Xinjiang and used throughout the world, it seems difficult to understand how social sustainability is being considered when transitioning into greener energy sources.
This leads to the dichotomy of the industry, how important is social sustainability and human rights in the supply chain, when companies still source their material from areas ridiculed with evident forced labour.

While the rapid growth of solar energy is a positive in the Green Transition, it also exposes significant ethical dilemmas that cannot be ignored. As highlighted by the treatment and forced labour of the Uyghur people of Xinjiang, the Green Transition becomes complicit in human rights violations. This raises the question of how, despite its environmental benefits, the solar energy industry remains intertwined with exploitation within their supply chain.

This thesis, will through the lens of Marxism as framework, analyse contemporary supply chains. The point of departure for this thesis is, that the Green Transition, cannot be fully understood, or evaluated, without accounting for the power structures and exploitation that underpins and forms the global

production. A Marxist lens allows for an uncovering of how capitalist accumulation operates through the systematic extraction of surplus value, including the appropriation of labour under coercive and unjust conditions. Therefore, the choice to centre the thesis on the Xinjiang province and the Uyghur people's link to the solar energy sector is not incidental. Rather, it represents a broader systemic issue in which the promise of renewable energy sources conceals the reproduction of global inequalities and systems of forced labour. By singling in on this case, the thesis aims to further visualise how labour exploitation is not a deviation from the norm, but rather a structural element of many industries and practices. In that way, the case of the exploitation of Uyghur labour in the production of solar panels and their role in a global supply chain is not an anomaly, but a lens into the contradicting nature of the term sustainability.

Through this approach, the thesis seeks to contribute with a structural critique of how social injustice is embedded in the renewable energy sector, and further, challenge the notion of social sustainability that has gained traction in the last few years.

This will be done by addressing a specific supply chain from a Danish company, analysing their procurement and social responsibility policies, and studying the different links of their supply chain. By investigating a Danish company's supply chain, questions will be asked on how actors from the Global North contribute to, benefit from, and potentially perpetuate exploitative labour regimes under the banner of renewable energy. Furthermore, as the demand for solar energy increases, so too does understanding the social consequences behind its production. Especially when exploitation is hidden behind the notion of sustainability. To boil it down, can a supply chain truly be sustainable, if its foundation rests on coercion, forced labour and social injustice.

This dichotomy or contradiction is what this report seeks to understand and investigate. Exactly how will be developed in later parts of the report. The report will be based on the following research question:

In what ways do the supply chain and sourcing practices of Danish solar energy companies interact with broader capitalist dynamics, and how might a Marxist analysis help to understand the potential tensions between economic growth, social sustainability, and labour conditions?

This research question allows the research to understand and investigate the structures that construct the system for which the agents are acting within - as well as being able to critically analyse the same structures through the lens of Marxism.

The aim for the report is to conduct a critical investigation into how Danish agents in the solar energy industry are both part of and active in reproducing global supply chains, and how these practices can be analysed considering the structure of capitalistic dynamics.

With a Marxist approach and framework, the report seeks to disclose how economic logics of capital accumulation potentially collide with ideals of social sustainability. Through this analysis the report

aspires to nuance the understanding of green transition as an area in which environmental and social consideration does not necessarily harmonise, but rather to some extent challenge each other through the capitalistic means of production and creation of value.

Scope and limitations

The report has set out to understand and investigate the sector for renewable energy, specifically solar energy. The investigation is in the structures that has formed the system and dynamics prevalent in the sector, in which a lot of the raw materials and production chains that are used in the production of solar energy panels and modules are subjected to forced labour and exploitation. The report will try to understand how the relationship between environmental sustainability, social sustainability and the ever-present capital accumulation can either coexist or challenge each other. Hence, the research will focus on social sustainability, social inequalities and the humanitarian side of sustainability, rather than the technological or environmental aspects of this field of study.

To research and investigate the subject at hand, the report has chosen to apply a Marxist approach to the analysis and understanding. Choosing Marxism as the lens and approach entices a complete and well-developed structural criticism of capitalism, the role of labour-power and the commodification of society. These aspects were intrinsic in the decision to choose Marxism, as the report seeks to critically understand how and why the sector for solar energy has been formed the way it has and potentially disclose the underlying structural capitalistic dynamics that influence the system. This approach also entices the report to add more importance to structural and class-based relations rather than cultural or actor-based explanation of the phenomenon. Other theories that could have provided the report with insight could be a neo-liberal analysis of the supply chain structures which could explain the necessity for outsourced supply chains in order to create a profitable and flourishing market, which could provide renewable energy to a larger population for a cheaper price, however, this approach would neglect or overlook the human consequences, and only focus on the financial and positivistic side of expanding markets and enhancing capital accumulation.

Methodologically, this research could be conducted by applying many different methods, which could be interviews with relevant actors to understand the intricacies and struggles that are present in a supply chain or a comparative analysis of most similar or most different actors to understand differences in approaching these risks. However, this report has decided to conduct the research by operationalising a case study, which has the advantage of being able to zoom in on one actor and thoroughly investigate their actions and the intricacies of their impact. Furthermore, choosing a case study, and choosing the correct case study can provide the research with a justifiable claim that the actions and impacts are not

just applicable for the specific case, but for the market in general. The potential generalisation, however, is contained to the Danish market, as the research will contain itself to only focussing on Danish actors on the solar energy industry. Furthermore, the geographical limitation will be closely linked to the geography of the supply chain, however, it is already certain that most of the geographical anchoring will be in the Chinese region of Xinjiang and in Denmark.

Explanation of key terms

What is a supply chain

In this report, a central element that is used both analytically and methodologically and is used as an instrument for answering the overarching question, is *Supply Chain*. Hence, it is relevant to understand what the term supply chain entices, and how this report understands and use the term. Furthermore, supply chains contain several other terms that will also be explained, such as *Tier, Upstream/Downstream* and *Value Chain*. It is important to understand these aspects to properly understand the report's findings.

To define a supply chain, as well as distinguishing a supply chain from a value chain, the exposition made by the consulting firm McKinsey & Company (2022) will be used.

Put simply, the supply chain is the journey raw materials, components and goods take before being sold to the end-user. Therefore, the supply chain is a product's journey all the way from extraction of raw minerals, refining the minerals, manufacturing products from these minerals, assembling a product, to finally selling it to a company that introduces the product to the customer on the open marked. What differentiate a supply chain from a value chain, is decided by what is included in the chain. A supply chain is only concerned about the journey from raw material to final product, while a value chain is also including all "value-adding" elements that are not physical components, such as innovation, design and marketing.

This report is only concerned about the supply chain, as it is within the supply chain that the structures to be analysed are found and the marketing, innovation and design part is not of interest.

As a supply chain is the journey of which the final product must go through in order to be able to sell, the different actors at each step must be divided into what is referred to as *Tiers*. Each tier represents a link of the supply chain. However, the tier list is not starting at the first step of production, but rather it is starting from the perspective of the company at the end of the supply chain, the company selling the final product. Hence, their immediate supplier will be a Tier 1 supplier, while their suppliers will be Tier 2, etcetera, often the supply chain in renewable energy will have four to five tiers. Furthermore, the supply chain is divided into an *Upstream* supply chain and a *Downstream* supply chain. The

Upstream supply chain, which is also the supply chain that is in focus for this report, is the operations explained earlier, extraction, manufacturing and production. The *Downstream* supply chain encompasses the final steps in which the company must sell and distribute products, for some businesses, especially in the renewable energy sector, this also includes end-of-life handling of their products.

Global North and Global South

Throughout this report, there will be used two very distinct terms to describe a relevant geographical, political and economic distinction. That is *Global North* and *Global South*. These terms are used in many parts of this report, as the distinction is relevant in relation to capitalism, history of exploitation, and general economic and power relations.

Generally, the distinction between global north and global south has been made on the basis of the system of more- and less developed countries by the United Nations. The classification is generally thought to separate historically wealthy and poor countries. Generally, the global north is the countries of Europe, United States, Canada, South Korea, Japan, Taiwan, Australia, New Zealand and Israel, while the global south contains Latin America, Africa, the Middle East (excluding Israel), Asia, and Oceania (excluding Australia and New Zealand) (Kenny, M., 2025).

ESG & CSR

As this report is reporting on and analysing sustainability, some important abbreviations need to be established for the reader to understand the context in some passages.

ESG and CSR are both abbreviations and terms used in the corporate world to report and document on sustainability goals.

ESG is a financial industry standard that is used to measure how sustainable a company's practices are. The three main criteria for measuring sustainability and the basis for the abbreviation are Environmental sustainability, *Social* sustainability and *Governance* sustainability. Reporting on ESG can give users and investors of companies a tool for comparing the sustainability of a certain company (Englund, E., n.d.).

Each sustainability measurement has its own specific focus. Environmental sustainability is measured on the impact on the environment that the practices of a company have, in all parts of operations, both directly and indirectly. Social sustainability is the social responsibility that a company has towards society and its employees. This includes evaluating working conditions and transparency in the supply chain, while also initiating initiatives to mitigate negative factors. Sustainability in governance is whether a business in itself is sustainably run, is there necessary measures in place in case of corruption

or bribery, is there diversity in the key roles of the company and is the board composite of the rightful competent people (Englund, n.d.).

CSR is comparable to ESG and follows the same ideas. CSR is an abbreviation of Corporate Social Responsibility and is a company's obligation to targets other than financial profit. CSR works as a strategic approach for how businesses can incorporate environmental and social considerations in their business practices (Palm, S., n.d.).

State of the art/Literature review/Positioning

Purpose – what is the justification for this study

The field of study that is to be researched and investigated in this report, is a field that has been scrutinised and investigated in many ways, and with different intents and purposes. The field of study can in some capacity be divided into three overarching topics of research or study; Theoretical research with a focus on critical theory, Marxism and Global Capitalism, Supply chains, their downstream structure and the derivative consequences, and finally sustainability as a widespread term and the implications of the term.

These topics can all be developed individually within a lot of fields of study and reach a great amount of relevant investigation and knowledge. Therefore, combining the three areas is how this report will handle approaching the topic of workers/human rights in the supply chain of solar panels. The investigation will be conducted with Marxism as an analytical tool and framework to understand supply chains and its implications to labour rights in a global capitalist structure.

The relevance of combining these three themes lie in the necessity to understand the underlying structures of a supply chain, especially a supply chain that in its *core* is regarded as sustainable and as an alternative to fossil fuels. However, the industry of solar energy has on many occasions been subject to scrutiny, as it has been proven that the supply chain is intrinsically linked to forced labour (Murphy, Elimä, 2021: 9). This creates an interesting dichotomy that is prevalent in many aspects of modern consumerism and modern production/supply chains – the structural and necessary need to be involved in forced labour to uphold the competitive advantage in a global capitalist system, all while producing and selling critical infrastructure to the environmentally sustainable transition. The dichotomy in this matter lies in the modern interpretation of sustainability, which often includes aspects of social and economic sustainability just as much as environmental sustainability (McCauley, D., 2018: 240). Hence, the necessity to understand the supply chain of this industry is rather important to get an understanding of how a *Just* and *equal* transition on paper is materialised and operationalised. To best get this understanding, it is preferred and obvious to view the matter through an understanding of the

workers and their position and worth in the supply chain. This is done by approaching a supply chain through a critical lens and analysing the intricacies and underlying exploitation of workers. This critical lens will be constructed through Marxist tools that can provide the investigation with valuable insights into how the labourer' role in the supply chain is constructed, and to understand the structural ideology that is rooted in modern supply chains.

It is in the understanding of the prevailing ideology, that this report will make its stance, as the metatheoretical anchoring of the report will be in *Ideological Criticism*. The aspect of the report that is ideological criticism will be in the investigation and examination of ideas and interpretation that reflect the interests of socially dominant groups (Arnold, D.P., 2015: 293). The ideology that is being criticised in the prevailing capitalistic structures that are expected to be uncovered within the supply chains of solar panels, which uphold a systematic exploitative network (Tsing, A., 2009: 149). It is intended that through an ideological criticism approach, the ideas that seams universally accepted can be analysed for its particularised interest and uncover who these interests serve, and serve to empower social agents, such as media to engage in societal change (Arnold, 2015: 293).

Marxism and global capitalism

The main theoretical lens that this report will apply, is that of *Marxism* and its view on *Global Capitalism*. This topic has been studied, investigated, understood and scrutinised since Karl Marx first presented his thoughts on newer historical and economic circumstances. Notably his thoughts have been further developed by acknowledged theorists such as György Lukács (1923), Antonio Gramsci (1929), Horkheimer & Adorno (1944) and Wright (1997). Out of these theorists, it is relevant to highlight Lukács' foundation for critical analysis of ideology and subjectivity, which pushed Marxism away from a narrow economic determinism (Lukács, G., 1923), and Gramsci, who introduces the idea of culture, ideology and civil society as battlegrounds for class-fight (Gramsci, 1929). All these developments of Marx's thoughts are very relevant to dive deeper into, but it is deemed more insightful to briefly cover the thought on Marxism by Rosa Luxemburg, who in *The accumulation of capital* (1913) presents an interesting development to the idea of capitalism's survival. Marx believed that capitalism could reproduce from the inside through surplus-value (Marx, K., 1867). This interpretation of capitalism is an underestimation, argues Luxemburg. Her interpretation is quite contrary to that of Marx. She argues that capitalism cannot realise its production internally, hence it is dependent on expanding into non-capitalistic areas for resources which in turn leads to imperialism. This imperialism is rooted in the classic understanding of imperialism, in which a capitalist country dominates and exploits non-capitalistic areas for their own survival and growth (Luxemburg, R., 1913). This expansion is relevant when addressing supply chains, as a supply chain, in some regard, can be seen as an expansion from a

company into markets in which resources are easily accessible, and imperialism will materialise through exploitation and forced labour.

As mentioned, Rosa Luxemburg's argument that capitalism's survival is structurally dependent on expansion is contrary to Marx's idea of *Primitive Accumulation*, which is the process of violently separating producers from the means of production (Luxemburg, 1913 ; Marx, 1867). Luxemburg's argument of imperial expansion as a necessity for capitalism is in not a direct contradiction but rather an argument for Marx's internalist logic being insufficient to explain capitalism's long-term reproduction.

Building on both these interpretations is David Harvey in his work *The new Imperialism* (2003). He introduces the development of *Primitive Accumulation* which he calls *Accumulation by Dispossession.* This term describes the neoliberal capitalist reproduction of earlier forms of structural violent appropriation. In this modern take on accumulation, Harvey includes privatisation, financialisaton and the commodification of everything, including body, culture and life, as representations for the modern mechanisms of dispossession (Harvey, D., 2003: 181-182). Thereby, Harvey updates the arguments of Luxemburg by showing how global capitalism systematically externalises and expropriates to maintain momentum. Furthermore, Harvey updates the commodification ideas of Marx.

Generally, David Harvey's Accumulation by Dispossession is a relevant mix of Luxemburg's argument of capitalistic dependency on external production, and Marx's thoughts on commodification. This is illustrated by what Harvey describes as the asymmetry of globalisation. Harvey argues that globalisation is not a harmonious integration, but rather an asymmetrical system in which rich/capitalist countries outsource labour and extraction. This is done in the name of growth and expansion. The growth is done by accessing more resources, which is not only natural resources, but also labour. In his theorisation of Accumulation by Dispossession labour is part of the goal of expropriation and appropriation, which is achieved through forced labour and coerced employment (Harvey, 2003: 161 & 181-182). Harvey argues that this appropriation and expropriation is done to secure resources and labour force rather than classic imperialism which was about territorial take over as well. The appropriation in modern capitalism is by economic power rather than military, which is operationalised through debt, investments and trade policies (Harvey, 2003: 182). At the heart of Harvey's idea of Accumulation by Dispossession is that capitalism will continue to look for new ways of gathering accumulation, especially under the pretence of development and liberalisation. Hence, Harvey's ideas are relevant to address and keep in mind in today's discourse. Development has become synonymous with sustainability, both environmental, social and economic.

These capitalistic mechanisms have been embedded in the transition and development of green solutions, as Darren McCauley argues. In his chapter *Just Transition* (2018), he continues some of the

arguments from Harvey, but in a green transition context. Whereas Harvey criticises the neoliberal phase of capitalism for reproducing accumulation through new forms of dispossession, McCauley extends his critique into environmental policies. His understanding of Just Transition is that it has been stripped of its radical, structural ambitions and reinvented as a *job-replacement logic*. This positions Just Transition as just a tool for the dominant economic perspective between employer and employee (McCauley, D., 2018: 245-246). McCauley argues that instead of confronting the exploitative nature of green transitioning and the dynamics of capitalism, the sustainable development has been co-opted by capitalistic market forces – preserving rather than transforming the structures of inequality.

This reinforces the logic of capitalism described by Harvey as: systemic expropriation under the guise of reform and progression. Further reinforcement from McCauley, is his focus on fairness, equity and justice has been introduced to the considerations for transitioning. However, McCauley argues that focus is still mostly on the variety of possible sustainable transitions and the technologies that can drive them – rather than a systematic analysis of inequality (McCauley, 2018: 243).

This inequality is rather important for most theorist on the subject of Marxism, so is it for John Smith, who in his 2016 work *Imperialism in the 21st century* argues that this new form of modern imperialism, which works as an outsourcing strategy through global supply chains, creates a new form of apartheid, in which workers in the global south are exposed to low wages and subpar working conditions. In this modern imperialistic/capitalistic system, the exploitation can be hidden through the global supply chains. The outsourcing of production to subcontractors creates a relationship in which the companies in the global north can disclaim responsibility for working conditions, and thereby make the exploitation less visible (Smith, J., 2015).

Global supply chains and risk management

In a Marxist analysis of supply chains, their role in a global capitalistic structure is regarded as exploitative and closely linked to modern forms of imperialism. Contrary to this approach and lens towards global supply chains is the mainstream view, which in general appreciates the neutrality of global supply chains as a means for optimised networks in efficiency, risk management and competitive advantages. A great number of scholars has produced literature about the intricacies of global supply chains, with the aim of analysing the competitive side and how to mitigate risks within the supply chain. The scholars and their works that will be addressed in this part is: Martin Christopher in his 2016 book; *Logistics and Supply chains management*, Ila Manuj & John T. Mentzer and their article *Global Supply Chain Risk Management Strategies* from 2008, and ManMohan S. Sodhi & Christopher S. Tang's book *Managing Supply Chain Risk* from 2012.

These analyses, contrary to what this report seeks out to understand, focus on the business aspect of a supply chain, in which the end customer is the most important factor, together with efficiency and costs. Hence, an effective supply chain is essential to creating a viable business, as value is created through efficiency and responsiveness (Christopher, M., 2016: 12-14). The efficiency and responsiveness is only created through a flexible approach to global supply chains, which occur by having multiple suppliers, flexible contracts with suppliers, to be able to pull out of certain business ventures in case of unforeseen complications, and by quickly being able to make redundancies (Manuj, I. & Mentzer, J.T., 2008: 201-203 ; Sodhi, M.S. & Tang, C.S, 2012: 27-30). Furthermore, Sodhi & Tang argues that dual sourcing and geographical diversification is a key part in creating a financially viable strategy for supply chains that can also act as a mitigating factor for some risks that might follow global supply chains. Exactly that, risk management is a key aspect and a returning field of interest for scholars whose interest lies in global supply chains. This thesis looks at the risk of social injustice, specifically in the first links of the supply chain, this is predominantly because of the critical approach to supply chains and the capitalistic structure rooted in these global supply chains, at least from a Marxist perspective. However, from a conventional business perspective, the risks involved in global supply chain management lies predominantly in the risk of consequences for profit margins. Risk management is a multifaceted subject that a company can address through many different strategies. Strategies vary from operational risks, that includes production failures, to reducing risks by building surplus stock (Sodhi & Tang, 2012: 15-17 ; Manuj & Mentzer, 2008: 198-201). Manuj & Mentzer argues further, that the risks experienced in the modern global supply chains gather evermore complexity because of increasing globalisation. These risks arise due to increasing distance, cultural differences, regulatory variations and instability of infrastructure (Manuj & Mentzer, 2008: 193-195). However, the risks are calculated as long as they can be contained, as the upside of globalisation is the agility that can be operationalised in the supply chain, making it possible to seek suppliers through flexible contracts in case of volatile or uncertain environments found in some links of a supply chain (Christopher, 2016: 94-95 & 120-122). These mitigations of risks, that are found in the literature presented above, circles one or two main targets with risk management, that is profit margins and value for customers. Every element in the supply chain must be driven by the goal of enhancing end-customer value, as Christopher argues. Although trivial, this is the business approach to a global supply chain, and a necessary means or approach to survival for any business in a competitive field.

As for this report, the value for the end-customer or the profit margins of a given company is not of interest. But rather something that the scholars above is concerned about, *Risk*. While risk in the sense that has just been presented is about risks that the company might endure in their production that will ultimately cost them money, the risks that are studied in this research is of a humanitarian extent.

To summarise, a mainstream understanding and mapping of supply chains are focussing on risks for business', this report will have a focus on the risks for the labourers within the supply chain.

Contribution to the field of study – and how this report will add valuable research

This report has the intention of contributing to the field of study in three distinct ways; theoretically, methodologically and empirically.

Theoretically, the report will build upon David Harvey's accumulation by dispossession and John Smith analysis of global exploitation through outsourcing in global supply chains. Combining these theories and using them for an analysis of sustainable and environmental business conduct, allows the report to construct a new understanding of how sustainable development and social injustice can co-exist. Furthermore, by applying a Marxist analysis to the context of the green transition, the report offers a new application of critical theory on an industry that for the most part, is linked to progress and responsibility.

The methodological contribution is closely linked to the theoretical contribution, as the supply chain mapping is looking to identify structural inequalities rather than the mainstream approach to supply chains, which predominantly are looking at risk assessments and risk management. The risk management approach to supply chains is in some capacity used in this report. However, the risks involved are not of an economic or end-consumer perspective, but rather the risk of social consequences in the supply chain and the evident risk of forced labour occurring in the supply chain. There are generally few examples of supply chain mapping combined with a Marxist analysis of the implicit supply chain; hence the work of Laura Murphy and Nyrola Elimä is the basis of a great amount of the methodological work applied.

The work of Murphy and Elimä is intrinsic in how this report understands and analyses supply chains with links to the Xinjiang province, however, their work has a predominantly global perspective and is incorporating a lot of corporations. Generally, supply chain analysis has been looking at the UK, USA or globally for actors to analyse, hence the importance to include other actors. This report intends to provide the field with a grounded case study that explicitly positions Denmark as part of the actors with possible ties to forced labour, thereby addressing the fact that Denmark too plays an active part in social inequalities within this specific industry.

How to approach the topic

Methodological approach, theoretical framework and analytical framework

This part of the research will explain and contextualise the choices that have been made in the research in terms of the different ways of approaching the topic and what frame of understanding these choices entail.

Theory and analytical framework for global capitalism

This part of the thesis will provide the report with the lens that is used to approach an analysis global supply chain. The aim is to make an understanding of how Marxism is used not only as a theoretical tool to understand, investigate and scrutinise modern capitalistic structures, but as a way of approaching significant institutional societal structures through a critical lens that seeks to explain why society has been constructed as it has, and how the human condition is suffering from that. Through this presentation, contextualisation and understanding, it should become evident that this report uses Marxism as more than just a critical theory, but as a tool for analysing society, and a critique of the capitalistic structures that is so embedded in modern life.

This part of the report will focus on classic thoughts on Marxism by Karl Marx and more recent adaptations of the classic thoughts by Harry Braverman. To give the report a modern outlook on how Marxism is applicable in today's society, John Smith and David Harvey's modernised interpretations on Marxism will be accounted for, and finally Jason Moore will be used to address the relationship between capitalism and sustainability. To continuously remain on the topic of modern supply chains, sustainability and the green transition, the explanation of Marxism will be accompanied by contextualisation that can address Marxist thoughts in a "real-world" sense.

Marxism as a lens to view the world

As stated above, Marxism is not just a theoretical framework to understand economic structures in a reality constructed around capitalism – but a way of understanding and critiquing the social reality constructed by capitalistic currents. Marxism offers a holistic understanding of the structural construction of our society, the ideologies that are embedded in our society and a critique of power configurations through a materialistic conception of history.

The conceptualisation of Marxism is produced through the mid-1800's by Karl Marx. The period was categorised by the industrial revolution which provided an all-new approach to work, labour-power and the structure of society. Production changed, from largely being a character of self-supporting agricultural population, to a system of factories, production and capital accumulation, which in turn

created new structures on how the classification of the population is divided. On the development of society, Karl Marx developed his view on the relationship between capital accumulation, social relations, exploitation and the working people of society.

Karl Marx argued that this development in society was more than mere economic changes, but that the economic relation of production is intrinsic in the foundation of society. On this lies law and order, politics, moral and religion (Marx, K., 1867: 3). Therefore, Marxism is not to view economics as an isolated sphere, but rather as the main driver behind societal development and the creation of social classes.

Marx is rather engaged in the importance of commodification in capitalism. He argues that commodities have a dual nature in which every commodity has a dual character. Its *use-value* and its *exchange-value*, which represents the qualitative and quantitative aspects of commodities, respectively. The *use-value* is determined by the utility of the commodity and realised through consumption, while *exchange-value* reflects the quantitative aspect of value, indicating how much of other commodities it can be exchanged for (Marx, 1867: 36-42). The use-value is how much of a commodity is needed to satisfy the user, which gives it its qualitative aspect, and exchange-value represents the worth of a commodity on the market. Therefore, there needs to be a balance between the satisfaction of the commodity for the user and the worth of the exchange. This is central in Marx's understanding of value in a capitalist structure, as he argues that human labour power is the greatest value. It is here that Marxism distinguishes between concrete and abstract labour, as this abstraction is what allows different kinds of labour to be compared, and commodities to be exchanged. The distinction is, concrete labour is what produces use-value, such as tailoring or carpentry, while abstract labour is human labour in a general sense and forms the substance of labour. This distinction is important to recognise, as the duality of labour is crucial in the understanding of the nature of commodities and the formation of value in capitalist societies (Marx, 1867: 42-49). The distinction is not just that of a technical one, but an insight into how labour is reduced to a commodity, detached from its human and social context. Labour is therefore only relevant for capital accumulation.

This point is further established as Marx introduces the idea of fetishism of commodities. Marx argues that social relations between people assume the form of relationships between things – all social relations are dependent on a commodity of value. Commodities appear to have intrinsic value, obscuring the labour and social relations involved in their production. With the fetishism of commodities, Marx describes how the value of a commodity becomes seemingly natural and independent of human labour, leading to a distorted perception of social reality – furthermore, Marx argues that this fetishism conceals the exploitative nature of capitalist production, where the true source of value – human labour – is

hidden behind commodity exchange (Marx, 1867: 74-88). This has the effect of hiding social conditions in which exploitation and class division occurs.

The complexity and exploitative nature of capitalist social relations are something that has been scrutinised by Harry Braverman, who approached Marxism in the context of the twentieth century, in which he argues that the one controlling labour, the employer or the capitalist, will view labour power the same, whether it be tools, domesticated animals or human power (Braverman, H. 1998: 35).

Overall, this shows that Marxism believes these structures are intrinsic in how the society has been constructed, formed and established, and that the exploitative nature of the capitalistic system is a driver for the goal of capitalism, capital accumulation for the capitalist.

Marxism offers a lens to view the world through, in which class, labour and economical power are indissolubly connected. Marxism exposes how capitalism is not only an economic system, but also a system for ideology and politics, which hides its exploitative nature through norms, institutions and ideas. Considering the report, and the critical investigation of capitalism, central terms such as Social Equality and Sustainability becomes more than technical and neutral terms but takes a central position in political matters of labour, profit and the conditions for this.

Labour-power, exploitation and value

In a capitalist system, human labour becomes indeterminate, the various determinate forms are not a product of biology, but complex interactions between tools and social relations, technology and society (Braverman, 1998: 35). Labour in the capitalist system has a focus, creating value, which the capitalist accumulates. The accumulation of capital started off as expropriating farmers, by separating the direct producer from the property of the capital goods. This factor is still very much relevant in a modernistic capitalist system of labour, commodity and capital accumulation. Capitalist production requires an exchange of relations, commodities and value in the form of money. Particularly with the capitalistic system is the purchase and sale of labour power, which creates the basis for the entire system, and is based on three basic conditions. The first being the previously mentioned separation of the means with which production is carried on. The workers can only access the production by selling their labour power to the capitalist controlling production. Workers are not able to gain access to resources, machinery and industrial areas, without selling their labour power (Braverman, 1998: 35). The second condition is that workers are free of serfdom and slavery, which prevents them from disposing of their labour power. This condition is from the wording positive, the worker is free to sell their labour power to whomever they desire, which is not an option through slavery. However, this freedom has a double meaning, the worker can dispose of their labour-power as their own commodity, but on the other hand, the worker has nothing else to sell other than their labour-power. This results in the worker being free

to choose, but also freed from everything else, property, resources and the means for self-sufficiency – and is therefore forced to sell their labour to survive (Braverman, 1998: 35; Marx, 1867: 272). Following this condition of the worker needing to sell their labour-power to access production, and survive, the third condition is the purpose of the employment of the worker. The workers sole purpose of the employment is, to expand on the unit of capital belonging to the employer (the capitalist). Therefore, the labour is beginning with an agreement or a contract for the conditions of the sale and purchase of the labour-power (Braverman, 1998: 36). These three conditions have resulted in a steady decline of self-employed workers since the start of the industrial revolution, which makes the sale and purchase of labour the most important trading commodity. This development has become a mode of benefiting the employer, who uses the labourer to produce and accumulate capital, which they in turn convert some of into wages.

What the workers are selling is not an agreed amount of labour, but the power to labour over an agreed amount of time (Braverman, 1998: 37). This point follows the notion that humans produce more than they consume, hence having an agreed amount of time instead of an agreed amount of labour will result in the worker producing more than needed. Within the agreed amount of time the employer has purchased labour, the employer will take up every means of increasing the output of the labour they have purchased. By using every means possible, the capitalist will realise the greatest useful labour, for this is the greatest way to yield the greatest surplus and thus the greatest profit (Braverman, 1998: 39). It is however, in the means that the employer uses, that capitalist structures can exploit the labour power, as the means for yielding the greatest output can be through overtime payment, longer working days, or in some extreme cases, forced labour.

Commodification of labour-power in a globalised economy

With an economic system built on the purchase and sale of labour-power, the individual value of labour-power becomes a significant topic of consideration for the capitalist. To maximise profits, and yield the greatest result in capital accumulation, the capitalist needs to seek labour-power in the cheapest fashion, and through means that makes the worker produce the most. This can come into effect, when the employer is evaluating the price for purchasing workers, as the price for a single worker with a lot of capacity is often more expensive than dissociating the elements and purchasing multiple labour power capable of performing the process (Braverman, 1998: 57). In this way, the labour power becomes commodified, and the use is no longer organised according to the need and desire of those selling, but rather to those purchasing labour, further disconnecting the worker from the means of production. It is the aim for the employer to expand their capital through cheapening of labour, and the simplest way of doing so is through breaking the commodity of labour into its simplest elements, and by that creating a

chain of labour, that each can produce a part of the production for cheaper than a single worker with the capacity to handle all of production, and so creating the foundation of a supply chain (Braverman, 1998: 57). This effect of cutting costs through division of labour is what John Smith argues as the most significant and dynamic transformation of the neo-liberal era, as most of the labour-power purchased will be in low-wage countries of production (Smith, J., 2015: 1). This is done by, as Braverman explained, cutting costs, by replacing expensive domestic high-waged labour, with cheaper foreign labour through outsourcing. This point is further developed by David Harvey, as he argues that globalisation is not a harmonious integration, but an asymmetrical system in which rich (predominantly European and North American) countries and companies outsource labour and extraction to countries with lower wages (Harvey, 2003: 160-163).

The outsourcing consequently comes with a division of labour that separates "hand" and "brain", in which physical labour is separated from mental labour. The separation is often that physical labour is outsourced and carried out by workers who have no impact on the technical/mental side of their work, hence have no control (Braverman, 1998: 87). As described the outsourcing and division of labour is a result of cutting costs, so that the capitalist can maximise profits. This maximisation of profits is therefore still possible, even in the face of stagnant effective demand, that is, if the cost of inputs such as land, raw materials and labour power decline significantly (Harvey, 2003: 139).

Such cost-efficient land, raw materials and labour power can often be found in the global south, that the capitalist system can exploit as new markets. Furthermore, exploiting such areas can become a survival tactic for companies, as they lack pricing leverage, hence the primary focus will be on exploiting new markets and cutting labour costs (Smith, 2015: 5). This has led to companies from the global north becoming dependent on the profits made by outsourcing to the global south and creating a significant dichotomy. The dichotomy lies in the outsourcing that can be done by for example Europe, the commodities can be reintroduced to the European market, however, the working labour cannot cross the same borders. This creates a world without borders except for the people creating the commodities by providing physical labour power. For John Smith and David Harvey, this is a sign of modern imperialism in its economic sense, as it entices the exploitation of southern living labour by northern capitalists. The economic sense of modern imperialism is best shown through John Smith's term *Super-exploitation*, which in short is an extreme case of exploitation in which the work is not only paid a low wage, but a wage so low that they cannot sufficiently reproduce their labour power (Smith, 2015: 5). This term and effect leads back to the previous argument, that companies lack pricing leverage, hence seek every possibility and every mean to survive, including cutting wage costs so low that the exploited worker is unable to live of the wage, and part of the global labour arbitrage that is the key driver for the globalisation of production, and the modern supply chains (Smith, 2015: 5).

This global commodification of labour-power has thus laid the foundation for modern supply chains, wherein labour is fragmented, displaced and systematically devalued in pursuit of capital accumulation. As Braverman argues, the division of labour has reduced the worker to a commodity isolated in functions in a system that they cannot control. This dynamic system is expanded across borders through outsourcing and global labour arbitrage which results in a structure of super-exploitation where the labourer of the global south are structurally denied the means to reproduce their own labour, which reflects a new form of economic imperialism, one that thrives on the unequal integration of global production, restricting labour mobility while facilitating the unhindered movement of capital and goods.

The capitalist structure of supply chains in a green transition

The commodification of labour is, as previously described, not an isolated economic tendency, but rather a part of a system of logic that extends beyond labour-power and the workplace. As Marx, Braverman, Harvey and Smith show, capitalist drive to cheapen labour is deeply linked to its need to externalise the costs of production, whether it be in the form of wages, land or raw materials. Following these arguments and approaches to the societal structure is Jason Moore (2015), who provides a crucial bridge by embedding the exploitation of labour with a world-ecological system, in which both human and materials of nature are appropriated in the name of capital accumulation.

Moore argues that the capitalist system is not only depended on cutting the cost of labour through low wages, but also by appropriating unpaid work and energy, enabled by the four cheaps: *Cheap Food, Cheap Labour, Cheap energy* and *Cheap raw materials* (Moore, J., 2015: 224, 227). As the capitalist exhaust the working body through long working days, extreme means of coerced labour and super-exploitative wages in the global south, it at the same time drains the ecological conditions that sustain life, draining soil, waters, and energy sources in the search for profit maximisation – which goes hand in hand with Marx's observation on capital simultaneously exhaust the soil and the labourer (Smith, 2015: 5; Moore, 2015: 229). This exhaustion happens through what has previously been described, when the neo-liberal capitalist system expands in the search for profit and capital accumulation. This expansion has been intensified under globalisation as companies mitigate stagnation in demand by cutting input costs such as labour and environmental costs, which is accomplished through outsourcing, supply chain fragmentation and global labour arbitrage (Smith, 2015: 5). This helps the capitalist in removing responsibility for the reproduction of labour and nature. Helped by the division of labour and the disintegration of labour into disassociated functions, allows employers to treat labour as interchangeable units of labour-power.

By operationalising a strategy of fragmentation and outsourcing, it in turn creates what Harvey describes as accumulation by dispossession (Harvey, 2003: 137). In this instance workers are not only separated

from the means of production, but also from the ecological and social conditions to support life including land, time or community. This effect is described by Braverman as the social structure, built upon the market, is such that relations between individuals and social groups take place through the market as relations of purchase and sale (Braverman, 1998: 192). By that, the capitalist system has created a structure in which the labourer is separated from means of social relations unless it is through the commodification of said social relations, which by virtue of super-exploitation is something the labourer is unable to obtain.

Moore frames this as the crisis of capitalist sustainability: the increasing cost of labour and natural materials signals the exhaustion of capitalism's historical strategy of stinginess and thereby exhausting the ecological basis for accumulation (Moore, 2015: 227).

The green transition and the push for sustainable supply chains is therefore, paradoxically resting on the extraction model which requires continuous appropriation of super-exploitative labour and undervalued natural resources, which is often located in the global south. Moore argues that while companies may conduct responsible sourcing frameworks and produce ESG reporting, their business model is still built upon the premises of *the capitalisation of nature* (Moore, 2015: 229).

The commodification of labour and construction of modern supply chains have enabled a global system where exploitation is both social and ecological. Labour is commodified through super-exploitative methods through outsourcing with wages lower than sufficient for reproduction of life, while nature is overdrawn to supply materials cheaply for the maximisation of capital accumulation. Through the lens of Moore, and on the back of what has been touched from Marx, Braverman, Harvey and Smith, the resulting crisis is not a failure of sustainable efforts, but a structural contradiction of capital itself, which tells that capitalism cannot sustain life and profitability at the same time.

Applying the Marxist approach to the analysis of European Energy

The theoretical exposition above has established Marxism as more than just a critical theory of political economy, but as a comprehensive worldview, that embed capitalism as a system imbued in the structure of society, one that shapes economics, politics, ideologies, class relations and social reproduction. Central to the Marxist perspective is the commodification of labour, the pursuit of surplus value, and the externalisation of social and ecological costs in the name of capital accumulation. These dynamics are, through the Marxist lens, foundational and enduring logics of capitalism and capitalist organisations, and therefore are embedded in the modern global economy.

This report has a Danish solar industry actor as the central case, their action in their supply chain and their policies and strategies for responsible sourcing. Hence, in analysing this unit, the operationalisation of the Marxist framework is to investigate to potential contradictions between the

company's commitment to responsible procurement and ESG standards on one side, and their embeddedness and active part in contemporary supply chains characterised by its fragmented production, cost-externalisation, and potential super-exploitation on the other side. This is especially relevant as the report is addressing the forced labour violations that occur in Xinjiang Uyghur Autonomous Region.

By utilising Marx's labour theory of value, Braverman's critique of labour fragmentation, Smith's theory of super-exploitation and global labour arbitrage, and Moore's ecological perspective on capitalisation, the analysis aim to investigate and understand whether the unit of the case's ESG discourse and policies of responsible procurement reflect structural shifts in capitalist structure, or if it functions ideologically, obscuring the reproduction of exploitation and capitalisation of ecologically and socially vulnerable situations and areas.

The Marxist lens makes it possible for the report to examine whether the Danish actors' operations, supply chain and procurement practices are transformative or if they are reproducing the same extractive dynamics under the notion of green transition and sustainability. By mapping their supply chain and comparing it to their stated ESG targets or policies, the report can critically assess how labour and nature are treated in practice and whether the company's economic incentives align or contradict their ethical commitments.

Methodological approach

The case study and how it is operationalised

This report has set out to understand whether human rights violations and working rights infringements are taking place in the supply chain of the solar panel industry. As stated earlier, the issue of human rights violations, forced labour, and unjust working conditions is a continuous and regular issue in the production of solar modules and panels. This has been analysed, scrutinised and understood in a multitude of different contexts, in which different companies or areas has been looked at, mostly from the global north. However, missing in the field of study, is an understanding of the role of Danish companies in the global production of solar panels, and the reproduction of forced labour in the supply chain. Hence, this report seeks to investigate the position of a Danish company in this global structure, and in what capacity this company is an active actor in upholding a systematic forced labour regime, and if the company's policies on procurement and responsible sourcing is compatible with their actual supply chain.

As the focus of the report is to understand a single company's supply chain, and the intricacies of that supply chain, it was deemed most useful and appropriate to approach the investigation through a case study design.

Generally, social research is interested in the social reality, and the development and changes happening within society (Sena, B., 2023: 7). Society today is rather occupied with the notion of sustainability, how to transition into greener energy sources, and how to make this available for as many as possible, as quick as possible. This development is the subject of much social research in the current agenda, as well as here. For a case study, the objective is to understand, investigate and explain events, actions or phenomena, which are approached in the same fashion as a police investigation, which is documented through factual data and evidence (Sena, 2023: 7). The police investigation in question in this report is, as mentioned, the supply chain of a Danish agent in the solar industry and their procurement and responsibility policies. The actions in their supply chains are given character of social relevance, and in the context of sustainability, the relevance is if the procurement is generally sustainable, and not only environmentally sustainable. With the term sustainability, the interpretivist branch of social research is central, as it is important for the researcher or interpretivist to recognise, that the same thing may seem different to everyone – and different explanations and positions must be considered in the knowledge and understanding of social phenomena. The research is based on the interdependence between researcher and object of research, as the goal is interpretation and understanding of phenomena and their meaning (Sena, 2023: 14-15). This report seeks to understand, and interpret a complex supply chain, to be able to create meaning to a development in society. Meaning and interpretation is applied to the subject, when understanding the position of the company in relation to their own policies and their action in the global supply chain structure.
For this reason, the case study design is best suited to create the necessary meaning and understanding. To further establish the relevance of the case study, the following part will present different definitions to a case study and what characterises a case study.

Definitions and characteristics of a case study

The history of case study is both long and extensive, but also fragmented and criticised – the criticised part will be explained later. Case studies were first introduced in the field of psychological research in the early years of the 20th century, in which deviant cases were investigated. It was with the Chicago School that the case study was contextualised in social research, in the realm of sociology. The Chicago School understood a case as single individuals, not organisations, events, processes or policies – contrary to today. For the Chicago School, the term could not be fully defined, but would refer to in-

depth personal history, interviews and participants observations. These interactions were important, as the emphasis in the case study should be on capturing the personal significance of those being studied, their inner life, interactive behaviour and all the information that could not be collected through statistical methods (Sena, 2023: 24-25). However, the prevailing method for the time was quantitative methods – hence the case study was mostly used as support, and therefore not developed much.

The development has happened later and has spawned numerous definitions and ways of approaching and conducting a case study. The following definitions are viewing the case study from a linguistic-methodological point of view, with method, strategy and research approach as the key differences of each definition.

For Bryman, the case study is a research design distinct from experimental, longitudinal, comparative and survey designs. Along the same lines, Punch & Mills defined case study as a strategy referring above all to the processes with which it is possible to conduct, analyse and interpret a case (Sena, 2023: 39). The distinct nature and strategic approach to a case study, is both valuable to adhere to, when conducting the case study for this research. Furthermore, Hammersley defined the case study in a broad sense, as a method, an approach and a research design, with no unambiguous definition (Sena, 2023: 40). However, the definition closest to the case study used in this report is that of Simons, Hamilton & Tight, who refers to the case study as an approach first and foremost. This is because of the inclusion of rules, procedures and research objectives, which determines a particular way of studying and analysing the social world (Sena, 2023: 39). The report will use this definition as Simons, Hamilton & Tight highlights how an approach is characterised by philosophical assumptions, such as worldview, paradigms and epistemologies. The predominant assumption for the report is the lens of Marxism, and therefore a clear and defined philosophical point of view is applied to the research.

It was earlier mentioned that the definition of a case would only contain a single individual. However, modern case study research is more inclusive of what can be analysed in the case study, hence it now includes an individual, an event, an institution, a society, and a program or policy. The most important factor is that the case study is a spatially delimited phenomenon observed at a single point or over some time, and that the phenomenon (the unit) of analysis i.e. what is included as the case, is related to the research – hence the case must be well-defined, specific, complex and be a functional object (Sena, 2023: 41). In context of this report, the unit is a specific Danish agent in the solar industry, which can be characterised as both specific and complex, as the nature of a business with a global supply chain is presumed to be rather complex, but also a functional object. By choosing a company, the case study will act at the *meso* level, in which institutions and organisations are placed. Furthermore, the company acts as the practical subject for the case, while the theoretical and scientific basis that will form the

analytical framework is Marxism – which covers what Wieviorka calls the two facets of the case (Sena, 2023: 42). By addressing only one company, and only their supply chain, it also calls for the case study to be that of a single-case study, which entices a more intense analysis. Hence, the analyser must be aware of the other variables other than data points that can provide context. Hence, benefiting from prior theoretical propositions to guide the design, data collection and analysis. Therefore, the analysis must rely on multiple sources of evidence, with data converging in a triangulating fashion (Sena, 2023: 45 & 95).

Choosing the single-case design also means choosing exactly what kind of case the phenomenon is categorised as. This case is within the category of *Critical Case*, which occurs when there is a critical issue with respect to a theoretical proposition – furthermore, the case is strategically chosen and rather theoretically anchored (Sena, 2023: 72; Flyvbjerg, B. 2010: 474). The critical part of the case is also operationalised through the premiss of the unit of analysis being a model example, hence if there is failure in their structure, there is a likely chance of the same being the case for similar companies in the Danish sector for solar modules, as argued by Flyvbjerg: *If it holds true here, it probably holds true elsewhere* (Flyvbjerg, 2010: 474). It should be mentioned, that if the opposite is true, that the supply chain mapping shows that no forced labour is used in the supply chain of the Danish agent, then there is a likely chance of that being true in the rest of the Danish sector.

The choice of subject

The choice of subject for this research relates to a lot of consideration. First of all, the research is based on a case study, hence, the subject (unit for the case) is rather important for the research to be valid. The research question and the research in general are interested in viewing the structural intricacies and the structure of global supply chains from a Marxist perspective. This approach entices the subject to be of a characteristic in which a relationship between employee and employer in some capacity could be analysed, hence the need for the subject to be a business/company. This is a criterion as the research is interested in studying and investigating some core principles in Marxism regarding the role of the labourer in global capitalist structures, which could only be found by investigating a company. This is further established, as the industry that is investigated is renewable energy, specifically solar energy. Another aspect in the choice of subject is the geographical context of the research. It has been established that previous research on the field has predominantly been concerned about the larger actors on the global scene, such as the United Kingdom and The United States, as well as a more general global scale of research – hence, singling in on a country or region that has not been thoroughly scrutinised will position this research within the field of research without repeating the exact context. Therefore, the focus is on Denmark and the Danish sector for solar energy.

With these factors in order, the exact company that is going to be acting as subject is needed. For this, there are more criteria, such as the company's position in the Danish market, the history of their supply chain, and what policies and rules they apply for their sub suppliers.
These criteria create great opportunities for a company to be selected, however it is not as easy as it may seem. Denmark, contrary to its small size, has a large and well organised infrastructure for companies to become successful in the renewable energy sector. Hence, the Danish market is not lacking solar companies that could fit the description for this research. An obvious candidate for the case could be one of the leading actors on the global market, Ørsted A/S, who's general focus is on renewable energy, both in biogas, offshore windmills, and solar panels. The size and influence on the Danish and global market makes Ørsted an interesting case, as they, as a frontrunner for renewable energy, have the power and magnitude to influence the market (Ørsted, 2025). However, Ørsted A/S, due to their global impact and predominant focus on offshore windmill parks – furthermore, their activity on the solar industry is not comprehensive enough for a deep dive into their supply chain and procurement processes, was not deemed suitable for this research singling in on the Danish context. Another agent that could be fitting for the research is the Momentum Group as their presence on renewable energy is rather strong, with projects in developing, operating and maintaining energy plants as their focus and source of revenue. However, Momentum Group's main activity is not the production and procurement of solar modules, hence, this limits the opportunities to analyse their supply chain (Momentum Green Energy, 2025). The category that Momentum Group is in, the operating, developing and maintaining, is generally what a lot of Danish companies are under. Such companies include Better Energy, Nordic Solar and GreenGo Energy.

These previously mentioned companies could all form the basis of a fruitful and interesting research in the supply chain of renewable energy, and specifically solar energy. However, they have all been dismissed as viable options for the reasons stated above, hence the questions remain, who is the right option for this research.

The options that have been discarded have some things in common, at least the ones named after Ørsted A/S, which is operations and maintenance. However, the area of contact these companies reach is not at a sufficient scale for this research, while Ørsted A/S is mainly focussed on wind energy. Hence, the company that is chosen needs to have a sufficient area of contact, a focus on solar energy and be a producer and developer of solar energy modules to be able to fit the research. Furthermore, an important factor is the opportunity to gather the relevant data and material necessary to conduct a sufficient analysis of both their supply chain and their procurement policies.

To be exact, the criteria that is in use for selecting the right subject is the following:

1. A focus predominantly on solar energy, with wind and biogas in the background or not in a part of the company at all.
2. Involvement in the production and procurement of solar panels and modules.
3. Predominantly operations in Denmark.
4. Sufficient public data available for supply chain analysis.

For these reasons, it has been assessed that the Danish company European Energy is the most suitable for this research. European Energy is the most suitable candidate for several reasons which will be established further here.

European Energy as the subject

European Energy is a Danish company, founded in 2004 by Knud Erik Rasmussen and Mikael D. Pedersen, with a vision of developing Danish offshore wind infrastructure. In 2024, European Energy had projects in 25 countries with the core business being in solar and wind energy production, which spans from development and construction to operations, as well as part of the Power-to-X, which is the Danish term for the process of converting electricity and water into hydrogen through electrolysis – the aim is to use said hydrogen for fuel in transportation (Energistyrelsen, 2025; State of Green, 2025). With that said, European Energy is a company whose impact on the Danish and European market is undeniable, and with an equity of over a billion euros in 2024, their financial strength and operational abilities are greatly established (Proff, 2025).

This position and the magnitude of their operations is a reason for choosing European Energy as the subject of this research. Their position on the Danish and European market is a contributing factor in choosing European Energy, as their position in some capacity correlates with impact, and in this instance, impact to change how production practices has been done throughout the industry. Furthermore, the predominant focus of the operations at European Energy is the production and development of solar energy modules – hence, their access to the relevant parts of the supply chain is quite significant. Exactly with this fact, the access that European Energy has to their supply chain, has previously put European Energy in a bad light, as their supply chain has been scrutinised and that the risk of forced labour happening is present, which European Energy has acknowledged. Hence, investigating their current supply chain, will both give an insight into their efforts to retribute their previous acknowledgement of possible forced labour in their supply chain, and give better grounds for, if the possibility is more or less likely. As a result of this notion of possible labour infringements in European Energy's supply chain, and the agenda of sustainability today, with significantly greater focus on social and economic sustainability, European Energy has introduced rather complex and stringent policies on responsible sourcing and supplier conduct, which is interesting to have in mind, and compare

to the mapping of their supply chain. In the particular context of this research, European Energy operates in the field where labour and capital are cross boundaries which makes the company ideal for analysing the division of labour and creation of value that Marx described in his analysis of exploitation in relations of production.

Because of this previous scrutinization of several global supply chains, including that of European Energy, the data accessible to the public is greater than, for example, the companies listed earlier. Furthermore, European Energy has since then been rather transparent in who their suppliers are for tier 1 and tier 2 – which will help provide the necessary data to complete the supply chain mapping through all tiers.
Other forms of data available are news articles from Danwacth and TV2, as well as reports from NGOs. Additionally European Energy has published relevant reports on their procurement processes and supplier policies that can be of use.

European Energy meets the criteria that was set up for this research and the subject: They have an obvious connection to supply chains for solar energy, available data and a prevailing relevance in the agenda of human rights in sustainability – thereby they can act as a strong case for the analysis of labour rights and structural inequality in the global transition into green and sustainable energy.

Based on the information above, it has been made clear why European Energy has been chosen as the case for the research, and why other companies were deemed unsuitable. Further elaboration on what kind of case European Energy will act as in this research, and what a case like European Energy can tell the reader about the solar industry in Denmark, will happen in later parts of this report, in the methodological section for the case study.

Operational plan for the research

As part of the planning for the case study it was identified that a structured research protocol was to be established, to ensure and create transparency, reliability and replicability. Papers on the methodology behind the case study has been intrigued by this subject before, and renowned authors such as Stake (1995) and Yin (2003) has both established their take on what a case study should focus on and hence what the research protocol should plan for the research to operationalise. Both Stake and Yin has different ideas on what the case study is to focus on, hence their respective protocols are different, with some differences being more obvious than others (Brereton, P., Kitchenham, B., Budgen, D. & Li, Z. 2008: 2-3). While Yin's epistemological approach leans towards post-positivism/realism, by testing theory and explain causal relations, Stake is more on the side of constructivism or interpretivism, in which the case sets out to understand meaning and context and interpretation takes centre stage rather

than explanation (Yin, R., 2018: 17-18 & 35-38; Stake, R., 1995: 1-2 & 8-9). The approach of this case study will employ a hybrid of the views of both Yin and Stake, by trying to interpret and understand causal relations in the supply chain of European Energy in relation to the Marxist theoretical framework. Regarding theory, this approach will be leaning most towards that of Yin's, as the theory will act as the basis for the analysis. Furthermore, the definition of the case as a limited system with a clearly defined context and subject is based on the approach of Yin, as the approach presented by Stake, with the case being a flexible definition did not fit this research (Yin, 2018: 32-33 & 38-41; Stake, 1995: 2). On collection of data, Yin and Stake are once again viewing the case study research in different ways. In the same vein as his approach to the definition of case, Stake operationalise a term he calls "progressive focusing" which entice the researcher to develop and adjust the data used in the case study (Stake, 1995: 9-10). Yin's approach is once again stricter and more controlled, as he argues for a data triangulation, which operates with different forms of data to reach convergence (Yin, 2018: 127-129). This case study will, once again, lean towards the approach of Yin, as the supply chain mapping and subsequent analysis is dependent on multiple forms of data and information – hence the data triangulation is expected to come in handy, when analysing this subject matter. This approach is furthermore useful by the role of the researcher in the analysis. As the researcher in this case will investigate and test assumption, without direct interference with the data.

Based on the approaches to protocol and operational planning described above, it is evident, that this case study will operationalise a mix of both what Yin and Stake are arguing is the preferred approach. The combined inspiration for the research protocol is made to ensure transparency, reliability and replicability in the study. While the case study does draw from the work of Stake and his description of understanding the case study in an interpretivist and constructivist manner, the predominant approach will lean towards that of Yin's and his structural and replicable approach. The study will draw on Yin's systematic orientation while also incorporating Stake's focus on contextual interpretation, to best align with the interpretivist nature of the Marxist analytical framework that applies to the analysis.

The investigation of the case study begins with the Marxist proposition that capitalistic modes of production externalise labour costs, often through coercion or exploitation – predominantly to the global south. Therefore, European Energy has been selected as a *critical case*, as its position on the Danish marked and commitment to responsible sourcing makes them a strong subject for theoretical confirmation or falsification. If forced labour is present in their supply chain, similar occurrences are likely to exist for other actors on the Danish marked. If the opposite is true, European Energy may serve as a best-practice model.

The unit of analysis for the case is the supply chain of European Energy, with focus on the use and characteristics of their suppliers from tier 1 downwards. The analysis is at the meso level and will be based on Wieviorka's two facets of a case study European Energy will act as the practical subject, while Marxism acts as the theoretical framework.

To ensure a stringent and structured approach to the case, there has been formulated the following guiding questions, which will steer data collection and analysis:

- What does European Energy's supply chain look like?
- Are there observable links to suppliers associated with forced labour, especially in Xinjiang and the Uyghur region?
- To what extent are European Energy's responsible sourcing policies implemented in practice?
- Does the empirical data support or falsify the Marxist theoretical assumptions of labour exploitation in global capitalism?

To approach the analysis through these questions it is necessary to gather the right data and documentation. This will be done through a data triangulation, in which data will be collected from multiple sources and have different characteristics, as recommended by Yin (2018).

- Primary documentation includes but is not limited to: European Energy's annual report (ESG report), supplier code of conduct, and sustainability disclosure.
- Secondary sources include but is not limited to: Investigative journalism (e.g. Danwatch investigation) and NGO reports (e.g. ASPI, NomoGaia).

This data triangulation is operationalised to get the best insight into the supply chain of European Energy, as well as strengthening the credibility, dependability and confirmability of the findings.
As an end remark, it is important to note the possibility of information being either hard to come by, faulty, or non-transparent, due to competitive advantages of supplier information, the subject matter and the regions that the investigation is focusing on.

The collected data will be approach and analysed through the operationalisation of document analysis with attention to thematic patterns and narrative contradictions and theoretical coding through guidance from the Marxist analytical framework and concepts such as exploitation, value extraction and commodification of labour.
By combining the theoretical anchoring with the strategic case selection and methodological triangulation the case study is ensured to not only be methodologically rigorous but also critically engaged with the structural dimensions of global supply chains.

Supply chain mapping

For this report to fully grasp and analyse the supply chain of European Energy, it is necessary to conduct a mapping of the supply chain, to understand how they might be complicit in social injustices – particularly in relation to labour practices in Xinjiang. This mapping will act as the empirical basis for the analysis and will allow the analysis to focus on two main links of the chain aligned with the case

study design, while contextualising the links to the rest of the supply chain. Therefore, it is relevant to understand what a supply chain mapping is, why it is relevant, how it has been done in other reports, and how this report is going to approach the mapping of European Energy's supply chain.

A supply chain mapping is, in its essence, a visualisation of how a product starts at an extraction of material to a sale to the end-customer. In this report, the starting point is the extraction of *quartz*, which is a mineral used in many kinds of electronic applications and components (MEC, 2025). In the production of solar panels, quartz is a resilient and important mineral that can stabilise and develop the durability of the module (AZO Mining, 2019). The end of the supply chain in this report will be the sale of the finished solar panel or module by European Energy. In between the extraction of quartz and the sale of the finished product lies a lot of processes that include numerous locations that all serve different aspects of the production. It is within these steps that the justification of a supply chain mapping is found, as the different steps of production are handled by different companies.

The different handlers of the production through the supply chain are why it is relevant to map a supply chain. This relevance is not only in the context of this report, but especially also for a company. For a company, knowing the steps of the supply chain is intrinsic in being able to uphold company standards and policies. These standards could be material standards, sustainability standards, or relevant to this report, labour conditions in the different links of the supply chain. Knowing the steps gives a company an opportunity to conduct audits, to survey the suppliers in the supply chain and perform proper due diligence. This has a multitude of benefits for companies, as it can help ensure reliability and quality in the materials, as well as it can give the company valuable control in who the producers of certain aspects in the production are.

For analysers of supply chains, mapping the chain is relevant for a lot of the same reasons. Tracking a company's suppliers all the way through the supply chain can give an analyser valuable insight into many different fields of study, whether it be an insight into the diversification/geographic location of suppliers to understand their risk management strategies, or insight to scrutinise who the company is collaborating with. The purpose of the mapping in this report, is to scrutinise the specific supplier relationships that European Energy maintains, in order to assess whether the firm's operations align with their stated commitments to human rights and social sustainability. This analysis is necessary to position a Danish company within the structure of global exploitation in the solar energy industry.

Mapping a supply chain for this purpose is not a new phenomenon. It has been completed successfully and with great impact by already mentioned researchers such as Laura Murphy & Nyrola Elimä in their report *In Broad Daylight* and Mark Anner in his work *Squeezing workers' rights in global supply chains*. These two works are significant in constructing a critical mapping and understanding of global supply chains as both Murphy & Elimä and Anner are investigating the supply chains of solar panels

and textile respectively through a critical lens. Their mapping was based on thorough research and years of labour towards constructing a supply chain that can give specific answers to how human rights are violated in the early steps of supply chains. Hence, their work will create basis, both methodologically and for the case of Murphy & Elimä empirically, for the mapping and investigation that this report will be completing. Therefore, it is relevant to understand how Murphy, Elimä and Anner has constructed their mapping, their methodological approach and what kind of data they have been operationalising.

Both reports applied mixed methods, in which data such as policy papers, trade data, industry reports and social media was the main driver (Murphy & Elimä, 2021: 18; Anner, 2020: 327). Murphy and Elimä consulted with experts on forced labour, solar energy, Chinese policy and the history of the Xinjiang Uyghur Autonomous Region to contextualise what they found in the data that was applied (Murphy & Elimä, 2021: 18). While Anner made use of factory visits and interviews in Bangladesh to further establish the contextualisation and grounds for the research. These interviews were the used as the basis for a survey (Anner, 2020: 327-328).

Adapting Murphy & Elimä's and Anner's approaches to a single-case design, this report will use critical document analysis to map and examine European Energy's chain of procurement, with a particular focus on links to regions associated with human rights violations and forced labour programs. For Murphy and Elimä the analysis of supply chains covered more than thirty companies, from extraction to final sale. This extensive investigation was based on documents that was mentioned above; publicly available trade documents, policy papers, social media posts, and industry reports such as CSR and ESG reports (Murphy & Elimä, 2021: 18). Their investigation of supply chains creates a basis both methodologically and empirically that this report can use to investigate European Energy. Especially the analysis of publicly available corporate disclosures and industry reports are significant in understanding and scrutinising European Energy's supply chain. Using this kind of data also ensures that the reliability of data is kept as high as possible. Specifically, the data that is expected to be useful in mapping the supply chain is customs data, third-party certifications, CSR/ESG reports, and list of tenders. The combination of this data will ensure the mapping to cover all bases and consider both the companies claims and how established evaluations has analysed the supply chain, as well as concrete trade data that explicitly can tell who and where certain products are coming from.

The data and documentation mentioned above should be enough for an adequate mapping of a supply chain, however, these forms of documentation and data come with its set of limitations and challenges, that the report needs to be aware of. Those include, limited access to the necessary documents, as trade data can be classified or simply not publicly available, opaque links to suppliers, which will greatly hinder the complete mapping of the supply chain, language barriers, which can occur, as the supply

chain crosses country boundaries, and finally the lack of up-to-date data, and the chance of the faults being discovered have been rectified.

Data collection and quality in research

For the critical case to be fully investigated and researched, it is needed to find and apply relevant data stemming from different sources. Therefore, it is most appropriate to mix research tools to gather the relevant information. The research tools will mostly be of qualitative type, such as company produced documents, financial statements and NGO-reports, but it is valuable to also include different kinds of quantitative data to nuance, create multiple perspectives on the phenomenon in question, and help facilitate the understanding and explanation of the case as much as possible (Sena, 2023: 82). This research will use both qualitative and quantitative data, with a focus on relevant documents such as company policies, articles and reports, and financial data. By using these forms of data, the report will benefit from the non-intrusive nature of the data, enhancing the quality of the data collected and its application. The non-intrusive manner of approaching documents is important, as an intrusive layer on top of a document that is already not necessarily a representation of the objective truth would hinder the credibility of the data used to form the results (Sena, 2023: 94; Brinkmann, S., Tanggaard, L., 2020: 194). The objectivity of truth in the data used is furthermore important as most of the data collected and applied is secondary documents with the intention of publication, such as NGO-reports, financial statements and company statements (Brinkmann & Tanggaard, 2020: 187). The analytical work done to the documents will be as a hypothetical deductive analytical framework, given the particularised theoretical framework being operationalised – this has a positive effect on the dependability of the documents used, as the research follows stringent procedures, and reasonable decisions (Brinkmann & Tanggaard, 2020: 194; Sena, 2023: 94). However, the documents that are being analysed are not only from a hypothetical deductive perspective, as the supply chain mapping that is to be conducted does not include direct theoretical framework to understand the links in the supply chain. Hence, the operationalisation of relevant data is analysed differently, depending on the use in the particular situation – which will be announced prior to the operationalisation of each part of the analysis.

In collecting data, the researcher is especially prone to picking and choosing data, with the intention of confirming an initial hypothesis. For this report, the hypothesis that might be overshadowing the researcher's entry into analysing data is to prove that forced labour and human rights violations is by all means still happening in the supply chain of European Energy. For this not to be true, the report, and the researcher must always be aware and open to including data that is contradicting the hypothesis and

the bias of confirming said hypothesis (Sena, 2023: 94). The confirmation bias and confirmability in the chosen data is a common point of criticism towards case studies, as critics will say the case study is a method to confirm or verify predisposed opinions and results (Flyvbjerg, 2010: 465). However, researchers defending the case study have the opposite opinion on the case study, arguing that the case study is a tool for falsification of predisposed hypotheses. The arguments stem from the notion that the case study has its own systematism, which is not less rigorous than that seen in quantitative methods – this rigorousness of the systematism will more often lead to falsification of a predisposed hypothesis than to verification of the same hypothesis. Furthermore, the question of whether the data chosen is subjective to the predispositions and bias of the researcher is prevalent in all qualitative methods, hence the argument is either not valid, or should cover all facets of qualitative research (Flyvbjerg, 2010: 479-480). Other critics have argued that the case study is less valuable than other forms of research because of the context dependency for the research to be fruitful. The consensus of critics is that for research to be able to develop the theory used, there is a need to not be dependent on context in the research. However, researchers such as Flyvbjerg (2010) argues to the contrary, that having a case study and approaching research within context dependency elevates knowledge and develops theory. The level of detail that can be reached through a case study and by being close to a specific context is important for two reasons. Number 1, it can create a nuanced image of reality that is not possible to reach by removing the context. The nuances create meaning to behaviour, and hence, helps develop the understanding of how and why certain aspects are as they are. In this research, the context and unit of analysis, European Energy, can develop the understanding of how Danish companies and consumers are part of global supply chain structures, that may or may not violate human rights and infringe labour rights. The second reason that context is important is, as Flyvbjerg argues, that there is no epistemic theory in social science/research, such as in natural science. Meaning, there has not been formed non-context dependent predicting theories – hence, social science can only offer specific contextually based knowledge (Flyvbjerg, 2010: 466-467). Therefore, having a study that has the context of the research as the main driver, is what is expected to develop the knowledge on the field.

This discussion on whether the context is important or not for the development of the field of study can be transferred to the discussion on whether case study research is able to be generalised, the generalisability of the results. Again, critics of the case study argue that the results of one context dependent research cannot be useful to address general issues and topics within the broader field of study, as the argument is, that it is not possible to conclude from a single case (Flyvbjerg, 2010: 465). However, Flyvbjerg is arguing that the generalisability is closely connected to the choice of case, and what grounds the choice has been made (Flyvbjerg, 2010: 469). Therefore, the choice of case in this research is rather important to understand. European Energy is chosen because of their position as a

major actor on the Danish solar panel market, hence having impact on the market. The results that are found in this research is not expected to be a generalised observation on the solar panel marked in Denmark, however, as previously mentioned, the critical case, which this has is, can create a logical deduction, that goes *if it is true here, then it is possible to be true for everyone*. Furthermore, the generalisability is expected to be more of a theoretical generalisability in the context of global supply chain structures. The case might prove how the theory that is applied to understand, investigate and analyse the global supply chain is either faulty or correct.

Analysis

The next part of the research will be the analysis of the supply chain of European Energy, afterwards the supply chain mapping will be used to analyse the actions, impact and intentions of European Energy through the lens of Marxism and the framework that has been established above.

Supply chain mapping of European Energy

Tier 1: Direct suppliers

In the network of supply chains, the first tier of the supply chain is the direct supplier to the company that sells the final product, which in this case is solar panels that European Energy are using for their projects in Denmark and some parts of Europe.

To find out who supplies European Energy with the solar panels for their projects, the report must investigate what European Energy describes in their work with transparency and securing of their supply chains. Through the article on the European Energy website called *The securing of our entire supply chain,* European Energy names 3 major suppliers of solar panel modules. That is LONGi Green Technology, Trina Solar and EGing Photovoltaic Technology (European Energy, n.d.).

Hence, Tier 1 of European Energy's supply chain is: LONGi Green Technology, Trina Solar Energy Company and EGing Photovoltaic Technology.

Tier 2 Producers of components

Now that the first-tier suppliers have been identified, it is time to investigate the suppliers that is used for the tier 1 suppliers. The suppliers in Tier 2 are the suppliers of components in solar panels, such as wafers, cells and silicon ingots. Before the next part of the tier list is being scrutinised, it is relevant to investigate the three suppliers listed in tier 1.

LONGi Green Technology: Based on information from LONGi's own website, the company was founded in 2000 and has a goal of becoming the most valuable solar technology company in the world.

Located in Yunnan, China and Kuching, Malaysia, LONGi employs a business model that seeks to create low-cost clean energy products for the world while the company itself uses clean energy and green manufacturing practices in its operations when possible (LONGi, n.d.). LONGi has a set of instructions that suppliers must follow in order to conduct business with the company and to follow social sustainability guidelines. The newest version is from 2024 and include guidelines such as, proper business ethics which entices the supplying company to comply with all applicable laws and regulations both national and international, prohibition of the use of child- and forced labour and modern slavery such as prison labour, as well as adhering to freedom of association and collective bargaining (LONGi, 2024: 4-6 & 10).

According to Murphy & Elimä LONGI Green Technologies has production facilities across Peoples Republic of China, however, non in the Xinjiang Uyghur Autonomous Region. Although they do run a solar power generation plant in the region, however, no evidence shows that LONGi, through their facilities are directly involved in labour transfers or forced labour violations (Murphy & Elimä, 2021: 40). Through the official canals of LONGi Green Technology's website there is no explicit suppliers listed (LONGi, n.d.). However, through investigation Murphy & Elimä found that LONGi had agreements with the following companies: 270.000 tons of polysilicon from Xinte through 2025, 112.000 tons of polysilicon from Daqo and an agreement to purchase 125.000 metric tons of polysilicon from Asia Silicon through 2025 (Murphy & Elimä, 2021: 40).

Trina Solar Energy Company: Trina Solar was founded in 1997 in Changzhou, China which is where the headquarters are still located. Their focus is on photovoltaic products such as PV modules and systems. Trina Solar is regarded as one of the most bankable companies in the industry and has a total amount of assets of 17 billion USD. With operations in 170 countries and regions, the reach of Trina Solar products and systems are enormous and their impact on the industry is noticeable (Trina Solar, n.d.). In Trina Solar's CSR report of 2023 – the newest available report – the implementation of 4 new processes for sustainable and responsible purchasing practices is introduced. Especially point 2 and 3 are relevant to address. Point 2 is a Strict *supplier-selection processes* which involves a 4-parts assessment principal, in which Trina Solar investigates the suppliers environmental and social impact, conducting audits of the suppliers' facilities, creating action correction plans and approving the supplier's vendor list (Trina Solar, 2023: 1-2). In the same vein, Trina Solar introduced a series of criteria for sustainable and responsible purchasing principles, such as prohibition of child- and forced labour conducted by the supplier and freedom of association (Trina Solar, 2023: 1, 3). These points of implementation are following the same suit as that of LONGi and might represent a heightened focus on responsibility in the supply chain that reaches further than environmental responsibility and

sustainability. Although these implementations should create a more just and fair upstream chain, Murphy and Elimä reports that Trina Solar Energy Company has operations in the Xinjiang Uyghur Autonomous Region, and in a public statement explained their hiring process as helping "solve the employment problem of the local people of all ethnic groups." Furthermore, that 120 locals have been "absorbed" (Chen, C., 2021: 373). The use of the word *absorbed* is often used referring to labour transfer in the Xinjiang Uyghur Autonomous Region (Murphy & Elimä, 2021: 41). Other than labour transfer, it is unclear to what extent Trina Solar's operations in the region are violating forced labour regulation.

Trina Solar Energy Company is supplied by some of the same suppliers as LONGi Green Technology, including an agreement with Daqo for the purchase of 37.600 tons of Polysilicon and Asia Silicon. Furthermore, LONGi as well is in Trina Solar's upstream supply chain. Trina Solar has an agreement with the company Tianjin Zhonghuan to purchase 1.2 billion units of silicon wafers (Murphy & Elimä, 2021: 41).

EGing Photovoltaic Technology: Unfortunately, not much public information is available for EGing Photovoltaic Technology, however, it is relevant to note that the company, founded in Changzhou in 2003, has its main expertise in producing photovoltaic batteries for use in solar panels, and is regarded as one of the top 5 companies in China within this field. Interestingly EGing's most recent ESG report from 2023 (in English) does not include any mention of the word "labour" and the word "supply" or "supplier" is only mentioned 9 times in relation to different specific numbers of suppliers, whether they have added more, if the suppliers are domestic and the percentage of domestic suppliers (EGing, 2023). This fact makes the further investigation into the upstream supply chain and the responsibility processes of EGing difficult. On the back of this lack of information available for public use, the supply chain of EGing Photovoltaic Technology will not be further developed from here on. There is, however, an interesting phrasing used in EGing's section about the company, in which they state that they currently "own" 3.500 employees, which in the Marxist context of commodification of labour seems to be a great example of how some businesses view their employees. However, in this context, it should be noted that this tiny phrasing might not be an exact representation of the views of the company, but a minor misuse of wording.

The supplier relation from this point on becomes more and more difficult to gain access to through publicly available sources such as the companies own reporting as seen above. Hence the upstream supply chain links have been established using the work done by Murphy and Elimä.

The supply chain for European Energy is now linked in this fashion: European Energy is supplied by LONGi Green Technology, Trina Solar Energy Company and EGing Photovoltaic Technology, all based in China. Both LONGi and Trina Solar are supplied by Asia Silicon and Daqo, while no records on EGing's suppliers were available. Asia Silicon and Daqo will therefore be the companies that are predominantly active in tier 2 of European Energy's supply chain. Hence, Asia Silicon and Daqo's suppliers, and European Energy's tier 3 suppliers are relevant to investigate.

Tier 3: Semi-manufacturing of polysilicon

Suppliers in tier 3 of the supply chain of solar panels and modules, are companies processing polysilicon, making the material ready to become wafers and ingots in the solar panel.

Asia Silicon: Asia Silicon, founded in 2006 in the region Qinghai in China, is a leading manufacturer of polysilicon employing a total of 1100 people (Asia Silicon, n.d.). Asia Silicon manufactures polysilicon in its facilities in Qinghai, which is the region immediately east of Xinjiang Uyghur Autonomous Region, hence their direct involvement in the forced labour and labour transfer violations that happens in XUAR is difficult to establish. However, some suggestions seem to indicate that Asia Silicon is transferring polysilicon outside of XUAR to their facilities in Qinghai through their suppliers Hoshine which constitutes the highest risk that Asia Silicon is implicit an active part of the forced labour and internment happening in XUAR (Murphy & Elimä, 2021: 35). By transferring the polysilicon outside of the region, it severely taints the notion that only polysilicon processed in XUAR is subject to forced labour.

Daqo: Daqo was first founded in 1965 under the name Xinba Integrated Company, but in 2004 renamed to the current Daqo Group Co. The company is engaged in a multitude of industries, such as Electrical, New Energy, Power Electronics, and Components (Daqo, n.d.). Within the Daqo group is the Daqo New Energy Corp. This subsidiary of Daqo Group is a leading manufacturer of high-purity polysilicon used globally in the solar industry, with a current annual capacity of 205.000 MT of polysilicon (DQsolar, n.d.). In Daqo New Energy Corp's ESG report from 2023 (the newest available version) they introduce newly implemented *Labour protection management systems* and *labour protection management processes,* these implementations are mostly on the working safety conditions at Daqo (DQsolar ESG, 2023: 39). Later in the report, Daqo New Energy Corp's supplier code of conduct is introduced, in which they report that the management of their supply chain is a crucial element, with suppliers mandated to sign an agreement to *Safeguard rights and interest of employees and opposing forced labour*, furthermore, the suppliers must comply with legal standards for wages and working

conditions. Daqo New Energy Corp reports that they have not identified any breaches in their supply chain regarding legal standards or child- and forced labour (DQsolar ESG, 2023: 46, 53-54). These initiatives set a precedence for change as Murphy and Elimä reports that Daqo is significantly subsidised by the XPCC and rely predominantly on operations in the Xinjiang Uyghur Autonomous Region, with reports that the Daqo New Energy Corp had received subsidiaries in relation to "labour transfer program" (Murphy & Elimä 2021: 28-29). Furthermore, recent reports show that Daqo is one of several companies, including previously mentioned LONGi Green Technology, Trina Solar Energy Company and Xinte Energy, are implicated in forced labour and slave labour practices in their operations and their respective supply chains (Ukpanah, I., 2024). Furthermore, Xinjiang Daqo New Energy is listed on the UFLPA Entity List of companies that needs scrutinization in order to pass through costumes in the United States (Homeland Security, 2025)

The primary suppliers of Daqo New Energy Corp are the aforementioned Hoshine Silicon and Xinjiang Sokesi who both operate in Xinjiang (Murphy & Elimä, 2021: 29).

Therefore, Hoshine and Xinjiang Sokesi act as the main suppliers in the fourth tier of the supply chain of European Energy.

Tier 4: Raw material extraction and production of metallurgical grade silicon

The 4th tier of the supply chain are typically companies that refine or extract raw materials such as quartz and metallurgical grade silicon, as well as companies that conduct some form of processing of the raw materials. These companies will, to a large extent, be extraction and refining raw materials in areas in which working conditions should be closely scrutinised and investigated, as much of the raw materials used in the production of a solar panel is found in the Xinjiang Uyghur Autonomous Region in China, and the facilities will often lay under the jurisdiction of the Xinjiang Production and Construction Corps (XPCC).

Hoshine: Hoshine Silicon Industry Co. was introduced in 2006, with headquarters in Zhejiang Province, and with facilities in 5 Chinese provinces, including 4 facilities in Xinjiang. Hoshine is the world's largest industrial silicon producer (Hoshine, n.d.). Hoshine Silicon's facilities in Xinjiang is run by the subsidiary Xinjiang Hoshine Silicon Industry Co., and started operations in the region in 2016, within the Shanshan Stone Industrial Park (Shu Forced Labour, 2022). Xinjiang Hoshine Silicon announced in 2021 that they would expand operations in Xinjiang, effectively becoming the largest producer of industrial silicon and polysilicon.

The Xinjiang Hoshine Silicon has been accused of engaging in labour transfer programs, and evidence shows that the company has employed "transferred surplus labour", which translates to forced labour of minority groups in Xinjiang Uyghur Autonomous Region. Furthermore, the Turpan government, the area that the production facilities are located, stated that Xinjiang Hoshine Silicon was a frontrunner in effectively implementing correct "vocational skills and programs", which is the indoctrination programs of the internment camps found in Xinjiang Uyghur Autonomous Region. Moreover, recruitment campaigns for Xinjiang Hoshine Silicon show clear signs of discriminatory factors targeting the Uyghur people, as workers must speak Chinese and have "no bad political records". Manual labour is paid by a piece rate, rather than a regular hourly or monthly salary (Shu Forced Labour, 2022). These factors alone, suggest that Xinjiang Hoshine Silicon Co. and the mother firm Hoshine Silicon Co. is engaging in forced labour programs exploiting the Uyghur people.

More evidence to that note is, that the Shanshan Stone Industrial Park in which Xinjiang Hoshine is located is directly engaged in forced labour of Uyghur people, as two internment camps can be found within the park, according to Australian Strategic Policy Institute (ASPI) (Murphy & Elimä, 2021: 22). In 2022, Hoshine was added to the UFLPA Entity list, restricting their access to the American market (Homeland Security, 2025).

As of 2025, Hoshine Silicon Industry Co. has been on an investment exclusion list of the Danish bank Danske Bank on the grounds of their labour practices (Danske Bank, 2025).

A lot suggests that Hoshine, and the subsidiary Xinjiang Hoshine Silicon is involved in problematic activities in the Xinjiang Uyghur Autonomous Region and are directly engaged in forced labour programs.

Xinjiang Sokesi: Xinjiang Sokesi also known as Sokos, is difficult to find information on regarding their foundation, expertise and operations, other than in reports regarding forced labour and labour transfer programs in Xinjiang Uyghur Autonomous Region. Several reports and NGO's are accusing Xinjiang Sokesi of violating labour regulations and engaging in compulsory labour programs institutionalised by the Chinese government and the local government of Xinjiang. The database OpenSanctions, which is a database for companies and persons who in some capacities are of political, economic or criminal interest funded by the German Federal Ministry for Education and Research, has listed Xinjiang Sokesi as a trade risk on the grounds of suspected use of forced labour and engagement in labour transfer programs (Open Sanctions, 2025). The CPA, which is an American NGO representing domestic producers, has recommended and requested that Xinjiang Sokesi is added to the list of companies that are included in the UFLPA Entity list, which would deny their goods of entering the United States, unless very strict compliance to human rights and labour rights are met (CPA, 2022).

Chinese state media has announced that Xinjiang Sokesi are engaged in "organised transfer of labour" and reportedly transferred more than 700 surplus labourers in one month of 2020 alone (Muprhy & Elimä, 2021: 25).

Although there were no official records on Xinjiang Sokesi, it can be established that the company is problematic, and with a high likelihood are engaged in forced labour, labour transfer and active in exploiting the Uyghur people for labour.

Conclusion of the mapping of European Energy's supply chain

According to the mapping of European Energy's supply chain, there are several risks of engagement with companies that are either actively taking part in forced labour violations, labour transfer programs and internment camps of Uyghur people, or companies that are supplied by companies that engage in these activities.

The suppliers for Tier 1 have a total of three suppliers, Trina Solar, LONGi Green Technology and EGing Photovoltaic Technology, in which Trina Solar has activities in Xinjiang by "absorbing" local labour-power, LONGi has no direct link to Xinjiang but are supplied by companies that have, and EGing has very limited public information which makes their risk assessment challenging.

The suppliers for Tier 2 have a total of two suppliers, Daqo New Energy and Asia Silicon, in which Daqo New Energy has operations in the Xinjiang Uyghur Autonomous Region and are currently on the UFLPA Entity List which makes their exploitation of Uyghur labour significant. Asia Silicon does not operate in the Xinjiang Uyghur Autonomous Region but does get their supplies from suppliers who operate in the region; hence their indirect affiliation is significant.

The suppliers for Tier 3 have a total of two suppliers, Hoshine Silicon and Xinjiang Sokesi, in which both companies are engaging in forced labour, labour transfer and exploitation on a significant scale, due to their geographical location, reports and affiliation with both XPCC and the Shanshan Industrial Park, which operates at least two internment camps on their territory.

The likelihood of European Energy been subject to forced labour and exploitation in their supply chain is significant, both due to this mapping, but also due to the companies listed, as they are some of the most influential and holds the greatest market share of materials such as metallurgical grade silicon, quartz and polysilicon which is intrinsic to the production of solar panels and modules.

For a full visualisation of the supply chain, please refer to **Appendix 1**.

Analysis of European Energy's responsible procurement and supplier code of conduct

The supply chain mapping that is conducted above shows sign of significant risks of European Energy indirectly engaging in the exploitation and forced labour of Uyghur people in the Xinjiang Uyghur Autonomous Region. The risks in the supply chain are prevalent and might be indicative for how the industry is constructed, as most of the raw minerals that goes into a solar panel and module are extracted from this region, hence the area of contact that these minerals have is hard to mitigate. All though the industry might be constructed in a way, that forced labour and exploitation is unavoidable, or to the least very hard to mitigate, it is still relevant to understand the position of European Energy, what are their policies on supplier conduct, rules for responsible sourcing/procurement and to a certain extent, how are European Energy engaging in changing the "inevitability" of exploitation and forced labour in the supply chain.

Their practices will be compared to their stated policies and intentions, while the analysis will remain approaching European Energy through the lens of Marxism.

Stated intention versus the reality of production

On the back of the very thorough and investigative report "In Broad Daylight" by Laura Murphy and Nyrola Elimä, European Energy released a statement, as it became clear, that some suppliers that were used by European Energy were severely scrutinised by this report. European Energy acknowledged the severe risks involved with the suppliers of polysilicon, and that these suppliers' ties to forced labour in Xinjiang Uyghur Autonomous Region could not be overlooked.

In the statement, European Energy proclaimed that their supply for a specific project in Aabenraa Municipality did not use products that had been in contact with forced labour in Xinjiang. The supply that European Energy names is Trina Solar (European Energy, n.d.). However, in the statement, European Energy is only concerned about the specific project in Aabenraa Municipality, and that the supplier, Trina Solar was not using any solar panels or modules for this specific project. Based on the supply chain mapping, many products from Trina Solar have a risk of being produced by forced labour or through coerced labour practices. Hence, if Trina Solar is part of the supply chain of European Energy on other projects other than this single one, the likelihood of forced labour practices being indirectly a part of European Energy's projects are significant. Given Trina Solar's position on the global market, their involvement in other projects is rather likely.

Some of Trina Solar's practices, as described in the supply chain mapping, contradicts the code of conduct for business partners that European Energy has implemented. These practices include the "absorption" of labourers, which in the Xinjiang Uyghur context refers to labour transfer. This practice is in violation with the code of conduct of European Energy, as their policy states that business partners must respect labour rights, such as freedom to leave the place of employment and all work to be done on a voluntary basis (European Energy, 2023: 7). In terms of Marxism, this practice would be similar to David Harvey's accumulation of dispossession, as Trina Solar are capitalising on access to cheap labour, that they can absorb into their labour-power effectively commodifying the people and talking about the labourer in phrases that are usually meant for non-human activities.

As stated in the supply chain mapping, Trina Solar is not an actor on the solar market that has the most obvious ties to forced labour and exploitation of Uyghur people, hence the direct impact on European Energy's products is somewhat mitigated. However, European Energy's code of conduct for business partners states that the standards that European Energy are expecting from their direct suppliers in terms of due diligence practices, are also expected that the partners are enforcing on their partners or suppliers (European Energy, 2023: 4).

Therefore, the suppliers of Trina Solar and LONGi Green Technology are very relevant to scrutinise for European Energy. Considering the policy, Daqo and Asia Silicon should be thoroughly scrutinised, in order to be able to pass as suitable suppliers for European Energy, as their relation to exploitation of Uyghur people is either as an active actor in the comprehensive labour transfer program or indirectly participating in the exploitation by exporting minerals out of the region for processing. These circumstances fall under the category of *Respecting Labour Rights* in the European Energy Business Partner Code of Conduct, and as both Daqo and Asia Silicon are supplying Trina Solar and LONGi, these companies should enforce due diligence practices (European Energy, 2023: 7). Once again, the Marxist view on a matter such as this, would consider these practices as rather problematic at first, and argue that it is clear signs of accumulation by dispossession through the use of cheap labour, in this instance coerced labour, to maximise the capital outcome of production, while the labourer is part of a "transfer" program, which demean their position to mere commodities of the production. Based on these suppliers' activities, the European Energy Business Partner Code of Conduct should be enforced to either mitigate the risks of exploitation or terminate the relation all together, according to European Energy's legal compliance policy (European Energy, 2023: 5). However, to completely terminate the relations to a supplier of the magnitude that LONGi or Trina Solar is, could prove rather costly for European Energy, as these to suppliers are two of the dominant producers on the market, and the suppliers that are used in the supply chain are too influential and prominent actors in the extraction and refinement of critical material and minerals for solar panels.

Terminating the partnership is therefore related to a great deal of financial risks. Exactly that, risks, are something that European Energy is basing a great amount of their Annual Report on, as they seek to be ambitious and proactive in their risk management. Their risk management is focused on five core risks: People Risks, Environmental Risks, Reputational Risks, Financial Risks, and Operational Risks. These five kinds of risks are assessed according to four guiding principles: A risk must align with the corporate goals and ambitions, meaning risks can be encouraged, if they align with corporate values and financial goals. Risks must be assessed in relation to the reward, a risk can be accepted if the outcome is financial, strategic or operationally beneficial. The hedging costs are always evaluated against the potential worst-case financial impact, meaning, the risk must be assessed according to the financial impact that the worst-case outcome will have on the company. Risks are managed and monitored according to "Enterprise Risk Management" (ERM) methodology (European Energy, 2024: 44). The risk assessment strategies of European Energy are encompassing the most important aspects of what risks could entail, both nationally on operations and internationally with supplier relations and new endeavours in markets and technologies, which works as a mitigating factor for the risk assessment (European Energy, 2024: 44). However, the risk assessment management does not include a priority of the risks, and a few statements included in the risk assessment strategy seem to prefer financial benefits in the risk assessment rather than People or Environmental risks. This factor puts the supply chain into a new light, as every link has a medium to significantly high risk of being directly or indirectly involved in exploiting and coercing Uyghur labourers. Therefore, the reason for using the suppliers could be in accordance with a risk assessment in which the financial and operational benefits overrule the "People" and Environmental risks involved, this matter will be discussed further later in the analysis.

Some factors stated above seem to be contradicting the strategy of European Energy, and their risk assessment, as the supply chain shows significant risks of forced labour involvement. However, in their double materiality assessment, European Energy has identified two ESRS topics that are potentially negatively impacted by their operations. ESRS is the European Sustainability Reporting Standards and includes twelve topics within Environmental, Social, and Governance standards (Dansk Industri, n.d.). The topics are workers in the supply chain, who might be impacted negatively by unfair working conditions, and affected communities, who might be impacted negatively by the extraction and mining of minerals, that could result in the disrespect of the rights of indigenous people (European Energy, 2024: 69).

These negative impacts that have been identified are planned to be mitigated through enforcement of due diligence, and mapping the identified areas to devise action plans, which is a positive development. However, European Energy does not specify how or in what capacity their remediation will take form,

other than, the areas affected by their actions can be provided with remediation if identified (European Energy, 2024: 130).

These two points are rather important, as the initial upstream supply chain starts with the companies supplying the aforementioned Daqo and Asia Silicon, which is Hoshine Silicon Industry and Xinjiang Sokesi. These companies have strong ties to the XPCC and are active in Xinjiang Uyghur Autonomous Region engaging in forced labour, labour transfer, internment camps and general undermining of Uyghur culture and ethnicity.

The practices of these two companies are indicative of the Marxist critique of capitalist company structures, human labour becoming indistinguishable from that of tools or objects. The cheapest labourer these companies can find to maximise their profit is through the labour transfer programs, vocational educational programs and surplus labourer programs, all a disguise for forced labour and internment of Uyghur people. If these issues are identified, then, on the back of negative impact issues that European Energy are aware of through ESRS, they would both have to offer remediation for the labourer employed throughout the supply chain, and the Uyghur people who have had their land and resources appropriated.

With this in mind and through the lens of Marxism, European Energy should not be viewed as an isolated actor acting purely in good faith in a flawed system, but rather as an active agent in a global capitalist structure that incentivises exploitation, appropriation and commodification of labour-power, while rewarding from dispossession, fragmentation and super-exploitation. This matter will be further detailed, analysed and discussed in the following part.

European Energy as an active agent in the capitalistic structure of supply chains

This part of the analysis will scrutinise the role of European Energy as an active part of capitalistic structures and supply chains, that engage in and uphold a system of exploitation, dispossession and capital accumulation. The scrutinisation will be conducted through a Marxist lens and therefore approach the actions of European Energy in a rather critical sense.

Green accumulation and greenwashing

It is obvious that European Energy is an active part of the supply chain for solar panels and modules, as the marked is in this time there is no company producing these products that are not a part of a supply chain in some shape of form. However, it is still important to understand the role that European Energy is playing in these supply chains.

According to Marx and Marxist in general, the core of capitalism is to accumulate value through exploitation. These structures of accumulation through dispossession or exploitation have been present in every market and facet of modern economical organisation. Hence, the green transition is a way in which new markets have been opened for capital gain. This is what Jason Moore addresses as "Green Capitalism" in which the crisis of the capital is turned into new avenues for revenue and profit. In this instance, the climate crisis, scarcity of resources and social injustice is turned into avenues for profit through investments in green technology and renewable energy. European Energy is part of this new market, as they brand themselves as climate frontiers and actors in the green transition, investing in renewable energy and green technology. But they do so through supply chains built on cheap labour and possibly severe exploitation and extraction in the global south. Actively enforcing a system that contradicts the nature of their branding and raison d'etre. Furthermore, the annual report and the code of conduct for business partners that European Energy has produced and hence should enforce, is concerned with responsible sourcing as a means to good business ethics. The responsible sourcing should come by mitigating risks of exploitation in the supply chain, enhancing due diligence and act within the scope of Just Transition, however, as the supply chain mapping shows, a great deal of the supply chain in implicated in forced labour and exploitative activities, such as Daqo, Hoshine and Xinjiang Sokesi. The position of European Energy therefore gets tainted, as they seem to capitalise on conduct that they try to mitigate or avoid. From the Marxist perspective, this factor is not necessarily a contradiction on the part of European Energy, but rather a function, as the "green" image is part of the creation of value, and not an independent ethical framework for business conduct.

This green image is established by European Energy, as they state that they are frontrunners in decarbonisation and that they act to revitalise the environment (European Energy, 2024: 51). To some extent their statements could be regarded as ideological greenwashing – as they state to act as frontrunners, their commodity to which they act as frontrunners with, is to some extent, just a change of who the exploited part is. From the classic working class in the global north through fossil fuels and industrial revolution, to now being exploitation in the global south and green transition. In Marxist terms, this could act as the commodity fetishism of sustainability, as the product for which capital accumulation is gained is seen as neutral or positive, regardless of the social relations that has formed the product.

Through the lens of Marxism capitalism has ways of adapting to circumstances, and in this circumstance, the capitalistic structure has adapted to capitalise on the need for renewable energy and the green transition, thereby introducing renewable energy and green transition into the accumulation logic that forms capitalism. Through this adaptation, companies such as European Energy are

sustainable while upholding the same structures of exploitation and dominance that have been prevalent for centuries.

European Energy as an actor in global division and the necessity of supply chains

Marxism views capitalism as a system in which the working class is forced to sell their labour to survive, as the means of production lie in the hands of the capitalist. This creates a permanent relationship of class based on ownership, production and exploitation. This relationship has been developed in the modern economy with globalisation, and as Harvey and Smith describes, the class division is now geographically displaced. The modern class division is devised so that the capital accumulation is concentrated in the global north, while labour-power and production is outsourced to the global south. This dynamic creates the opportunity to establish the global class division in which labourers in the south are subjected to super-exploitation, conditions so bad that they cannot reproduce their labour-power.

European Energy is part of this dynamic and division. Their supply chain is a direct source of cheap labour, and cheap raw minerals. The actors in the supply chain are all in some capacity related to the exploitation of laborers effectively creating the division in class on a globalised scale. Furthermore, this division that European Energy is engaged is the division of labour described by Braverman, in which the brain/mental labour is centred in the global north (organisational, operations, administration) while the hands/physical labour is centred in the global north (production, refinement, extraction). Furthermore, as Smith argues, this is a reproduction of imperialistic structures, in which people or labourers in the global south are trapped in a system of exploitation to gain the capital of the north, with no possibility of improving their living condition.

However, this entrapment or imperialistic structure is hidden through the outsourcing that is possible with a supply chain. The Marxist analysis will say that European Energy has outsourced their responsibility through the complexity of their supply chain, effectively distancing them self from the exploitation in order to continue undisturbed, further adding to the accumulation by dispossession.

European Energy is upholding and profiting from a global structure in which class and geography is intertwined. This is done by outsourcing their production to areas in which the working conditions are constructed without respect for the labourers' rights and ethnic minorities are oppressed and coerced into physical labour.

This contributes to the modern form of class struggle, which is not as much the struggle between capital owner or the owner of a factory and the labourers in the same country, but rather a global system in which the geographical location of labour-power is directly resulting in its value and its rights.

The strategy for risks in the rationality of capitalism

As stated in the first part of the analysis, the risk assessment of European Energy would be revisited and scrutinised through a Marxist perspective.

Marx described how capitalism treats individuals, not as humans with needs and rights, but as labour-power, a commodity such as the products they produce. Hence, the system of the labourer selling their ability to work, their labour-power as a commodity. This means that the capitalist rationality is always tied up on the ability of purchasing as cheap as possible, while maximising the value and profit of said purchase. Braverman developed this approach, and described how labour-power became measurable, controllable and interchangeable. The labourer loses the control of their labour, and their role is fragmented, meaning their ability to organise and understand the full picture is reduced.

This development is reflected in modern supply chains, where companies such as European Energy do not directly engage in forced labour practices, but rather outsource to suppliers with lower standards and engagement in violations. The responsibility is reduced, and the risk assessed stems from a reputational point.

The risk assessment of European Energy entices a list of five risks, People, Environmental, Reputational, Financial and Operational risks. However, the criterion for evaluating a risk is quite different as stated in the Annual Report 2024. Here it shows that the risks are based on three parts, if the risk balances with the strategic goals, if the risks potentially give an operational or financial yield, and if the risk is able to be hedged in case of worst-case scenario. However, there is no explicit mention of the prioritisation of the People-risk or the Environmental-risk.

From the perspective of Marxism, this is an evident prioritisation of the capitalistic instinct of self-preservation – human conditions are only evaluated on the basis of the risk it entices on the continuous profit.

In Bravermans analysis of the capitalistic system, he argues that companies remove themselves from the labour-process, through outsourcing, to be able to control the labour-power's outcome, without directly being involved with and responsible for working conditions. Which could be transferred to the strategy of European Energy, they are not trying to change the practice of the industry but optimise their distance from the responsibility by outsourcing the production and there by the risk and problem.

The actions of European Energy is not an anomaly, but part of a functioning capitalistic structure. They are not an outlier but are engaging in the system in the way predicted by Marx and Braverman: by optimising the capital's relationship to the labour-power and risks.

Conclusion

Based on the analysis of European Energy's supply chain and their policies of responsible sourcing and partnership code of conduct, the report will now answer the research question, which is:

In what ways do the supply chain and sourcing practices of Danish solar energy companies interact with broader capitalist dynamics, and how might a Marxist analysis help to understand the potential tensions between economic growth, social sustainability, and labour conditions?

The conclusion will centre around three overarching fields of interest that will help inform the answer to the research question. These being; the capitalistic system and logics in a sustainable context, the role of European Energy in said system and logic, and what European Energy represents in terms of similar companies in the industry and in Denmark.

Through the supply chain mapping it became evident that European Energy's supply chain to a great extent has a significant potential for exposure to products made through forced labour practices. The suppliers that are used throughout the supply chain, all has significant direct or indirect relations to the exploitation of Uyghur people in Xinjiang Uyghur Autonomous Region, and some suppliers, such as Hoshine and Xinjiang Sokesi has close links to the Xinjiang Production and Construction Corp, the organisation in charge of organising labour-power in Xinjiang. Close partners of European Energy such as Trina Solar and LONGi have documented ties to the aforementioned corporations, hence, based on policies in European Energy's partner code of conduct, the supplier relation must be terminated.

This matter represents a general tendency that exists between European Energy's policies and practices. European Energy's business partner code of conduct demands respect for human rights and labour conditions throughout their supply chain. However, these demands are negated through the relations to suppliers such as Trina Solar, who takes part in labour transfer program, or "absorption" of labour, a term closely connected to the labour programs aimed at Uyghur people in Xinjiang, furthermore, the sub suppliers further upstream has even higher risks of involvement in said labour programs. This matter puts into question the actual impact of the policies that European Energy intends to enforce, as the actions of their suppliers and sub suppliers should warrant a termination of relations.

However, the lack of termination of the partnerships is indicative of the logic of capitalism in which the climate crisis and sustainability becomes a new avenue for accumulation and capital gain, in what Jason Moore describes as *Green Capitalism*. This helps build a façade, in which sustainable products get

fetishised so as the product is viewed neutrally or positively, regardless of social relations and exploitation. In Marxist views, this can be seen as a reproduction of exploitation, however, in new ways. The exploitation changes character but the logic remains the same.

This logic places European Energy as a central and active agent in the modern global division of labour, classified by the division of mental/administrative work in the global north, while physical production is outsourced to the south. Further reiterating the imbalance of labour and the fragmentation caused by outsourcing. The outsourcing and division of labour, furthermore, creates the super-exploitative structures that makes continuous outsourcing throughout the supply chain profitable.

Exactly that, the continuous profitability is an important factor in understanding the structures within this capitalistic system. Profitability and financial growth are a key strategic aim in the risk assessment of European Energy, with financial, strategic and operational risks being prioritised over what is described as "People" risks. The risks involved with new opportunities are regarded through a financial risk assessment prior to evaluating new ventures impact on affected people. In practice this works through outsourcing more than just labour, but also responsibility and risks, which in turn minimises the risks and expenses for the company if potential violations are discovered. This effect helps uphold the rationale of capitalism and the system it has formed.

The capitalistic system that is upheld through these practices are important to understand in context of the scrutinisation of European Energy's role and actions in exactly this system.

The actions of European Energy are not an exception in terms of other similar companies, but rather a product of the system that it is engaged in, and a manifestation of how the capitalistic rational works. This also answers the question posed by choosing European Energy as the case, as they were chosen to represent the critical but model case. The business practice of European Energy is not significantly different to that of similar businesses in the field of renewable energy, hence, the phrase ushered by Flyvbjerg: *if it holds true here, it probably holds true elsewhere*.

European Energy does not appear as just a passive participant in an opaque system, but as an active agent in a capitalistic structure, which reproduces global inequalities and hides exploitation behind sustainability and strategic risk management. Analysing these structures through a Marxist approach, illustrates the need for capital accumulation by not prioritising human rights, labour rights violations and the sustainability of nature.

Bibliography

- Anner, M. (2020). Squeezing workers' rights: The role of purchasing practices in labor violations in Bangladesh's garment factories. *Review of International Political Economy*, 27(2)

- Arnold, D. P. (2015). Critical theory. In J. D. Wright (Ed.), *International Encyclopedia of the Social & Behavioral Sciences* (2nd ed., Vol. 5, pp. 266–271). Elsevier.

- Berger, P. L., & Luckmann, T. (1967). *The social construction of reality: A treatise in the sociology of knowledge*. Anchor Books.

- Braverman, H. (1998). *Labor and monopoly capital: The degradation of work in the twentieth century*. Monthly Review Press.

- Brereton, P., Kitchenham, B., Budgen, D., & Li, Z. (2008). Using a protocol template for case study planning. In *Evaluating Information Systems* (pp. 1–14). Springer.

- Christopher, M. (2016). *Logistics and supply chain management* (5th ed.). Pearson Education.

- Elimä, N., & Murphy, L. (2021). *In broad daylight: Uyghur forced labour and global solar supply chains*. Helena Kennedy Centre for International Justice.

- End Uyghur Forced Labour. (2023). *Solar industry FAQ*.

- European Energy. (2023). *Code of conduct for business partners*.

- European Energy. (2024). *Annual report 2024*.

- Flyvbjerg, B. (2010). Fem misforståelser om casestudiet. *Tidsskrift for Samfundsforskning*.

- Gramsci, A. (1929). *Prison notebooks*. Columbia University Press.

- Harvey, D. (2003). *The new imperialism*. Oxford University Press.

- Hemetsberger, W., Acke, D., & Schmela, M. (2024). *EU market outlook for solar power 2024–2028*. SolarPower Europe.

- Hofmann, H., Schleper, M. C., & Blome, C. (2015). Conflict minerals and supply chain due diligence: An exploratory study of multi-tier supply chains. *Journal of Business Ethics*.

- Horkheimer, M., & Adorno, T. W. (1944). *Dialectic of enlightenment*. Stanford University Press.

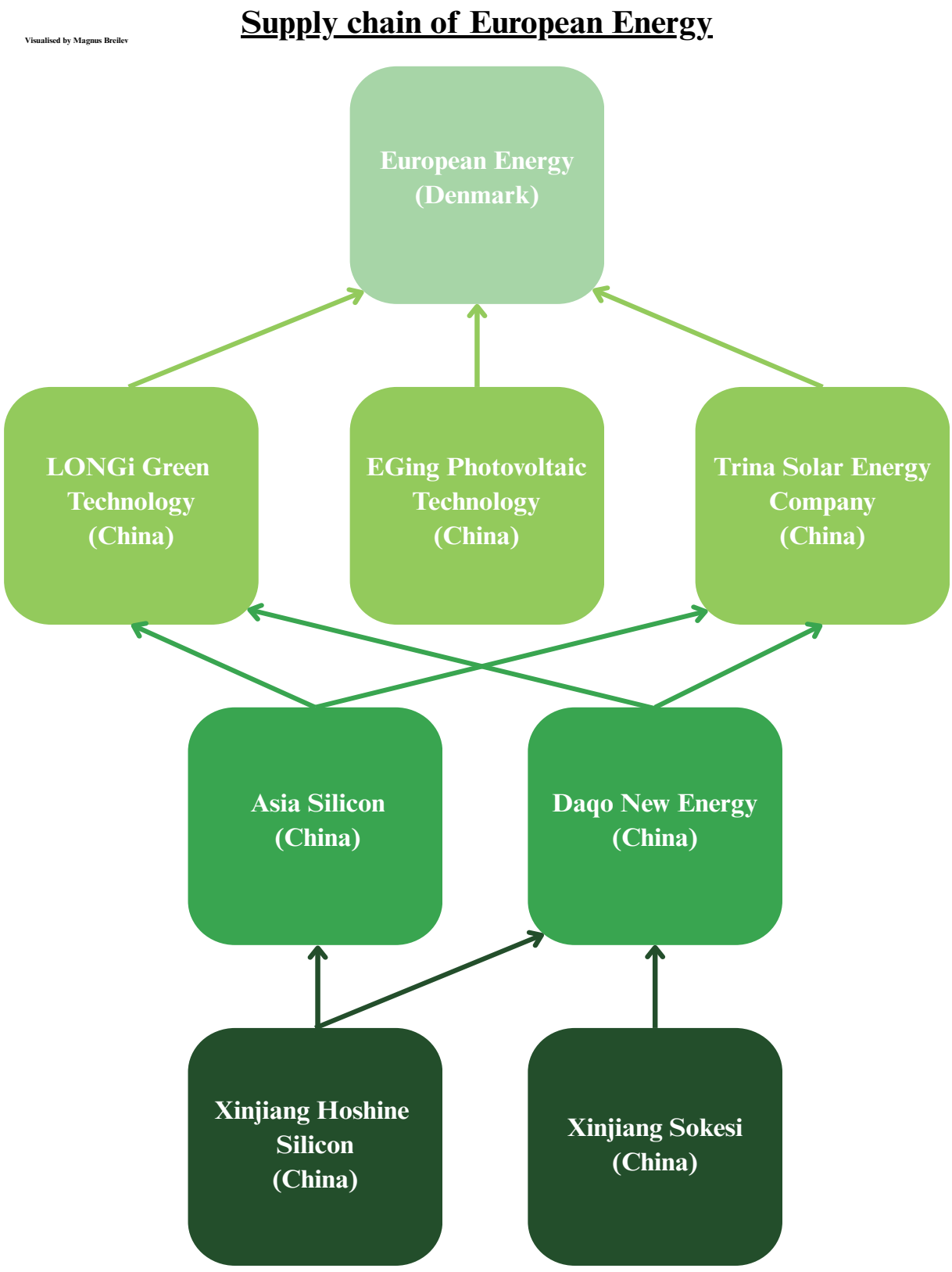
- IEA. (2022). *The role of critical minerals in clean energy transitions*. International Energy Agency.

- Kenny, M. (2025). Global North and Global South. In *Encyclopedia Britannica.*

- Lenberg, L. (2022, October 10). Interview: There is a clear intentional destruction of Uyghur culture and identity. *Radio Free Asia*.

- Lukács, G. (1923). *History and class consciousness*. MIT Press.
- Luxemburg, R. (1913). *The accumulation of capital*. Routledge.
- Manuj, I., & Mentzer, J. T. (2008). Global supply chain risk management strategies. *International Journal of Physical Distribution & Logistics Management.*
- Marx, K. (1867). *Das Kapital: Kritik der politischen Ökonomie*. Verlag von Otto Meissner.
- McCauley, D. (2018). *Just transition: Integrating climate, energy and environmental justice*. Palgrave Macmillan.
- Moore, J. W. (2015). *Capitalism in the web of life: Ecology and the accumulation of capital*. Verso Books.
- Murphy, L., Elimä, N., & Tobin, D. (2022). *Until nothing is left: China's settler corporation and its human rights violations in the Uyghur region. A report on the Xinjiang Production and Construction Corps*. Helena Kennedy Centre for International Justice.
- OECD. (2023). Survey shows households are willing to shift to greener lifestyles but that cost and convenience are key.
- Palm, S. (n.d.). Hvad er CSR? *Climaider*.
- Sena, B. (n.d.). Case study. In *Sustainability and Social Responsibility: Regulation and Reporting*. Taylor & Francis.
- Smith, J. (2015). *Imperialism in the twenty-first century: Globalization, super-exploitation, and capitalism's final crisis*. Monthly Review Press.
- Sodhi, M. S., & Tang, C. S. (2012). *Managing supply chain risk*. Springer.
- Stake, R. E. (1995). *The art of case study research*. Sage Publications.
- Tsing, A. L. (2012). Supply chains and the human condition. *Rethinking Marxism*.
- UK Parliament. (2025). *Gas and electricity prices during the 'energy crisis' and beyond*. House of Commons Library.
- UNDP. (2022). What is just transition? And why is it important? *United Nations Development Programme.*
- World Economic Forum. (2023, November). These 3 charts show energy prices in the EU.
- Wright, E. O. (1997). *Class counts: Comparative studies in class analysis*. Cambridge University Press.
- Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Sage Publications.

Appendix 1


Supply chain of European Energy
Visualised by Magnus Breiler
European Energy (Denmark)
LONGi Green Technology (China)
EGing Photovoltaic Technology (China)
Trina Solar Energy Company (China)
Asia Silicon (China)
Daqo New Energy (China)
Xinjiang Hoshine Silicon (China)
Xinjiang Sokesi (China)