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Bargaining Power in Hydro's Global Production Network

Implications of Path Dependence and Local Context in the Alunorte Crisis

Master's thesis in Globalisation and Sustainable Development

Supervisor: Asbjørn Karlsen

May 2020



Picture: Hydro. Photo of Alunorte in Barcarena, Brazil.

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NTNU

Kunnskap for en bedre verden

Abstract

This-case study is centred around an extractive industry. The alumina factory Alunorte in Barcarena in Northern Brazil is part of Hydro's Aluminium-Global Production Network. After a heavy rainfall in February 2018, local inhabitants were concerned about emissions of toxic bauxite residue from Alunorte into the local environment. In contrast to previous cases of suspected emissions, the Brazilian authorities immediately took action, and imposed production embargoes on Alunorte. Alunorte had to reduce their production capacity by fifty percent, causing severe operational and economic difficulties. It took nineteen months before the final embargo was lifted. This research is based on documents, and contains an analysis of the bargaining process between the authorities and Hydro that took place after the incident. To provide explanatory power, I have applied *path dependence* in combination with GPN-*theory*. Thus, the local context and history of Barcarena have also been a part of the analysis.

The results show that due to GPN-concepts of territoriality and embeddedness, the bargaining power first favoured the Brazilian authorities. The return to normal operations was a long and expensive process for Hydro, in contrast to a similar, but more serious emission in 2009, when Vale had the majority ownership of Alunorte. Hydro was constrained by *embeddedness*, *lock in* and *sunk costs*. And the authorities had several reasons to make this a difficult situation for Hydro. Alunorte's emissions violated licences, which provided the opportunity to act against Hydro. The local context and history, combined with international politics and national election, including personal prestige, were detrimental for Hydro's operations in Pará. Legacies and lack of network embeddedness reinforced the negative consequences for Hydro. Eventually, the asset of *employment* changed the bargaining position of Hydro. All embargoes were lifted after nineteenth months of economic losses and shifting bargaining power. The outcome of the bargaining process was path dependent, resting on history; legacies, past events and the sunk cost of investment, accumulated over time. This research illustrate why *path dependence* in combination with GPN is useful to apply in analyses of bargaining processes and causal explanations.

Samandrag

Dette kasusstudiet omhandlar gruveindustri. Alumina-fabrikken Alunorte i Barcarena i Nord-Brasil er ein del av Hydro sitt Globale Aluminium Produksjonsnettverk (*aluminium-GPN*). Etter ein kraftig regnskur i februar 2018, vart lokale innbyggjarar bekymra for utslepp av giftig rødslam frå Alunorte til omkringliggjande natur. I kontrast til tidlegare tilfelle av mistenkte utslepp, reagerte brasilianske myndigheiter umiddelbart, og innførte produksjonsembargo for Alunorte. Alunorte måtte redusere produksjonskapasiteten med femti prosent, noko som førte til store operasjonelle og økonomiske vanskar. Det tok nitten månader før alle embargo var oppheva. Denne forskinga er basert på dokument, og inneheld ei analyse av forhandlingsprosessen mellom myndigheitene og Hydro som fann stad etter hendinga i februar 2018. For å tilføre forklaringskraft, har eg anvendt *stiavhengigheit (path dependence)* i kombinasjon med *GPN-teori*. Difor er òg den lokale historia og konteksten i Barcarena ein del analysen.

Resultata syner at GPN-konsepta *territorialitet* og *forankring* kan forklare kvifor forhandlingsmakta først favoriserte brasilianske myndigheiter. Veggen tilbake til normale operasjonar var langdryg og kostbar for Hydro, i kontrast til ei liknande, men meir alvorleg, sak om utslepp i 2009, då Vale var majoritetseigar i Alunorte. Hydro si makt var avgrensa av *forankring*, *innlåsing (lock in)* og *irreversible kostnader (sunk costs)*. På den andre sida hadde myndigheitene fleire grunnar for å gjere dette til ein vanskeleg situasjon for Hydro. Utsleppa frå Alunorte braut gitte lisensar, noko som opna for moglegheita til å ta grep mot Hydro. Lokal kontekst og historie, kombinert med internasjonal politikk og nasjonalt val, inkludert personleg prestisje, var øydeleggjande for Hydro sine operasjonar i Pará. Nedarva tilstandar og manglande nettverksforankring forsterka dei negative konsekvensane for Hydro. Omsider synte det seg at ressursen *arbeid* endra forhandlingsposisjonen til Hydro. Alle embargoane var oppheva etter nitten månadar med økonomisk tap og skiftande forhandlingsmakt. Utfallet av forhandlingsprosessen var stiavhengig, understøtta av historie, arv, tidlegare hendingar og irreversible kostnader, akkumulert over tid. Denne forskinga illustrerer kvifor *stiavhengigheit* kombinert med *GPN* er nyttig å anvende ved analyser av forhandlingsprosessar og forklaringsmekanismar.

Preface

When I started out with this thesis, a suspected new virus was on the rise in Wuhan, China. It turned out to be the beginning of a new pandemic. I have so far been spared of severe consequences, but it did disrupt my progress meetings and visits to campus. This thesis was written when corona closed down country after country, including Norway.

*

I want to thank my parents for their support and encouragement.

*

Also, I would like to thank my supervisor, Professor Asbjørn Karlsen, for valuable input. The quick responses and thorough feedback have been indispensable.

*

I owe a special thanks to my husband.
Your patience and support have been decisive for the completion of this thesis.

This thesis is dedicated to my girls.
You provide my life with necessary structure, and imperative love and attention.

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Abbreviations

BRL – Brazilian Real

CPI – Parliamentary Inquiry Commission

DRS1 – Depósito de Resíduos Sólidos 1 / Bauxite Residue Deposit 1

DRS2 - Depósito de Resíduos Sólidos 2 / Bauxite Residue Deposit 2

FDI – Foreign Direct Investment

GPN – Global Production Network

GVC - Global Value Chain

GCC – Global Commodity Chain

IBAMA – Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis / The
Brazilian federal environmental agency

IEC – Instituto Evandro Chagas

MP - Ministério Público (public prosecutor's office)

NGO – Non-governmental organizations

NOK – Norwegian kroner

SEMAS – The Secretaria de Estado do Meio Ambiente e Sustentabilidade/ The agency
for environment and sustainability in Pará

TAC – Termo de Ajuste de Conduta / Term of Adjusted Conduct

TC – Term of Commitment

TNC – Transnational Corporation

1 Introduction

In 2010 Norsk Hydro ASA (hereafter only Hydro) spent almost 30 billion NOK in Brazil, acquiring large parts of Vale's operations in the state of Pará. This secured full ownership of the bauxite mine Paragominas, 91 percent of the world's largest alumina factory Alunorte, 51 percent of the aluminium factory Albras and 81 percent in the alumina refinery project CAP (Halvorsen, 2011, p. 217). Hydro went from a difficult raw material situation to securing raw materials in long-term perspective, assumed around one hundred years. Through this acquisition Hydro became a fully integrated aluminium company, with operations in every part of the value chain (NTB, 2010).

Barley eight years after the gigantic acquisition, in February 2018, a heavy rainfall put Hydro's CEO Svein Richard Brandtzæg in the most critical situation in his career, after a decade in the role as CEO of Hydro (Elvevold, 2018i). An immediate report, later contested by Hydro and found faulty by several investigations, concluded that Alunorte had had an overflow from its oldest bauxite residue deposit (DRS1), which had contaminated local rivers. Hydro was given a production restriction, only allowing them to produce at half capacity. It took 19 months before the final embargo was lifted, in September 2019. The embargoes had financial and operational consequences for Hydro, put local employees' jobs at risk and were eventually calculated to have cost Hydro 2,4 billion (Klevstrand, 2018f, 2019a; Wig & Hovland, 2018a).

Hydro is a Transnational Corporation (TNC). A TNC has certain characteristics, such as the ability to coordinate and control processes and transactions within a Global Production Network (GPN), both within and between countries (Dicken, 2015, pp. 58-59). Hydro has the dominant role within its GPN and is therefore a *lead firm*. Although the lead firm usually is the analytical focus in a GPN analysis, it is possible to shift the focal point of analysis to different positions in the network (Coe, Dicken, & Hess, 2008, p. 277). Hydro's role in the GPN implies that they have great potential for impact in the local community (Dicken, 2015, p. 59).

Previously environmental scandals in the Brazilian Amazon has usually ended with the company admitting a limited responsibility, and then they pay fines and compensation, the cost often symbolic (Leira, 2020a, p. 55). The extent of the aftermath this time is far from

this. To understand how the situation in Brazil developed after the incident in February 2018, and why it escalated as it did, it is necessary to map and perform an analysis of the actions of the most relevant actors involved in the case. The local context is relevant because events are both place bound and formed by the historical conditions, also known as path dependence, in line with Coe et al. (2008, p. 279). This study is particularly relevant since aluminium-networks have not received too much attention in GPN-literature, and that makes this Alunorte-case original and seminal to GPN-theory and empiricism, and it can also be considered a contribution to research on crisis management in extractive industries.

1.2 Aim

The aim of this study is to identify how relevant factors and actors contributed to the development in the Alunorte situation. This implies an analysis of the power balance between the various actors, and its development over time applying the Global Production Network (GPN) approach as theoretical framework. GPN-theory and empirical research will be applied when appropriate to help explain the course of action from both the company and the authorities. In the conclusion I will use the empirical analysis and discussion as grounds for theoretical assumptions, and hence attempt to make generalisations from this case. The most relevant actors for this analysis are Norsk Hydro ASA (hereafter “Hydro”) and *the authorities*; Brazilian public institutions on three levels, Barcarena municipality, Government of Pará and the Brazilian Federal Government. In addition, the local community is an actor with relevance for this thesis.

Problem formulation:

1. How did the historical background and local context affect the development in the Alunorte-case?
2. How has power been distributed between Brazilian authorities and Hydro within the identified global production network, and how has the power shifted in the process from the situation started in February 2018 until December 2019?
3. Why did this situation become so difficult and costly for Hydro?

This thesis is structured in eight chapters, with corresponding sections. After the *introduction*, with the research questions and aim, follows *the background* in chapter two. The background

gives a brief account of the relevant context in Brazil, Pará and Barcarena. This is also where my case is defined. In chapter three I present the GPN-theory and conceptualizations relevant for my thesis. To make this research transparent and reliable, the methodology chapter clarifies the methods used in my research, data-collection and analytical approach, including ethical considerations. The analysis begins with the historical background and local conditions in Barcarena. Then follows the development of the Alunorte-case from the incident in February 2018 until December 2019, divided into sections reflecting the dynamics of bargaining power. This is the basis for the discussion, which has a similar structure as the analysis. The aim of the discussion is to evaluate and compare my findings within the theoretical framework of GPN, in order to answer the research questions. The conclusion shall sum up my main findings. I will also look into the possibility to generalise from this case, and contribute to the development of the GPN-framework.

2 Background

Brazil is a federal republic with twenty-six states plus the Federal District of Brasília. The country has 210.147.125¹ million inhabitants, 26 states and 5570 (IBGE, 2020) autonomous municipalities.

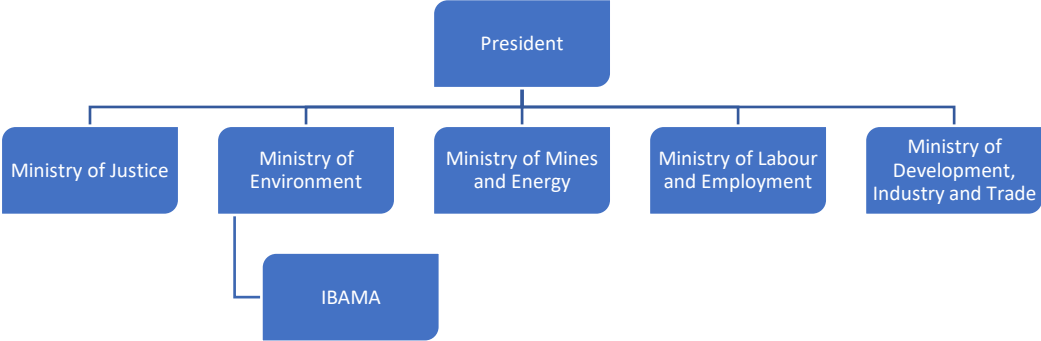


Figure 1 Federal Government of Brazil²

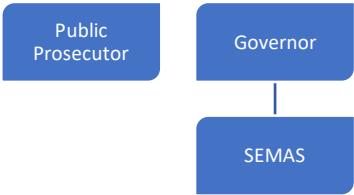


Figure 2 State Government of Pará

With the ending of a military dictatorship in 1985, Brazil is now a democracy, and in the 2018 election the controversial Jair Bolsonaro won presidency (BBC, 2018; Cornejo et al., 2010, pp. 2-3). Brazil has a large informal sector, also present in the mining- and extractive sector. The country also has one of the highest levels of income inequality in the world, and scores around the same level as South Africa and Haiti on the Gini index. In metropolitan São Paulo the poverty rate is 3,1 %, while in the rural north and northeast, in the states of Maranhão and Pará the poverty rate is more than 50% (Cornejo et al., 2010). Pará is located in the northern, Amazonia region of Brazil, with the second largest state territory in the country (Cornejo et al., 2010, p. 5). Aluminium is the second largest export commodity in the mining sector, with

¹ This number is an estimate from 2019. The last official count was in 2010 and then the population was 190.755.799 Source: IBGE <https://cidades.ibge.gov.br/brasil/panorama>.
² Source: Cornejo, Kells, de Zuñiga, Roen, and Thompson (2010, p. 30)
³ Only relevant units included. Source: Cornejo et al. (2010, p. 30)

22,2 % of total exports. But Pará has severe social problems related to the extractive industries. Expropriation, environmental degradation, poor health and safety, lack of equality and power imbalances are some of the main concerns in the area. The government has been characterized with little coherent authority, and a lack of resources to implement policies for positive societal development (Cornejo et al., 2010, p. 5).

Pará has large bauxite mines, and more than 80 percent of Brazil's bauxite extraction takes place in this state. Barcarena is a municipality and city about 40 kilometres from Belém, the largest urban centre in Pará. Barcarena is situated in proximity to large bauxite mines. Combined with other factors such as proximity to Belém, availability of land and labour and the depth of the adjacent Amazon River, favourable for large shipping vessels, Barcarena is a preferential place for TNC's in the extractive industries. This includes Hydro, a TNC with majority ownership in the local industrial complex of Albras and Alunorte (Cornejo et al., 2010, pp. 5-8). Before Albras and Alunorte were constructed, the area of Vila do Conde in Barcarena mainly consisted of small farms with self-employed production. It was a place of hunting, fishing, gathering fruits and planting cassava. Social relations were based on family units and reciprocity. Few families in Vila do Conde currently practice small agricultural production (Nahum, 2017, p. 2). Presently, neighbourhoods in Barcarena recognize unequal territorial distribution of public investments and social wealth, which is primarily clustered in the industrialized areas. Barcarena is thus segregated by income; the quality of housing is according to salary, and lower-income populations often live away from the urban centre and basic infrastructure (Nahum, 2017, pp. 23-27). Within this context, Norsk Hydro ASA operates the industrial complex of Alunorte and Albras. Before Hydro acquired these sites from Vale in 2010, they controlled 34 percent of the stocks in Alunorte (Leira, 2020a, p. 25).



Figure 3 Map of Barcarena⁴.

2.1 The Case

This is an embedded, single-case study. This means that there is one case being studied, but it can involve sub-units and intermediary units (Yin, 2018, pp. 47-52). This case description is the basis of the research questions, analysis and discussion. The Brazilian node of Hydro's GPN is the spatial area, limited to focusing on Alunorte. The case's actors are Hydro/Hydro Alunorte, Brazilian authorities and the local community. The first subunit is the events that took place after a heavy rainfall in February 2018, at Hydro Alunorte in Barcarena, Pará, Brazil. This subunit has a temporal scope from 17 February 2018, until 31 December 2019. The timeframe is set because it includes the main events, from the incident, to the embargoes being implemented and finally lifted. The events within this timeframe has been titled "the Alunorte crisis" (Klevstrand, 2019a). It is also referred to as "the Alunorte-case" as a more neutral term in my thesis. The timeframe is set to December 2019 in order to include the relevant adjacent context after the final embargo was lifted. The bargaining process between Hydro and the Brazilian authorities is the second subunit of the case.

⁴ The map shows how the industrial sites stretches out in the terrain. Vila do Conde is now the place of the industrial complex of Albras and Alunorte, including a port. Territorial inequalities, meaning differences in public infrastructure and income-levels in between the various neighborhoods in Barcarena, followed the territorial reorganization in the 1980s (Nahum, 2017, p. 3). Source: www.google.no/maps.

An intermediary unit of the case is the local community and the historical development of Barcarena, an important factor in the Hydro-Government nexus of power. The temporal scope for the historical unit of the case is from the 1980s, when the plans and construction of Alunorte was initiated, to the present situation under scrutiny. The local community is relevant since, as Dicken (2015, p. 135) claims, characteristics of a TNCs host environment will inevitably influence the practices of a TNC. In this particular case it means that Hydro has had to adapt to the local conditions. The reason that a segment of the local history is included in the case, is because a production site is a product of a cumulative process of developments. In this case, this relates to economic, infrastructural, political and socio-environmental history, resulting in the present local conditions, a process referred to as *path dependence* by MacKinnon (2008). The formal requirements and temporal scope of this thesis limits the possibility to go in depth on this topic, it is merely an overview of important conditions and changes. This case-study is justified by the extreme and unusual situation that occurred after the heavy rainfall in February 2018.



Figure 4 DRS1. DRS2 in the backgrounds.

⁵ Picture: Hydro. Source: Berget, Magnussen, Malme, and Røtjer (2018, p. 10)

3 Theory

3.1 Economic Globalisation and Development

Globalisation is an often used, misused and confusing term (Dicken, 2015, p. 4). In this context, globalisation refers to *economic globalisation*. Panitch and Gindin define globalisation as “the spread of capitalist social relations to every corner of the world” (Greig, Hulme, & Turner, 2007, p. 165). There is a need to clarify the concept and its relevance in context of the case. The empirical meaning of globalisation refers to structural changes that are presently occurring, it is often used to describe the interconnectedness between states and places. It also refers to the way the global economy is organized and integrated. Globalisation is a complex, indeterminate set of processes operating very unevenly in both time and space. The ideological meaning refers to the neo-liberal, free market ideology of the “globalisation project”. It is necessary to separate the two meanings in order to perform a critical analysis of processes and their implications (Dicken, 2015, pp. 3-4, 8). Henceforth the terms will be applied as clarified above.

The key principle of the globalisation project was the implementation of a free world market. Building on the neoclassical economic theory, the political version, *neoliberalism*, idealized a universal shape in welfare reform, wage erosion, relaxing trade controls, and privatization schemes. Liberalization put pressure on social rights and included an export regime, but Ricardo’s concept of comparative advantage legitimized this (McMichael, 2017, pp. 124, 129). An important component of the globalisation project is the growth of TNC’s. And under a more deregulated global market, promoted by the World Trade Organization (WTO), the global markets dictate where goods are produced (Greig et al., 2007, p. 164). However, the extractive industry has some peculiarities which limit corporation’s mobility. Extractive resources are locationally specific. Initially, they must be exploited where natural resource deposits occur, although later stages of refining might be located elsewhere (Dicken, 2015, p. 396).

Brazil had experienced success with their Import Substitution Industry (ISI), and trade liberalization and privatization took off in the 1990s, slightly later than the rest of Latin America (Bull, 2010, pp. 55-56; Rodrigues, 2003, p. 209). Historically, the mining sector in Brazil has been an important source of income in Latin-America, but also a source of social conflict, characterized by precarious work and low wages. More recently it is controversial

due to environmental aspects and because of the relative lack of economic contribution in the local societies in which the mining takes place (Bull, 2010, pp. 69-71).

3.2 Global Production Networks

The global economy has fundamental geographical unevenness and huge inequalities, which give rise to conceptual and empirical difficulties (Coe et al., 2008, p. 271). Globalisation requires a different focal point than the traditional state-centred research on social and economic development. Such research requires a focus on the flows, the places and their dialectical connections, in order to simultaneously foreground the dynamics between transnational, national and subnational level (Henderson, Dicken, Hess, Coe, & Yeung, 2002, p. 438). There is increasing consensus among researchers that the concept of *network* is one of the most useful keys to understand the geographical complexity of the global economy (Coe et al., 2008, p. 272). Global production network (GPN) is a broad relational framework that can be applied to analyse space- and time-sensitive issues; economic processes that consist of complex circuitry with a multiplicity of linkages and feedback loops. GPN goes beyond the linear concept of global value chains (GVCs) and global commodity chains (GCCs) (Coe et al., 2008, p. 272). GPNs are fundamentally economic, social, cultural and political systems (Coe et al., 2008, p. 280). GVC and GCC are chain metaphors providing valuable insight into the sequential and interconnected structures of economic activities (Henderson et al., 2002, p. 439). The core of these three concepts are similar. They revolve around the nexus of interconnected functions, operations and transactions through which a specific product is produced, distributed and consumed. However, Coe et al. (2008, p. 272) recognize two crucial differences between the chain-concepts and the GPN concept. First of all, the GPN concept strive to go beyond linearity to incorporate all kinds of network configuration. Secondly, while the chain concepts focus narrowly on the governance of inter-firm transactions, the GPN-concept attempt to encompass all relevant sets of actors and relationships. Production networks are dynamic, and their spatio-temporality is variable and contingent (Coe et al., 2008, p. 272).

3.2.1 The Concept of Global Production Networks

GPN is a multiscalar conceptual framework that is capable of grasping the global, regional and local economic and social dimensions of the process involved in many forms of economic globalisation (Henderson et al., 2002, pp. 445-447). Economic globalisation refers to the

qualitative and quantitative transformation of economic relationships across geographical space, in terms of processes and activities (Dicken, 2015, p. 6). GPN consist of a multiplicity of agents with asymmetrical influence and power (Henderson et al., 2002, p. 447), and subsume the possibility to shift the focal point of analysis to different positions in the network (Coe et al., 2008, p. 277). The purpose of a production network is to create value through the transformation of material and non-material inputs into demanded goods and services (Coe et al., 2008, p. 274). The importance of nomenclature is reflected in the GPN-term. The word *production* has been applied in the GPN-concept to re-focus the attention to the social process and circumstances under which commodities are produced and consumed, as opposed to the word *commodity*, which is an economic discourse emphasizing a fixed production in time and space (Henderson et al., 2002, p. 444).

3.2.2 Conceptualizations

The GPN-framework is based on three principal elements; *value*, *power* and *embeddedness* (Henderson et al., 2002, p. 448). Value can be seen as a surplus, after the costs of production or transformation at each stage in the process. This is also called economic rent in economic terminology (Dicken, 2015, p. 254). Value is one central theme, and economic rents in this case relates to how a firm can generate rents from an asymmetric access to key product and process technologies, and through the organization of inter-firm relationship. Value creation is also relative to the institutional context within which firms operate (Henderson et al., 2002, pp. 448-449). Also relevant in this case, although often neglected within the field of economic liberalization, is the externalization of costs related to environmental responsibility and sustainability. Externalizing these costs means to neglect environmental safeguards and regulations, relax safety measures or overexploit the commons (air, forests, rivers and oceans) (Rodrigues, 2003, p. 206). The GPN-framework enables researchers to identify where the value is created and for whom. Externalized costs should be part of this equation. Value capturing is thus dependent on many factors, such as government policy, firm ownership and corporate governance (Henderson et al., 2002, p. 449). Value capture within a GPN depends on power distribution and bargaining processes (Dicken, 2015, p. 255).

Basically, power is the ability to reach one's goals. Power takes the shape of connections between actors, and power therefore denotes relationships and structures (Østerud, 2014, pp. 31-32). This implies that the network approach is appropriate to analyse power-relations. Bargaining power is influenced by the distribution of resources and needs (Østerud, 2014, p.

32). This general notion on power also applies to power within a GPN; it is contextual and dynamic (Coe et al., 2008, p. 275; Dicken, 2015, pp. 242-243). The three most significant forms of power are *corporate power*, *institutional power* and *collective power*. Corporate power entails the capacity of the lead firm, alongside other firms in the network, to influence decisions and resource allocations within the network. Institutional power refers to the exercise of power by national or local state and international institutions. Collective power consists of actors that seek to influence companies at particular locations in a GPN, their respective governments and even international agencies (Henderson et al., 2002, p. 450). A multi-dimensional network perspective emphasizes the complex nature of interdependencies, which raises issues of coordination and control within production networks, namely *power relationships* (Coe et al., 2008, pp. 275-276). The bargaining relationship between states and TNC's can be seen in terms of *power resources* and *constraints*. TNC's typically have control over technology, access to markets, capital, can offer employment, and thus control the GPN. Constraints can be competition, territoriality (Dicken, 2015, p. 408), and control over and access to resources. A state's power resources can be availability to and control of natural resources, availability of labour and infrastructure, government incentives and political climate. Constraints for states are often international competition for investment, debt problems, dependence of foreign direct investment (FDI), and political uncertainty or instability (Dicken, 2015, pp. 244-245). The relative bargaining power is thus based on a myriad of factors (Coe et al., 2008, p. 275). The relative bargaining power depends on the demand for resources which the other controls, the constraints and the extent of control each actor encompasses (Coe et al., 2008, p. 276). Usually, the scarcer the resource being sought, the greater the relative bargaining power of the party that controls access to the resource. Obsolescing bargaining occur once capital has been invested, especially in the extractive industries. The balance of bargaining power tends to shift from the TNC to the host country once investments are made (Dicken, 2015, pp. 245-246). Fixed capital becomes 'sunk', meaning that the TNCs investments are bound to a particular place and territory (Clark & Wrigley, 1997a, p. 340), and the advantage skews towards the state who controls access to the resource (Dicken, 2015, p. 411). The GPN-approach provides a relational perspective on the concept of obsolescing bargaining (Bridge, 2008).

Firms are embedded within their countries of origin, influenced by the particular social and cultural context, which evolve over time and form trajectories which are path dependent and thus somewhat historically constrained (Coe et al., 2008, pp. 451-452). *Territorial*

embeddedness refers to the degree a firm absorb or are constrained by social and economic dynamics already existing in a given location (Coe et al., 2008, p. 452). A TNC is embedded within different national jurisdictions and contexts, affecting the complexity of coordinating and controlling internal and external network activities (Dicken, 2015, p. 130). Obligated embeddedness occurs when a TNC is forced to comply with state criteria in order to gain access to a particular resource and operational licenses. Two conditions for obligated embeddedness to occur are a localized asset of high importance to the TNC, and state control of the asset within its territory (Dicken, 2015, p. 243). Territorial embeddedness can be augmented if a firm make use of or expand existing structures, such as local sub-contractors, labour markets and social networks. National and local policies can also affect the embeddedness of a firm in a particular location. The mode of territorial embeddedness is important for value creation, enhancement and capture, thus having great implications for the development of the location (Coe et al., 2008, pp. 452-453). *Network embeddedness* is the connections between network members. The durability and stability of these relations, both formal and informal, determines the network embeddedness (Coe et al., 2008, p. 453). As Coe et al. (2008, p. 453) explains it:

“Network embeddedness can be regarded as the product of a process of trust building between network agents, which is important for successful and stable relationships.”

The extractive industries are conditioned on territoriality, and obligated embeddedness often follows. In my thesis, another conceptualization is integrated with the GPN-approach. This is the case’s accompanying history and its relevance for future developments.

3.2.3 Path Dependence and Sunk Cost

Economic geography has applied concepts such as path dependence and lock-in since the early 1990s, for example within the sub-field *Evolutionary Economic Geography* (EEG). According to MacKinnon (2012, pp. 228, 232-233) EEG and GPN can complement each other, and the concept of path dependence can develop a broader conception of coupling, recoupling and decoupling processes within GPNs. Path dependence describes a system or a process whose outcomes evolve as a consequence of its own history (MacKinnon, 2012, p. 233). This definition makes the concept suitable for this thesis, considering the research questions, and it is interesting to explore if this thesis can apply *path dependence* to develop a broader conception of bargaining processes within GPNs. The concept of *lock-in* is closely

related to path dependence. Lock-in refers to how regions, behaviours and organization can become *locked-in* to existing paths of development, making it difficult to induce and adapt to change (MacKinnon, 2012). Another relevant aspect for path dependence is *sunk costs*; investments that are committed to a particular use, and non-recoverable in case of exit. Three types of sunk cost have been identified. *Setup sunk costs* represent the initial capital investment. *Accumulated sunk costs* refer to costs that have accrued over time (Clark & Wrigley, 1997a, p. 340). This can be training and senior employment, establishing networks, regional business connections and logistics, social investments and other infrastructure. *Exit costs* are commitments and expenses that commence once the firm leaves their production site. It can be early-retirement pension commitments, but also cost that will follow the exit due to the loss of production site and access to a crucial resource. In line with Clark and Wrigley (1997a, p. 340), sunk costs are considered a barrier to exit, hence it can also be considered an *asset* for the state, and a *constraint* for the TNC in territorially embedded industries. Next section will look into the specific configuration of a GPN in the aluminium industry, primarily the Brazilian node of Hydro's GPN. The intention is to show the peculiarities of an extractive GPN, applying the core principles of *value*, *power* and *embeddedness*, in addition to the concepts of *path dependence* and *sunk cost*.

3.2.4 An Extractive GPN in the Aluminium Industry; Hydro Alunorte

The basis of extractive industries is the *natural resource*, a socio-cultural and political construction, by which effective demand, appropriate technology and property rights ascribes value and the ability to make use of the resource. The materiality of the resource influence the organization of production, and the territoriality affects its embeddedness in territorial structures (Dicken, 2015, pp. 396-397). Acquiring natural resources has been a central component of the development of the global economy for centuries (Santos & Milanez, 2015, p. 757). Hydro owns one of the world's largest bauxite mines, Paragominas in Brazil. Access to the bauxite requires the removal of trees and other plants causing the relegation of animals. Then the topsoil is removed, and it takes another ten to twelve meters vertical removal of mass before the bauxite can be extracted and sent to Alunorte, the world's largest alumina refinery, through a 250-kilometre-long pipeline from Paragominas to Barcarena (Nickelsen, 2019). This pipeline crosses areas inhabited by traditional Quilombola groups, and there are still unresolved issues with affected inhabitants (Hydro, 2020, p. 93). Quilombola are descendants of African slaves who fled into remote regions of Brazil. They previously had no legal rights, but have recently started to campaign for legal status, entitling them to property

rights and social benefits (Watts, 2018). These issues relate back to before Hydro became an owner (Hydro, 2020, p. 93). The combination of finite quantities, fixed locations and territorial embeddedness shapes the development path of the extractive industries and help explain why it is so sensitive to economic, political, environmental and cultural aspects, as well as involved in intense conflicts and bargaining processes (Dicken, 2015, pp. 396-397). The particularities that follow extractive industries leads to continuously shifting power struggles between firms and states (Dicken, 2015, p. 408).



Figure 5 The pipeline from Paragominas to Alunorte in Barcarena, Pará.

To a certain extent, the extractive industries are characterized by a mix of private firms, joint ventures and state-owned enterprises, often dominated by giant firms. These firms are mostly producer driven, which means that the consumer-aspect is less prominent and relevant in extractive GPNs (Dicken, 2015, pp. 396-397). Since World War II, mineral extraction has been seen and justified as an agent of development in modernization theories, ideally turning endowments of natural resources into regional socio-economic development (Bridge, 2008, p. 390). In Brazil, the Amazon III Development Plan 1980-1985 illustrates this. The plan included the construction of Albras/Alunorte. It was implemented during the military dictatorship and in addition to the goal of developing and integrating the Amazon-region with the rest of Brazil, it had a geo-political purpose (Nahum, 2017, pp. 1-9). However, the plan was not completed during the military regime, Alunorte did not start its production until 1995. The realization of Alunorte/Albras were completed after the democratic turn in Brazil and has continued since. Thus the modernization project could be seen as an element of continuity in a

⁶ (Hydro, 2019c)

political transition from authoritarianism to formal democracy (Bridge, 2008, p. 390; Nahum, 2017, p. 9).

When Hydro acquired the bauxite mine Paragominas, the alumina refinery Alunorte and the aluminium factory Albras in 2010, they were place bound due to the territoriality of the resource, in line with Dicken (2015, p. 408). Path dependence accounts for how Hydro also was bound by institutional legacies and the previous history of the industrial complex, since a place often becomes ‘locked into’ the local pattern of economic development, strongly influenced by its particular history, in line with MacKinnon (2008, pp. 1453, 1458). The necessary infrastructure was already in place, such as production sites, operational licences, logistics and employees (Hydro, 2010a, pp. 5-16; Nahum, 2017). The waste-alumina ratio in alumina production (Gendron, Ingulstad, & Storli, 2013, p. 15), sunk costs (Clark & Wrigley, 1997a) and logistics cost (Coe et al., 2008) indicate that Hydro would not relocate their production site from Barcarena. The constitution of extractive industries, especially the capital and technological intensity, favours large firms with a high degree of control (Bridge, 2008, p. 394; Dicken, 2015, p. 400). The initial cost of the acquisition in Brazil was US\$ 4,9 billion, and it secured access to bauxite and alumina within Hydro’s own control in a 100-year perspective (Hydro, 2010b; NTB, 2010). As it later turned out, the secured access to bauxite turned out to be more volatile than the company had expected. After a heavy rainfall in February 2018, Hydro experienced one and a half year of production embargoes, causing production loss and supply difficulties (Hydro, 2018a; Klevstrand, 2019a). The GPN theory presented here will form the backdrop of an analysis of the situation, with focus on the power balance between the Brazilian authorities and Hydro, and reasons for the particular development, including historical and local aspects.

3.3 Previous Research

Dicken claim that the global economy involves a *syndrome* of processes and activities. This makes the study of global economic organization a complex task (Dicken, 2015, pp. 6-7). GPN’s multiscalarity and network approach makes it suitable for my research project. However, it is not the most commonly applied theory for extractive industries (Bridge, 2008, p. 389; Santos & Milanez, 2015, p. 757). This research can therefore contribute in expanding the use of GPN-theory within the extractive sector. Although the literature on challenges of extractive-based forms of regional development is extensive, it has mostly been confined

within the national sphere, and avoided network-based modes of analysis focusing on the production chain (Bridge, 2008, p. 389). Increasing concerns and the negative aspects often appearing in relation to the extractive industries, such as breach of human rights and environmental degradation, perpetuates the need for an alternative perspective. It is necessary to look at the relational way production is organized, while being time- and space-sensitive. Phelps, Atienza, and Arias (2017) bluntly states that there is a need to revisit, or put under scrutiny, the uneven development within the field of economic geography. They claim that the inception of GPN theory was imbued with political economy sensibilities, reflected in the three core concepts of *value*, *power* and *embeddedness*. But after its scope has expanded and the theory developed, uneven development, although mentioned frequently, is merely an implicit theoretical possibility or empirical reality. The dark side of regional development outcomes has been left to others to elaborate on (Phelps et al., 2017, p. 240). Concurrent with what Bridge stated in 2008, extractive industries have been a neglected area in economic geographical scholarship (Phelps et al., 2017, p. 241). The extractive industries cover many sub-sectors, and while oil and other mineral extraction has been given some attention, less is found on the composition of an aluminium-GPN, and even less on Hydro's GPN. An aluminium-GPN has a different composition than other minerals, especially in comparison to oil, both due to territoriality, materiality and production process (Bridge, 2008, pp. 394-395).

The Alunorte crisis in 2018 is an interesting research object, and a few, limited research projects have been completed. One relevant study is the Master's thesis by Eirin Heddeland (2019). The core of Heddeland's thesis is related to Hydro's role in the local community and as portrayed in the sub-title "the actions and reactions of Norsk Hydro in the aftermath of the Alunorte crisis in February 2018 in Barcarena, Brazil" (Heddeland, 2019). The master thesis by Maria Næve (2018), centres around the Alunorte crisis. It is a case study of Alunorte and the implications of host community context, extra-firm actors and stakeholders in Global Production Networks (Næve, 2018). There is bound to be some overlap in the empirical descriptions of the Alunorte-case. However, the analysis and application of theory will be divergent since the research questions are different. The relevance of another thesis on the same topic is clear, it is important to apply different perspectives and explore various research questions to a case that is likely to have had both social, economic and political implications for a variety of stakeholders. Another interesting point is that doing research that partly overlaps in some areas, makes it possible to compare the outcomes and conclusions and hopefully create a debate.

4 Methodology

Methodology in social sciences is about how to gather information about the social reality, how to analyse it and what the information can tell us (Johannessen, Christoffersen, & Tufte, 2011). This research project is partly interdisciplinary, mainly placed in the economic geography subdiscipline, but contains elements of history due to the research questions and their need to look at historical context. Therefore, it seems appropriate to open with a brief notion on how academic disciplines within the social sciences and humanities view research. In the humanities research objects are considered ideographic, meaning they have to be understood and interpreted (Andresen, Rosland, Ryymin, & Skålevåg, 2015, p. 177; Hauge & Holgernes, 2005, p. 73). In the social sciences research objects can be both ideographic and nomothetic. The dichotomy of ideographic and nomothetic science has been challenged, as it has been claimed that all science is both ideographic and nomothetic since it seeks underlying patterns and employ particulars to guess at and check generalities (Bunge, 1998, p. 23). This project contains elements of humanities and social science and consists of data that must be interpreted, but also holds the possibility for analytical generalisations as noted in Yin (2018, p. 21). Hans-Georg Gadamer argue that it is not possible to attain a completely objective interpretation of opinions, since the researcher's background and knowledge will influence how the data is interpreted (Hauge & Holgernes, 2005, pp. 90-91). This is regarded as *researcher's bias*. Avoiding bias is part of research ethics (Yin, 2018, p. 87). However, with Gadamer's notion on objectivity, I would argue that biases cannot be avoided. Instead, biases have to be minimized through the correct use of methodology and research ethics.

One way to minimize a biased thesis, is to apply source criticism (Andresen et al., 2015, p. 176). In the tradition of Leopold Von Ranke and historic research, this project will integrate some of his influential school of thought. The first one is that human phenomenon has to be understood and interpreted within their own spatial-temporal context. The second one is that each historical phenomenon is unique, and that history has to be understood in light of this uniqueness (Andresen et al., 2015, pp. 172-173). Fernand Braudel viewed history as a social science and sought to integrate these two disciplines. This thesis will seek to integrate history with geography, as history complements the contemporary case study under scrutiny. Building on Braudel's strain of thought, the goal is to view the societal structures within a specific timeframe, considering geography as spatio-temporal (Andresen et al., 2015, pp. 190-191; Barratt & Ellem, 2019, p. 1556).

4.1 Method

The method chosen for a research project must be suitable for the research question (Andresen et al., 2015, p. 93). A qualitative case-study has been found suitable for the research questions in this thesis because a case-study is an empirical method that investigates a contemporary phenomenon. It is about understanding a real-world case, and assuming that such an understanding is likely to involve important contextual conditions pertinent to the case (Yin, 2018, p. 15). For this particular case, it is about understanding the development in the Alunorte-situation after the heavy rainfall in February 2018 and attempting to explain the development within the GPN-framework. The case is spatially confined within Barcarena in Brazil, although not cut off from external influence. The temporal scope of events is from 17 February 2018 to 26 September 2019, since that period represent the beginning and the end of the embargoes. However, the timeframe is extended backwards to the 1980s to provide explanatory power, and extended to 31 December 2019 to include adjacent events related to the Alunorte crisis. It is not extended further since it is not considered relevant to answer the research questions. To understand the way in which such a case unfolds it is necessary to consider the local and historical context. History is endogenic in the concept of path dependence, and the trajectory of events builds on this. According to Yin (2018, p. 9), history and case studies as method both ask *why*- and *how*-questions and don't require control over behavioural events. The difference is that case studies focus on contemporary events, while history does not. However, the development of causal explanations has long been a concern in historiography (Yin, 2018, p. 7). This is why there is a need to combine the two methods, adding a historical perspective to a contemporary case in order to provide explanatory power (Yin, 2018, pp. 9-11, 14).

This specific case-study about the "Alunorte crisis" initiated in 2018 was chosen due to relevance and interest. It can illuminate important aspects of a global production network, and substantiate the theoretical concept with empirical data in line with Yin (2018, p. 38). The case is relevant under the topic of globalisation and development because it entails environmental issues and uneven development within a global production network revolving around the TNC Hydro, connecting Norway and Brazil. Author's motivation is also driven by the familiarity with Hydro and Barcarena, after having worked for the company in Norway, and living in Belém in Pará for almost a year in 2014. The ethical concerns this raises will be

discussed in section 4.4. The interest in the case led to three research questions. The questions asked in this study, are *how-* and *why-*questions, justifying the case study-method (Yin, 2018, p. 27). They include some propositions, namely that history and local contemporary context has implications for how a case will develop, and that the shifting power between actors involved is related to both historical trajectory and contemporary events in line with Yin (2018, p. 28). Applying GPN-theory provides nomenclatures for the relevant concepts, limits the case and provides the opportunity to analyse the case in relation to other cases within GPN-literature. However, as the GPN-literature is an overarching theory, it is important to narrow down the focus area within the framework, as have been done by applying research questions and case-description which has determined the focal point. The focal point within the GPN-framework is the Brazilian node of Hydro's aluminium network, the two actors *Hydro* and *the Brazilian Authorities*, historical and local context in terms of path dependence and shifting power balance. Combining this case with theory can help achieve analytical generalisations; generalisable findings or lessons learned (Yin, 2018, p. 38).

4.2 Data-Collection and Selection

Building on Ranke's historiographic concept of *source criticism*, I have applied four steps throughout the data-collection. The first step is to locate sources. This was done online via webpages like *google.no*, *scholar.google.no* and *oria.no*. For case-information I used different constellations of the search words "Alunorte", "Hydro", "Barcarena", "krise", "utslipp", "embargo", and used newspaper compilations from NRK and DN regarding the case. Links in the articles led to additional case-information. Next step was to critically examine the source, which for the most part consisted of identifying the publisher and/or the people that had contributed to the source and reflect on the background and motivations for each contributor. The third step in the applied source criticism was to interpret them, and the last step was to write. In section 4.3 I will provide information about my interpretation of selected sources and the analysis reflects how I have chosen to write about the data I initially located. The data mostly consists of narratives about events and historical reality (Andresen et al., 2015, p. 176). Initially, this case was intended to combine secondary sources of information with primary sources such as interviews. However, after a look into the available material, it was decided that it was sufficient and plentiful information available in newspapers, books and other documents. In addition, time- and financial restrictions were a barrier for conducting interviews. Documents contain text and pictures that have been

recorded without the researcher's intervention, and the data must be examined and interpreted to elicit meaning, understanding and empirical knowledge (Bowen, 2009, p. 28). But when *Litteraturhuset Oslo* announced a streaming lecture by Torkjell Leira about his new book, I sent in a few questions I had prepared for hypothetical interviews, and got replies in the direct sent broadcast. A written consent was not considered necessary since people were encouraged to send in questions, and the questions were answered on a voluntary basis and publicly broadcasted, similar to the information gathered from newspaper articles.

The documents included in this research are public available, categorized as *public records*. They include newspaper articles, blog entries, student papers, research articles, press releases, Hydro's webpage and reports. Another applied category is documents created by the researcher, such as notes and summaries of relevant literature (Olson, 2012, p. 318). Document analysis is efficient, requiring *selection* of data instead of *collection* of data, although it initially requires a collection of secondary data in order to make the selections. The data is available, unreactive, stable, exact and provide broad coverage (Bowen, 2009, p. 31). On the other side, documents can be insufficient for the research questions, and the research can suffer under biased selectivity (Bowen, 2009, pp. 31-32). This has been a concern, and to avail both of these issues, a broad use of publications and sources has been applied in the data-selection process. This should help to reduce selection bias and provide variety in the obtained results. A problem for me is that much information is in Portuguese, which I have limited knowledge of. Therefore, this research relies on Norwegian and English data sources, in addition to some articles and information in Portuguese. These were translated using google translate and my acquired knowledge of the language and logic interpretation. This is a single-method case study which limits the ability to seek corroboration in findings across methods. Using documents from multiple sources has been applied to minimize this problem. Document analysis can function as a stand-alone research method, especially in history and cross-cultural studies. Despite its potential drawbacks, and although there are other available sources and methods for this particular case, the research questions, efficiency and cost-effectiveness make document analysis the most feasible option and justify the chosen method (Bowen, 2009, pp. 28-29). The data collected were chosen both through thematically and temporal criteria, reflecting the case description.

4.3 Analytical Approach

When the data collection and selection had been executed, a secondary selection process took place. Pertinent information were separated from not pertinent data (Bowen, 2009, p. 32). In secondary sources such as newspaper articles, and particularly in books, there is information that is not relevant for the case. Identifying the relevant data and separating it from less- or irrelevant data is important to make the academic analysis feasible. Thematic analysis is about recognizing a pattern within the data, and then let these themes become the categories for analysis. In my research, I categorized the data chronologically, since path dependence is an important part of the research questions, and since the case is extended over time. First, I made a document with written summaries of all the selected news articles in chronological order. I also made a brief summary of the book by Torkjell Leira (2020a), and a transcription of his answers from the live broadcast. Analytical categories were decided after a closer look at the data, and coding in NVivo. Through this process, prominent dates for changes in the situation between Hydro and Brazilian authorities were identified and applied as beginnings of a new period. Organizing the data in NVivo helped me review the data material and extract categories. The input in NVivo was a summary of the selected news articles, Hydro’s annual report 2018, summary of the book “Kampen om Regnskogen” by Torkjell Leira, the transcription of the answers to my questions in the broadcast from Litteraturhuset, and a PDF-file of the book “Modernization and Political Actions in the Brazilian Amazon. The city of Barcarena, Pará” by João Santos Nahum.

Table 1 Nodes in NVivo used to organize the data.

Barcarena – Community	Causal Explanations	GPN	Hydro Alunorte
Corruption	The Negotiation Process	History	Alunorte Crisis
History	Hydro	Path Dependence	CSR
Local Community	Hydro/Community	Power Balance	Embargoes
Neo Liberalism	Hydro/Community History	Territoriality	Production Process
Politics	Politics		

Similar to Ranke’s concept of source criticism, Bowen (2009, p. 33) also emphasize interpretation as an integral part of document analysis. The researcher must establish the meaning of the document and its relevance for the research problem. Further, the source of the document and the original purpose must be considered, in addition to the degree of

nuanced and balanced information (Bowen, 2009, p. 33). Such source criticism was applied to the data in my research. It is an integral part of my methodology. Selected sources will be briefly discussed here, to make it clear how their contributions have been reviewed by me.

Hydro is an important source of information for this thesis. The company has economic objectives to pursue, but is considered to be trustworthy, although not perfectly transparent. Its connections to the Norwegian state, and the Norwegian business culture, implies that the company wants to run its business in an ethical and transparent manner. This is in line with what Dicken (2015, pp. 132, 178-179) writes on *home country influences*, in which cognitive, cultural, social, political and economic characteristics of the national home base plays a dominant role in GPNs, and states as cultural containers. In the company's Code of Conduct, the commitment to ethical business practices and compliance in their entire organization is an absolute requirement (Brandtzæg, 2018). However, the home-country influence also applies to Hydro's subsidiaries Alunorte and Albras, in which Brazilian company Vale was the majority shareholder until 2010. Taking path dependence and local culture and practices into consideration, the Brazilian business culture is likely to have a noticeable amount of influence in the Brazilian operations of Hydro's GPN (Dicken, 2015, pp. 36, 132-133, 178-179). But taking the different cultures into consideration, I claim that the facts presented by Hydro are trustworthy. However, I note that information can have been excluded, as the facts represent what the company *wants* to share with the public, that the words and formulations are constructed to present Hydro in a positive way, notably as an ethical and responsible company, and that there in some instances has been a delay in public announcements of guilt⁷. In addition, I note that the communication between the Brazilian branch and the Norwegian headquarter might not have been all-encompassing and transparent, as Leira (2020a, p. 91) implies as a possibility due to the early miscommunication to the public about the Alunorte-case from the Norwegian management, although someone at Alunorte necessarily knew about the emissions, as later confirmed (Klevstrand, 2018c; Leira, 2020a, p. 91).

The social geographer Torkjell Leira has profound knowledge of Brazil. In 2018, he worked for the University of Oslo doing research for Hydro in their bauxite mine Paragominas and had interactions with Hydro-employees in Oslo. He has talked to many people in Barcarena after the incident in February 2018. Generally, Leira is critical of Hydro's environmentally

⁷ Characterization of Hydro deduced from their website, strategy and Code of Conduct, case information from Wig (2018).

destructive industries in Brazil (Leira, 2018, 2020a), but at the same time he seems to present the case based on documented facts and his knowledge of the case at any given time. Adding good discussions presenting different perspectives, Leira's statements are considered justified and well-documented, in line with academic standards.

Further, my research includes data from people and organizations. In addition to an opinion on matters, some of them have a particular, sometimes concealed, objective. In this research it mostly refers to people working in opposition to Hydro or Alunorte and their industrial activity, and people working *for* Hydro's interests. Local inhabitants and local organizations mostly represent their own interests and objectives, while politicians and bureaucrats often have several interests to balance. Some of these people are activists, working alone, or in an organization, towards a specific goal. The lived experiences are an important factor in this research, even if the statements are not backed by evidence or science.

Often those presenting information, including that from activists, are journalists and newspapers. Journalists are expected to uphold integrity, but a journalist's methods and biases are seldom made known in articles. This leaves the judgement of the content and the journalist's background to me. To increase credibility of the data, I try to find multiple sources for the same or similar information, and view the data within the context that they were given and made known. This is not something that ends up with an exact answer. However, these aspects are part of the reflections I make when I use news articles for my research project.

4.3.1 Reliability and Validity

Construct validity is a challenge for case studies. However, in this particular case the area of focus will be limited by the research questions. They narrow down the research area in spatial and temporal scope, confined to a specific case. The operational measures are opinions, facts and statistics related to the case, unfolding within GPN-theory. Internal validity does not concern the descriptive part of this case study, the shifting power between actors. However, it does concern the part trying to explain the shifting power. It is important to be aware of the possibility of an intervening factor (z) when declaring a causal relationship between x and y . Analytical techniques are applied to avail this problem, and rival explanations and other possibilities have been considered. The possibility for analytical generalisation in the case of qualitative studies, and thus achieve external validity, is stronger with *why*- and *how*-

questions, than with *what* questions (Yin, 2018, pp. 43-46). Thus, I can attempt to generalise from the combination of theory and empirical evidence. The methodological framework is important to ensure reliability. In theory, a study should have the possibility to be repeated, by using the exact same methods and procedures. This is difficult to achieve in case studies, since the selection and analysing processes are intrinsic to the researcher's present state of mind and might not easily be replicated even with a thorough methodology. The goal of reliability is to minimize biases and errors. This is done by describing methodology and carefully citing all sources. In addition, a table showing the most relevant incidents in the prioritized timeframe has been created^s, and relevant articles and documents have been compressed into a summary of each in order to get a decent overview of the case before analysing. Making the procedures as transparent as possible is the general way of approaching the reliability problem (Yin, 2018, pp. 46-47).

4.4 Ethical Considerations

Research ethics is an overarching consideration in every part of this research project. Ethical behaviour means to do no harm, protect individuals, communities and environments and have the potential to do good. Utilitarianism building on the work of Jeremy Bentham and John Stuart Mill holds that the sum of good and bad outcomes of an action is decisive for the morality of an act (Israel, 2016, pp. 10-12). Critics have claimed that this might morally justify terrible actions if in sum it creates more good for more people than bad for a few people (Israel, 2016, pp. 10-12). The deontological view put forward by Immanuel Kant, considers an act morally right if the maxim of the action can become an universal law, meaning that our actions are morally justified if we can recommend all other people to act in the same manner (Israel, 2016, pp. 10-12). There is an alternative way, the principlist approach. The Scottish philosopher W.D Ross meant that ethical conduct should be based on widely accepted principles, including fidelity, non-maleficence, justice, beneficence and self-improvement. Researchers' individual moral judgement and intuition must be applied to decide how this works out in practice (Israel, 2016, pp. 13-14). The principlist approach, with the utilitarian and deontological view as guiding structures, is the ethical base for this research project. Separately they have, and can be, criticized. However, according to Israel (2016, pp. 19-21) working with principles makes it easier to know what to do. In addition, I have applied principles from utilitarianism and deontology, which should provide a sound base for ethical

^s See appendix B: Timeline Alunorte-situation.

research. The risk of sudden, situational difficult ethical decisions is small in a research project relying on documents. The implications of the principlist approach in this study is that I have had an intention to do no harm, and hopefully this research can benefit actors in global production networks, and researchers in this field. I have acted in a manner that have kept my personal integrity intact, along with the integrity of the research project. This is reflected in the application of citations and references, and describing the methodology in a transparent manner. In the selection of sources, I have applied source criticism, but also considered if it would be safe and justified to take information out of original context and use it for other purposes than intended. In the consideration of consequences of this research, there is a possibility that Hydro, the local community and Brazilian authorities will dislike or be disadvantaged by this research, but the applied research ethics and methodology should minimize this risk. While also keeping the research transparent; and based on documents and already existing knowledge, my research is unlikely to be the source of any potential disadvantages for the involved actors. Further, I will strive to minimize researcher's bias when analysing and discussing data, as a precautionary ethical measure. I manage this by keeping the original meaning of the data, including several sources and views, and applying source criticism.

Methodology and ethical considerations are part of building and keeping this trust. Integrity is assured by applying good research practices, comply to research ethics, consistently siting sources and be transparent about the research process (Israel, 2016, pp. 2-3). My own position needs a clarification, since I have been employed by Hydro since 2009 as an operator in the cast house. I later have had maternal and educational leave, and have not actively worked for Hydro since 2015. I did, however, have an unpaid internship with Hydro's CSR-department in 2019, and thus I know the company from different positions. My husband has worked, and still works, for Hydro, and this led to an expatriate position at Albras, in Barcarena. We lived in Belém for 10 months in 2014. This attachment to Hydro is part of my background, or *research lens*, as Yin (2010, p. 272) calls it. I have reflected upon the way I present my case and research, since it can appear to be centred around Hydro's goal of normal operations at Alunorte. However, in line with Coe et al. (2008, pp. 274-275), I argue that my thesis is centred around the production process and the accompanying relationships as clarified in *the case*. Hydro's operations at Alunorte are central in the production process within its GPN. But my inherent research lens has been a factor in the decision to study this particular case, considering that my history within Hydro created an interest for this case, and has been a

source of knowledge about Hydro, the local context and conditions. One way I have been working to minimize my inherent bias, was to provide ‘contrary evidence’⁹, in this case it means that I have included arguments with both negative and positive connotations for Hydro. Further, to help minimize my bias I have made my methodology explicit to provide reliability, as recommended by Yin (2018, p. 46). In addition, I have resigned from my job in Hydro and by the end of May I no longer have a professional attachment to Hydro. This thesis does not contain confidential information obtained during my employment with Hydro. Providing this information is meant as a clarification to ensure integrity and transparency.

This project relies on secondary sources, which decreases the number of ethical issues to consider, as they already are available to the many. In the beginning, when interviews still was an alternative, an interview guide and information letter were created and attached to an application to NSD (Norwegian Centre for Research Data). With minor adjustments, the application was approved. I include this information to illustrate ethical considerations. It is important to respect the rights of all actors, such as privacy and correct representation. Ethics applies to all parts of the research.

⁹ (Yin, 2018)

5 Analysis

In this chapter the focus is on establishing explanatory factors that led to the long and expensive situation for Hydro Alunorte after the incident in February 2018. There will also be a focus on factors that can illustrate the power balance between Hydro and Brazilian authorities at the time of the incident, and how it unfolded. Both in terms of how it affected, and were affected by, the case-development.

5.1 Historical Context and Local Community

The temporal aspect of geography is essential to understand current events. Places are, in a way, products of long and varied history, and can be considered as historically contingent. This also applies to global production networks, where time is a factor in both development and actions within the network. Spatio-temporality helps explain interactions in a network over time, and it can help in explaining constraints and choices faced by GPN actors (Barratt & Ellem, 2019, p. 1556). As the precise geographical configuration of the global economy at any one point in time constrains future developments, so can the configuration of a GPN at any point in time constrain the network's future development. A given point in time constitutes the context in which subsequent processes operate. This implies that the configuration of a GPN, and the actions taken within the GPN, is path dependent. For that reason, I will look into certain aspects of the past of Alunorte. These historical aspects shall have explanatory power for the present case's context and development, in line with Hoelscher and Rustad (2019, p. 108).

As already mentioned in section 2, Barcarena went from rural district with self-sufficiency as the main livelihood, to a more complex societal constitution with the instalment of Albras and Alunorte, on the track to modernity (Nahum, 2017, pp. 5-6). Aligned with this change, Nahum (2017, p. 70) demarcates two geographical periods in the territorial dynamics of Barcarena, one before and one after the implementation of Albras and Alunorte. The government had a plan to extend its modernization model of combining geopolitical interest with extensive development of capitalism to this part of the country (Nahum, 2017, pp. 5-8). This modernization project did not take into account the interests of the entire population of Barcarena, and were propagandized as essential and inevitable progress (Nahum, 2017, p. 1). The state granted concessions, leases and licenses where needed, including regulation of vacant land and expropriation if necessary (Nahum, 2017). The expropriations were a

disorganized process, and land used for cultivation, both as a complement to family income and for subsistence farming, were exchanged with rural lots with houses. The loss of common lands used for fishing, gathering and hunting contributed to increased poverty, since the change in livelihood were accompanied by a lack of work. The expropriations had undervalued family units and compensation was mostly insufficient or absent (Nahum, 2017, pp. 11-16). The changes that were initiated with this imposed modernization that increased disparities in livelihoods, living standards and income levels, can help explain the adjoining and continuous social unrest and protests against the industrial complex (Nahum, 2017, pp. 14-21). Due to migration influx following the need for migrant labour and rural workers who's lands had been expropriated, the deficiencies in infrastructure and urban services increased (Nahum, 2017, p. 18). Pará also faced environmental problems due to an increase in economic migration, in response to projects in the aluminium value chain. Social issues across the aluminium value chain are perceived as local, and has not been a concern for the federal government (Cornejo et al., 2010, p. 31). Also, the government failed to deliver expected services to the population (Hoelscher & Rustad, 2019, p. 109). The development that followed the construction of Albras and Alunorte thus had severe socioenvironmental impacts. This refers to the impact of economic activities on natural environment and human communities (Rodrigues, 2003, p. 208). In line with Santos and Milanez (2015, p. 757), the sociocultural history and institutional structures around Alunorte, the company's social and territorial embeddedness, can affect behaviours within the host country. These historical aspects will, according to path dependence, shape the future of the local community, and the future of the forthcoming GPN revolving around Alunorte. The population, including discontented and dispossessed inhabitants, had to adapt to a new way of life, initiated and facilitated by the authorities. This socio-spatial rearranging of society must therefore be seen as an influential factor in the reactions to the heavy rainfall in February 2018.

Another example for historical relevance in present situations, is the local community's previous experiences with environmental emissions. The socioenvironmental impacts of the industrial complex can be seen in relation to several emissions of bauxite residue in 2003, 2006 and 2009. Local inhabitants complained, claiming that the emissions destroyed their traditional way of life, in which they depended on forestry, fishing and water (Nerdal, 2018b). In 2009, there was a large emission from the bauxite residue deposit after a heavy rainfall. Initially Vale denied any leakages of bauxite residue, claiming only rainwater had been released from the industrial area. Later it was confirmed that there had been a leakage, and

that the local population's health had been at risk (Leira, 2020a). However, both Vale, and later Hydro, denied culpability for environmental damages and livelihood impacts (Hoelscher & Rustad, 2019, p. 105). With this recent history in mind, local people again feared environmental damage and health problems after the heavy rainfall in 2018. The reassurances and denials from Hydro in 2018, were so similar to Vale's response in 2009 that it made local people doubt the statements' accuracy based on previous experiences (Leira, 2020a, p. 26). It is also possible that the rejection to investigate Alunorte in 2009, immediately after the emissions, mobilized the authorities to execute an immediate investigation in 2018. State environmental authorities, SEMAS, and the public health institute IEC, both sent representatives in a helicopter to investigate the industrial area 17 February 2018. After the heavy rainfall in February, the perceived arrogant statements from Hydro worsened the relationship with the local community and authorities (Leira, 2020a, pp. 26-29). This implies that path dependence and corporate behaviour in a crisis are explanatory factors that can lead to prolonged operational difficulties.

As can be seen from the emission in 2009, and previous cases of emissions, they have not been taken seriously enough by the authorities, even though some representatives from the authorities have been critical to Alunorte. Legal claims put forward after the 2009-emission are still pending in the judicial system. However, 3321 out of 3710 cases were all decided in Alunorte's favour, likewise in the 2702 appeals that rendered a decision (Hydro, 2019b, p. 261). A likely advantage for Vale in these cases, was that they had political connections in Brazil, and few politicians dared to challenge them (Nerdal, 2018b). This claim is put forward by Roar Nerdal, a Norwegian journalist living in Brazil, and is deemed credible due to other accounts of Brazilian politics. For example, in the congress, there is a powerful lobby, *bancada ruralista*, working for the interests of agribusiness and mining companies (Watts, 2018). In 2014, Vale paid around 200 million NOK to political parties and individual politicians in Brazil. This is a tradition in Brazil, but creates connections between companies and politicians, which can induce loyalty that favours companies over local communities' needs (Dale, 2018).

The local community has been complaining about environmental damages caused by the industrial complex for a long time prior to the incident in 2018. In addition, research by Prio¹⁰

¹⁰ The Peace Research Institute Oslo.

claims that for several decades a split between local community, local authorities and industry has prevailed (Nerdal, 2017). In 2015, activist Petronilo P. Alves states that Hydro's bauxite extraction and alumina production contributes to pollution, excess water consumption, violations on indigenous peoples' rights and a huge climate footprint. One of the largest environmental risks is the bauxite residue. Alves says that as a cornerstone business, Hydro is jointly responsible for the local population's living conditions. Hydro's media contact Halvor Molland said the company was aware of the dissatisfaction with the poor water quality, but that the pollution stemmed from untreated sewage and emissions from other industries along the riverside. Further, Molland stated that Hydro complies with all cleansing regulations and requirements (Skjeseth, 2015). However, after the incident in February 2018, Hydro admitted to several unlicensed emissions from *Canal Velho* over the past years (Leira, 2020a, p. 169). It is unlikely that this only happened after Molland's statement in 2015. Another example of community discontent is from 2017, when several demonstrations against Hydro took place, escalating in December and continuing until the incident in February 2018 (Hoelscher & Rustad, 2019, p. 107). Local inhabitants required compensation for environmental damage, among other things for their drinking water being contaminated with metals (Nerdal, 2017). After the bauxite residue leakage in 2009, inhabitants close to the bauxite residue deposit has been worried about environmental emissions, and early in 2018 this became an increased concern (Nerdal, 2018a).

The population in Barcarena had almost tripled in twenty years (Mota, 2018). The local community is characterized by poverty. According to a civil society organization one third of the population is living under the poverty limit. Barely 15 percent have adequate sanitary conditions (Skjeseth, 2015). In a ranking of 231 municipalities by the sanitary association ABES¹¹, Barcarena has the lowest rank. According to local garbage collectors, there is a large, open garbage disposal area there (Elvevold, 2018d). Considering these conditions, it would be presumptuous to pin the environmental pollution to Hydro's business alone. In 2018, the employment rate was 19,2%, and the average salary for this group was three times the minimum wage set by the state (one minimum wage equivalent to US\$288,4). In contrast, 46,4% of the total population had an income up until one half of the minimum wage set by the Brazilian authorities (IBGE, 2020), illustrative of the inequality within the municipality. In addition to poverty and poor living conditions, violence and prostitution are common in

¹¹ The Brazilian Association of Sanitary and Environmental Engineering.

Barcarena. More community engagement from Hydro is wanted, according to the mentioned activist Alves (Skjeseth, 2015). According to Arivaldo Brandão, a Quilombola descendant and leader of the local community organization Burajuba, local companies, including Hydro, does not reply to their requests for dialogue. Brandão says the local community lacks an elementary school and a local health centre, in addition to practical education which can provide their children with an opportunity to find employment (Stefansen, 2018). Presently, few local inhabitants are qualified for the jobs that are offered in Barcarena (Nerdal, 2018b). These conditions poses a dilemma for the locals. They don't have access to the lands they used to, and can't reap sufficient quantities of food due to the industrial activities taking over arable land and polluting their surroundings, while at the same time they are de facto excluded from the labour market due to lack of education and training. The local conditions in Barcarena are an inherent part of Hydro's global production network and thus represent an important part of the analysis and discussion.

Another part of Hydro's production network is the Norwegian State. The intention here is to show how international politics and (lack of) diplomacy can affect situations involving TNC's business operations, and probably did play a role in the Alunorte crisis. In June 2017, Brazilian president Michel Temer visited Norway. A troubled politician already before his inauguration in Brazil. Shortly before Temer's visit to Norway, Minister of Environment in Norway, Vidar Helgesen, sent a letter, border lining undiplomatic, expressing concern for the increased deforestation and environmentally destructive decisions on Federal level. The letter was sent to his counterpart in Brazil, Minister of Environment José Sarney Filho. In Norway, Temer was met with public protests, and at the end of the visit, the Norwegian Prime Minister, Erna Solberg, publicly exclaimed her environmental concerns during a press conference with Temer by her side. It is said that Temer and parts of his establishment found this humiliating (Enge, 2017; Leira, 2020a, pp. 58-59). As will be shown in chapter 5.2, Filho had something to say about the incident at Alunorte in February and it was not diplomatic.

In addition to the environmental concerns on international scale, there were also more localized environmental concerns, in the municipality of Barcarena. After years of concern for hazardous emission, these concerns ascended at the beginning of 2018 (Nerdal, 2018a). These concerns were later justified based on affirmations by Hydro, although the type of emissions are not necessarily what the locals were most concerned about, and the potential for environmental damage by emissions of surface water is debatable (Leira, 2020a, pp. 167-

169). Pictures showing alleged environmental emissions were spread on social media. Saturday 17 February residents reported that there had been emissions from the bauxite residue deposit. Hydro replied that no evidence of environmental emissions had been found (Nerdal, 2018a). Next up is an account of the incident, and initial actions taken by Hydro and the authorities on regional and federal level.

5.2 The Heavy Rainfall in February and its Consequences (17.02.2018-31.12.2019)

On the night of the 17th of February 2018, there was a heavy rainfall in Barcarena, 210 mm of rain in 24 hours, a lot even for a rainforest (Leira, 2020a, p. 23). This rainfall led to flooding in Barcarena, and also within Alunorte (Hydro, 2019e, p. 2). Hydro experienced trouble with the capacity of their water treatment system (Leira, 2020a, p. 23). But it wasn't until 11 and 19 March that Hydro publicly admitted to several unlicensed, controlled emissions in the period from 17 February to 25 February, done to relieve the water treatment plant from overload. The first emission was reported to local environmental authorities two days after the heavy rainfall, but not to the local community (Klevstrand, 2018c). Three irregular emissions of surface water were documented (Hydro, 2019e, p. 2).



Figure 6 Map of the documented emissions at Alunorte in February 2018¹².

¹² Picture: Hydro. (Berget et al., 2018)

Alunorte operated within the terms of obligated embeddedness, and the violations placed the fate of Alunorte's further operations into the hands of those who controlled the territory and access to resources, the Brazilian authorities. The extent of consequences for Alunorte's violations, must be seen in relation to the power held by the state versus the power that Hydro had, and the state's ability to exert that power, in line with Dicken (2015, p. 243). One aspect of power is the ability to decide the discourse. It appears as Hydro consequently denominates the emissions as *rainwater*, but a more precise term would be *surface water*, rainwater that has been in touch with the surface of Alunorte's industrial area. On the night in question, Alunorte's one metre freeboard limit in the oldest bauxite residue deposit (DRS1) was exceeded (Hydro, 2019e, p. 2). However, no evidence of leaks or overflow were found, after more than 90 investigations and inspections by relevant authorities including SEMAS and IBAMA (Hydro, 2019b, p. 15). Despite large amounts of rain on one night, the amount of rain is not considered abnormal by everyone. Professor Simone Pereira at the Federal University of Pará, claim the rainfall was more than the everyday rain, but not unusual in this geographical area (Elvevold, 2018c). Roar Nerdal, a Norwegian journalist living in Brazil says it was a lot of rain on the night in question, but not extreme amounts, as Hydro claims (Nerdal, 2018b). Further, the capacity of the water treatment system and the precipitation statistics must have been known to Hydro, as a part owner of Alunorte for around a decade before the acquisition in 2010. Not investing in upgraded capacity is their mistake, according to geographer Torkjell Leira (2020a, pp. 115, 169-170).



Figure 7 Area 45 at Alunorte flooded after the heavy rainfall in February 2018¹³.

¹³ Picture: Hydro. Insufficient capacity to pump away the water led to flooding in Area 45. No signs of overflow to the outside from this area. Source: Berget et al. (2018, pp. 6, 20-21).

During the heavy rainfall in February, as DRS1's required one metre freeboard decreased, local inhabitants became increasingly worried. Water flooding with red colour in nearby areas led people to believe that there had been an overflow from DRS1. These overflows were in reality a part of the treatment system, where excess waste water flows over an edge into a ditch, then it is treated and released into the river (Leira, 2020a, pp. 27-30). Hydro (2019e, pp. 2-3) confirmed that there had not been any overflow from DRS1 based on several investigations. In the following days after the heavy rainfall, both the Brazilian federal environmental agency, IBAMA, and the Pará state environmental agency, SEMAS, had investigators inside and around Alunorte. An initial report from IBAMA on 18 February stated that there was no leakage from the bauxite residue deposit (Leira, 2020a, pp. 56-57, 168-169). But another report, the first report from IEC 22 February¹⁴ claimed the opposite, that there had been overflow from DRS1 into the environment, and that the water surrounding Alunorte was contaminated. The report rested on picture evidence and chemical tests (Elvevold, 2018a). Justified by the local concerns and the IEC-report, MP filed a criminal lawsuit against Alunorte alleging an overflow from DRS1 into the external environment and environmental damage (Hydro, 2019b, p. 260). Later the IEC-report was refuted by several parties. The methods were questionable, the results were inconsistent and lacking causation (Elvevold, 2018e, 2018h, 2018k; Leira, 2020a, p. 56).

Even if the evidence of a leakage from DRS1 was weak or absent, something else did constitute a problem for Alunorte. The one metre freeboard limit required in DRS1, was exceeded after the heavy rainfall. On 24 February, SEMAS required Alunorte to comply with the one-metre freeboard requirement by Monday 26 February, and in addition distribute water to neighbouring communities. According to Hydro, this was not notified to them, but published on SEMAS' website. If the conditions were not met, the state would take other measures (Hydro, 2019e, p. 3). Molland from Hydro said that curtailing the production at Alunorte by 50 percent could have severe operational and financial consequences for the company. At this time it was not clear when a potential production embargo would be implemented (Nerdal, 2018a). In the continuation I will look more closely at the consequences of Hydro's violations and alleged violations and examine how the power balance between Hydro and Brazilian authorities, with the local community as an intervening factor, could dictate the terms of the case.

¹⁴ (Hydro, 2019e, p. 3)

5.2.1 Phase One: The Embargoes (26.02.2018-03.04.2018)

Despite the initial report from IBAMA, and the flaws of the first one from IEC, Monday the 26th of February, Secretary of Environment José Sarney Filho publicly announced that according to the reports they had, there was no doubt about Hydro's responsibility. Filho said the evidence was clear, and that IBAMA had all the information they needed to take action as soon as possible. Further, Filho recommended production embargo and heavy fines. Literally instructing the Federal Ministry of Environment was an obvious breach of ordinary proceedings. In addition, the report from IBAMA had been available for one week and did not support Filho's statements. During his public performance, Filho also mentioned that the emission was serious coming from a company owned by the Norwegian State, a company one expects to be responsible (Leira, 2020a, pp. 56-57). This requires a flashback to the previously mentioned letter from his Norwegian counterpart Helgesen, and the presidential visit to Norway eight months before. Leira (2020a, pp. 59-60) is certain that Temer's visit to Norway is one of the most important reasons for why the Alunorte-incident grew big, fast. An indication is the unusual fast and strict reaction from Filho. Many political commentators in Brazil wrote about this connection. Andreaza Matais from the large newspaper *Estado de São Paulo*, and an anonymous Hydro-employee both concluded that the reactions from the authorities were strictly pay-back from the humiliating visit to Norway (Leira, 2020a, pp. 59-60). This indicates that personal prestige, or the loss of public esteem can affect the execution of power within a GPN. Just hours after the national politician had proclaimed Hydro's responsibilities and fault at a press conference, SEMAS made a statement that they would order Hydro Alunorte to cut production by 50 percent due to non-compliance regarding the one metre freeboard in DRS1. SEMAS also introduced daily fines of approximately BRL 1 million until Alunorte reached the freeboard limit (Hydro, 2018c; Leira, 2020a, p. 60). The urge from Filho had been accommodated by Pará state authorities, and the recommended embargo and fines were to be implemented.

SEMAS officially notified Hydro about the embargo and fines 27 February. On the same day, one day after the formal requirement, the one metre freeboard limit was reached (Hydro, 2019b, p. 73). Despite the fact that Alunorte had fulfilled the operational requirement of the freeboard limit one day after the deadline, SEMAS did not waiver their sanctions (Leira, 2018). Wednesday 28 February, additional state agencies got formally involved. A criminal lawsuit against Alunorte was filed by the State Public Prosecutor's Office, Ministério Público,

to the State Criminal Court of Barcarena. It required a 50% curtailment of production at Alunorte, due to concerns about leakages causing contamination in nearby rivers (Hydro, 2018c; 2019b, p. 260). The court's injunction placed an embargo on the production at Alunorte reducing their allowed operational capacity to 50 percent. The court also decided that all operations at DRS2, Alunorte's new bauxite residue deposit, had to stop, awaiting verification of operational licenses (Hydro, 2018c; 2019b, p. 260; 2019e, p. 5)¹⁵. No new environmental licenses would be given until the nearby communities had been mapped and risk analysis performed. In addition, the decree from SEMAS required the suspension of activities at one of two deposits at the bauxite mine Paragominas (Nerdal, 2018a). The same day as the court ruling, federal agency IBAMA issued a notification ordering Alunorte to discontinue test and commissioning at DRS2, including press filters operating under the same licence as DRS2. Further, IBAMA issued fines of BRL 20 million. One fine was due to potential polluting activity without a valid license for DRS2, and the other to a drainage pipe discovered during inspections (Hydro, 2019e, p. 4). The license to operate DRS2 allowed operational testing, not full-scale operations. While Hydro claimed they were still in the test phase, IBAMA contested this view alleging that Alunorte were operating on a larger scale than allowed by the license, hence the fine (Leira, 2018).

The Alunorte-situation caused local inhabitants to gather that Wednesday, to protest against Hydro, Alunorte and the damages caused by leakages from Alunorte's deposit. Even though it seems like the authorities was engaged in this particular case, the protestors criticized the lack of action from Paraense state authorities. Reportedly employees of Hydro participated in the peaceful demonstrations. The newspaper applied the initial report form IEC to support its claims of leakage from the bauxite residue deposit and the consequential damages to the local environment (Diarioonline, 2018). The report from IEC was also considered highly credible by Brazilian authorities, including IBAMA who judged the analyses performed by IEC as trustworthy. Hydro contested the claim that their industrial activities could be blamed for the contamination in local rivers. Early in March medical personnel told Hydro that drinking water and sewage had been mixed after the heavy rainfall, and adding many other sources of possible contamination, Hydro stated that any conclusions on causality was too soon (Elvevold, 2018b).

¹⁵ In one of the references "Hydro 2019c" it is claimed that the court ruling was made on 1 March. In the two other documents it is stated that the court made the decision on 28 February. The distinction is deemed to have little relevance for the case and context.

After a visit to Barcarena, state politicians referred to the living conditions in Barcarena as a humanitarian crisis. The politicians also thought that mining companies, like Hydro, had been given too little operational requirements, for example in periods where environmental licenses were granted by commissioning housing to the local inhabitants (Elvevold, 2018b). Procedures for granting environmental licenses require public hearings, but with little opportunity to affect change in mining projects. However, the hearings can, and have been, the basis of complaints to MP and following lawsuits. In August 2012, such a complaint led the court to order a halt of Vale's expansion of the Carajás Railroad (EFC) (Santos & Milanez, 2015, p. 762). However, in December the same year, IBAMA granted Vale an installation license for the construction of the railroad linking the company's mining operations in Pará and Maranhão (Vale, 2012). This case involving Vale and environmental licenses has characteristics resembling the Alunorte-case. It involved community protests and legal devices (Santos & Milanez, 2015, p. 762). The process of obtaining a license, and the reference to the living conditions in Barcarena as a "humanitarian crisis", implies that the Alunorte crisis was a path contingent process, meaning that the present situation is dependent on previous development, in line with MacKinnon (2012, p. 233). This assumption is supported by a local politician's claim that the reasons behind the crisis were structural, and that this needs to be addressed in order to avoid a more severe crisis in the future (Elvevold, 2018b).

In this first phase of the case development, Hydro took several measures. According to the Triple Bottom Line (TBL) theory by Elkington (1999, pp. 2-3) environment, community and business are intertwined, and prosperity in one area is closely related to the success of the two others, combined leading to *sustainability*. So, after the incident, Hydro contributed to local health care, water distribution and supply, decided to invest in a new waste sorting facility and improved its dialogue with the local community. These measures were a reflection of the new, improved CSR-strategy¹⁶ that Hydro deemed necessary to become a trusted partner and thus, in line with Franks (2009), achieve social legitimation to operate (Hydro, 2018b). The social unrest and protests after the incident in February, points to the fact that the previous CSR-measures had been unsuccessful in obtaining social legitimation. The new measures are more consistent with the generalised lessons in how to avoid mine-community conflict that

¹⁶ CSR=Corporate Social Responsibility. CSR is both a corporate strategy and a theoretical discipline.

Franks (2009) deducted from empirical cases, and strengthening the assumption that the past CSR-strategy had failed in avoiding mine-community conflict. In the middle of March, Hydro took measures to preserve jobs at Paragominas and Alunorte, imposing collective vacations on employees (Hydro, 2019e, pp. 5-7). This reflects an important dilemma in the case. There was a conflict of interest in the local community between those depending Hydro for employment, and those who viewed the industrial activity as a constraint on their livelihoods.

Although IBAMA previously had deemed the reports from IEC trustworthy, in a new evaluation they had a different opinion, suspecting the city's sanitation system to be the cause of the contamination (Elvevold, 2018d). A few days after the new statement from IBAMA, Hydro publicly admits to illegal emissions from Alunorte. However, Hydro had information indicating that the factory was not the cause of local water contamination, but that the fault was to be found in poor sanitary conditions in Barcarena (Klevstrand, 2018c). Later it became clear that there had been three unlicensed emissions from Alunorte 17-18 February. This reinforced the lack of trust between the public, the authorities and Hydro. Public prosecutor Richard Negrini exemplified this distrust when he said he feared what else Hydro might be hiding about Alunorte (Bjerknes & Klevstrand, 2018c). In line with the notions by Bridge (2008, p. 413), the authorities have a legal right to grant and retract operational licences and thus they can impose fines and production embargoes on Alunorte based on indicial and proven violations. In addition, Hydro operates their industrial complex in Brazil based on obligated embeddedness, thus they are forced to comply with the terms dictated by the state, they are here subject to obsolescing bargaining. When Hydro's capital was invested in Brazil, it became 'sunk'. Sunk costs are investments that are committed to a particular use, and lost upon a company's exit. Over time assets can become a sunk cost, for example if it has become strategically important or lost value relative to newer and more sophisticated machinery and constructions (Clark & Wrigley, 1997b, pp. 286-287, 294). In Hydro's case, their sunk cost is related to the territorial embedded investment in Pará, and the company's internal infrastructure. Hydro's operational and financial advantage as a fully integrated aluminium company relies on access to raw materials from Paragominas and subsequently Alunorte, in a long-term perspective (Hydro, 2019b, pp. 13, 16). An additional factor that disfavoured Hydro, was the upcoming Brazilian election. One person claimed the emissions was "a gift sent from above" for local authorities and politicians, who could use the crisis to show off their environmental cares. And the Temer-incident in Norway was not favourable for Hydro either. Induced by these incidents, the bargaining power favoured the Brazilian

state at this point in time, they controlled the natural resources through licenses, had the infrastructure and the political will to drag out the process and make Hydro pay (Dicken, 2015, pp. 245-246; NTB, 2010; Stefansen, 2018).

Hydro was in this phase engaged in constructive dialogue with the relevant authorities in Brazil, according to CEO Brandtzæg (Solberg, 2018). Probably as an attempt to avoid problems with emissions during heavy rainfalls in the future, and strengthen their position in relation to the local community and authorities, on 16 March Hydro decided to upgrade the water treatment capacity in order to withstand future extreme weather conditions (Hydro, 2019e, pp. 5-7). Alunorte also actively reached out to the community, for example by inviting representatives from the community into the industrial area and allowing external committees to enter Alunorte for inspections. Hydro also engaged in dialogue with the SEMAS, the environmental authorities in Pará, to resume normal operations. But since Hydro were burdened with many public actors' sanctions, the company also reached out to MP in order to achieve an agreement. MP published a proposal for an agreement 26 March (Hydro, 2019e, pp. 5-9). Two days later, another report from IEC were published, and it did not do Alunorte any favours. It reported that the emissions from Alunorte had an even more severe effect on the local environment than previously thought (Elvevold & Lorch-Falch, 2018). This report has, just as the first one, been discredited by Hydro, claiming that the measurements included communities several kilometres away from Alunorte, and that all heavy metal measurements close to Alunorte were within drinking water quality (Hydro, 2019e, p. 9). But upon entry of the second phase of the crisis, the power balance was still at Hydro's disadvantage.

5.2.2 Phase Two: Diverging Views and Standstill (04.04.2018-02.10.2018)

After a month of negotiations between MP and Hydro, negotiations ended at a standstill 4 April. According to MP, the company broke off further negotiations after declining the terms presented by the public prosecutor's office (Klevstrand, 2018b). Hydro had a different account of what happened. According to Hydro, the authorities cancelled the negotiations when Hydro presented a new draft to an agreement. Alunorte requested to know which terms the public prosecutors disagreed with, but MP chose to leave the negotiations without further explanations. When Hydro's version was made public, state attorney Cazetta confirmed the version Hydro gave. Cazetta said Hydro's draft was unrealistic to the degree that it was not considered a real proposal in the negotiations, and that Hydro had to make accommodations in order to retrieve the licenses the company wanted. Molland from Hydro replied that Hydro

wanted to continue their dialogue with MP, but based on facts. This referred to the contested reports from IEC, which MP relied on to a large extent according to Molland (Klevstrand, 2018g). The power balance was clearly favouring the authorities at this point, illustrated by the explicit speech from Cazetta. The authorities held the key to the licenses, and they would not give it away easily. It is interesting to note that although the state attorneys left the negotiating table, they are willing to provide the journalist from Norway with information about their disappointment in Hydro, their requirements and expectations. In addition, Cazetta remarked the unequal power relationship between the two parties:

*“The negotiations are not about an agreement between equal parties, but about that the company has to convince us that the security around the bauxite residue deposits is good enough, about the water treatment system having enough capacity, and in addition, that they have to contribute with emergency measures for the local population”.*¹⁷

These public remarks could have several explanations. One reason could be to show the public that Hydro were unreasonable, and that the prosecutors were demanding reparations for the local population. It could also be because MP wanted to make it clear to Hydro what they needed to start the negotiations again. Cazetta said Hydro’s first denials, followed by admittances of emissions gave little reason for trust (Klevstrand, 2018g). Both parties wanted to negotiate based on facts, but there were divergent views on what constituted *facts*. The lack of trust, and the fragile relationship between Hydro and MP, empirically show that a low degree of network embeddedness can influence the bargaining power. The advantage went to those who controlled the licences.

When Cazetta made his public statements to the journalist from Dagens Næringsliv, the public prosecutors had already filed a lawsuit against Alunorte, on 4 April. The lawsuit was based on the alleged polluting leakage from Alunorte, and required almost 600 million NOK in reparations for this (Zondag, 2018). Left out from negotiations with MP and being sued for leakages they contested; Hydro decided to counter-sue. Hydro filed a lawsuit against MP requiring a third-party evaluation and thus continued negotiations. Alunorte had to balance the interests of several public authorities, with diverging views on the incident in February, and individual interests and aspirations. Molland from Hydro made it clear that the dialogue

¹⁷ Translated from Norwegian (Klevstrand, 2018g).

between Hydro and Pará state authorities, SEMAS and IBAMA were continued, despite the break with MP (E24, 2018). On 9 April, Hydro publishes a report showing that there was no overflow from the bauxite residue deposit, and no indications or evidence that Alunorte had polluted neighbouring areas. Local authorities and local activists, on the other hand, thought that Alunorte *did* contaminate local drinking water (Norum, 2018). Cazetta replied that he didn't trust the conclusions in the report, due to incomplete consideration of factors. There is some inconsistency in the way the two parties viewed the negotiations, Hydro claimed they had good dialogue with the authorities, while Cazetta contradicts, he says the public prosecutor's office have tried to enter into negotiations, but that the two parties are too far apart to find common ground (Cosson-Eide & Svaar, 2018).

The different perceptions can be attributed to a number of factors, one of them simply being that Hydro meant other public authorities than MP. It could also be tactical, trying to use the media to their advantage. Hydro can gain on being gentle and inviting in their statements, and Cazetta can achieve his goal by showing strength and being explicit about what Hydro had to do in order to restart negotiations, which he knew Hydro wanted, and needed, more than him. A clear indication of how distribution of power played a role in the respective parties' public performance and statements. Although it was clear that the relative bargaining strength was in favour of the public authorities, Alunorte had some cards to play. Both workers in Paragominas, and at Alunorte had demonstrated against the embargoes, and 10 April, Hydro decided to curtail its production at Alunorte's neighbouring aluminium factory Albras with 50% (Hydro, 2019e, pp. 7-8, 10). In addition, workers at Alunorte were worried for the safety after the production restrictions (Vosgraff, 2018), but other concerns were still more prominent for the authorities, than the employees of Albras and Alunorte.

The political climate is highly relevant in Brazil. A local resident in Barcarena said that there were many who would take advantage of the situation because of the upcoming election. The governor of Pará before the election in 2018, Simão Jatene, had publicly supported Hydro, and had been laying low since the incident. Jatene's opponent, at the time Minister of National Integration, Helder Barbalho, got engaged early, and promised drinking water to the local population. The press coverage was good. Professor in developmental sociology, Marcel Hazeu, said it was logical for the politicians to get involved in the case, considering their public mandate. Although Hazeu thought the politicians had a real concern for the local population, the authorities would most likely find a solution with the industry, where the

capital was. Hazeu further said that the election meant that Hydro had to turn to the local population, because they are the ones participating in the election, not the companies (Klevstrand, 2018e). This implies that capital is a valuable power asset for companies, in addition to social legitimation. As noted before, Hydro does not pay for political campaigns¹⁸, and thus have less power and influence, as opposed to mining companies, like Vale. Vale have paid large amounts to political parties and politicians (Dale, 2018). This can help explain the huge difference in reactions after the damaging emission in 2009, when Vale was a majority shareholder, and the reactions after the less damaging emissions in 2018. Governor candidate Barbalho used the case to criticise incumbent Governor Jatene for not being critical enough towards Hydro. Because of the election, it was important for politicians to declare support to the local community, and distance themselves from Hydro (Dale, 2018). Local inhabitant Samuel dos Santos Amorim says that leakages from Alunorte has been going on for years. Amorim concludes that the attention to the incident in February only took place because it was a year of national and regional election (Krokkjord, 2018). So, did this make the Alunorte-case a proxy-campaign, politicians fighting over small disagreements in licenses and emissions, while really, they were running their election campaigns? Although there is no clear answer to that, it seems that politicians capitalized on the combination of the Alunorte-case and the upcoming election in 2018, which in turn benefited the local community in Barcarena. The interconnectedness between Hydro, authorities and the local community clearly illustrates the importance of a network-based model for analysis.

In line with Yeung and Coe (2015, pp. 30-32) this case involving the Brazilian node of Hydro's GPN, empirically supports the GPN-theory in combination with a path dependence-perspective as useful tools to analyse the global economy. The industrial activity had polluted and negatively affected the local community for many years, and conflicts over land stretched back to the military dictatorship and expropriations in the 1970-80s, with no, or minor concessions to the locals previously (Fjordbakk et al., 2018). Suddenly the most important thing for both Hydro and politicians was to gain goodwill from the local population. Hydro needed to mend the relationship with its local community and provide financial support and services to the population, in order to please the authorities and mitigate local unrest, while politicians needed to show environmental care and ability to act against a company who had violated licenses, attempting to get the goodwill of the population before the upcoming

¹⁸ Based on Hydro's explicit compliance to laws and regulations, and the company's own anti-corruption regulations in the Code of Conduct.

election. Rumour had it that José Filho said to members of the congress in Pará, that President Temer wanted Hydro to face severe consequences (Dale, 2018). Brandtzæg admits that the critique from the Norwegian government in 2017 could be a reason for the difficulties, according to some¹⁹. Being asked if Brazilian authorities had mentioned the incident in Norway, Brandtzæg answered that “someone has brought it up in conversations with us” (Elvevold, 2018i). Nerdal (2018b), as Torkjell Leira, noted the unusual quick and serious reaction from the regional and federal authorities, with immediate reactions and politicians eager to start inspections. Two main reasons stand out for this, the humiliation in Norway and the upcoming election. Politicians that had a lot to gain from a prolonged conflict, put Hydro at disadvantage in the negotiations (Klevstrand, 2018e). Nerdal judges Hydro’s strategy of using experts against the government’s experts, and suing the authorities, as bold due to the often close connections between justice authorities in Brazil (Nerdal, 2018b). Seen together with the severe financial and operational implications of the embargoes (Klevstrand, 2019a), this implies that Hydro were lacking bargaining strength, and dared to make a bold move in an attempt to improve its bargaining position.

After a period of little progress, on the 14th of August Hydro were presented with an agreement from state and municipal authorities and MP (Bjerknes & Klevstrand, 2018b). The agreement was concluded 5 September, and consisted of a *Term of Adjusted Conduct* (TAC) and a *Term of Commitment* (TC). The TAC contained commitments regarding Hydro’s production facilities, distribution of food coupons to the local population and social investments. The agreement in itself did not grant operational licenses, but the intention was to use the TAC in court and opt for removal of the embargoes. The disagreement regarding the operational license for DRS2 had been solved in the TAC, the authorities showed strength through endurance and Hydro agreed to get a new license (Klevstrand, Bjerknes, Christensen, & Iversen, 2018). The estimated cost of the agreement was BRL 319 million (Hydro, 2019e, p. 12). While Alunorte initiated their social commitments through community meetings and progression in the Sustainable Barcarena Initiative, they received a report on the 29th of October that said DRS1 would be safe to use for many months. This was important since the new deposit was currently unlicensed and illegal to use (Hydro, 2019e, p. 12). A few days later, new advice from the consultancy firm that had declared the safety of DRS1, were about to change the bargaining power in favor of Hydro (Hydro, 2019e, p. 12).

¹⁹ It is not explicit who said this, the statement is vague: “noen sier at det kan være en årsak” (Elvevold, 2018i).

5.2.3 Phase Three: Turning Point (03.10.2018-25.09.2019)

The new advice from the engineering consultancy was received by Alunorte 3 October 2018²⁰. The current part of DRS1 was no longer safe to use with the applied filter technology (Hydro, 2019e), and the unforeseen advice was to immediately stop using DRS1 (Elvevold, 2018j). The same day, Brandtzæg announces that Hydro will shut down all operations at Alunorte, due to technical advice (Wig & Hovland, 2018a). The industrial infrastructure made it imminent to shut down Paragominas and Albras as well (Wig & Hovland, 2018b). Hydro's CEO was clear that the decision was purely operational, despite speculations of this being political motivated due to the upcoming election. However, Brandtzæg had hopes that the authorities would understand the gravity of the situation (Wig & Hovland, 2018a). The news and the decision to shut down came sudden on politicians as well as Hydro. Eight thousand local jobs were at stake. Local authorities immediately called for a meeting with Hydro. Governor Simão Jatene, head of MP, Ophir Cavalcante, and head of SEMAS, Thales Belo, were all present. Two days after the announcement, thousands of employees demonstrated in favour of Alunorte (Bjerknes, Klevstrand, & Christensen, 2018; Hydro, 2019e, p. 13). The bargaining strength had made a sudden leap, favouring Hydro. The risk of losing the industrial activity, and 8000 jobs had changed the outlook for the authorities and politicians to come victorious out of the Alunorte-situation (Dicken, 2015, pp. 244-245). Where the concerns of environmental pollution and poor living conditions in the local population previously had been the main concern and a source of bargaining strength for the authorities, suddenly the main concern was the part of the population that depended on the jobs that Hydro provided, directly and indirectly. The authorities' bargaining strength must have been further weakened due to the effort that Hydro²¹ had made to comply with implicit and explicit requirements for social responsibility and improvements in operational security. A TNC's ultimate sanction is to pull out of an existing location (Dicken, 2015). In practice, this was what Hydro had decided, however detrimental to their own bottom line (Wig & Hovland, 2018b). Three days after the announcement, Alunorte received exceptional authorization from IBAMA to use the modern press filters to process bauxite residue, and when SEMAS supported IBAMA's decision 9 October, Alunorte resumed with 50 percent production. The

²⁰ Hydro announces this in their summary of the Alunorte-situation. In an article in DN, Thales Belo from SEMAS revealed that the final report was received by Hydro Monday 1 October, two days before the announcement on 3 October (Klevstrand, 2018d).

²¹ (Hydro, 2019e, pp. 5-12)

announcement led to many meetings with the authorities, a positive outcome for Hydro who depended on communication and negotiations in order to resume full production at Alunorte (Wasberg & Forsland, 2018). But despite the efforts from the public agencies to keep Alunorte operational, there was still critical attitudes towards the company. In a public notice, MP repeated the previous accusations and the necessity of reducing Hydro's production by 50 percent. They were still leaning on the report from IEC and discredited the TAC-agreement for achieving too little. MP blamed Hydro for not having obtained the right license for DRS2 earlier (Klevstrand, 2018a).

At this time, the elections are held. Jair Bolsonaro was elected President, and Helder Barbalho became governor in Pará (Mikkelsen, Nilsson, & Tonholt, 2019). Barbalho has been one of the most active politicians attempting to profit from the Alunorte crisis, exemplified through his new-found care for environmental issues and concern for clean drinking water for the population in Barcarena. While playing his cards right from the beginning of the Alunorte crisis, he continued to do so by changing his tactic just before the election when Hydro announced curtailment of all operations. Then Barbalho said he would personally meet with Brandtzæg to solve the crisis after his pending instalment as governor. The outcome in the election was not a bad starting point for Hydro's further negotiations to resume full capacity. Whether Hydro intended to participate in the political game or not, as they claimed, they certainly were part of it anyway (Elvevold, 2018f). Sandra Amori, leader of the Quilombola "São Joao", in Barcarena, was not happy with the turn of events (Latinamerikabrigaden, 2018). The Quilombola São Joao is, in line with previous statements, a community of descendants of African slaves that run away and sought refuge in remote areas. Historically these type of communities have had no legal rights in Brazil, but currently there is a process for obtaining more rights to Quilombola groups (Watts, 2018). From Amori's view, the sudden closure of Alunorte led to huge conflicts in the area, between those who protested against Hydro's industrial activity, and those who were at risk of losing their jobs. The quick solution to the declared production stop made it appear as though Hydro used their power to get a good deal with the authorities. Thus, Amori was concerned that Hydro soon would be running full scale operations again, without the local population's protests being taken seriously. While Hydro offered jobs for some, and community meetings, the community "São Joao" wanted the opportunity to drink clean water from the river and reap from the surrounding nature (Latinamerikabrigaden, 2018). This sheds empirical light on the concept of path dependence (MacKinnon, 2012). The old ways of life are not simply eradicated with

the introduction of modern institutions (Nahum, 2017, p. 1), and in this case the two co-existing paths seem rife with conflicting interests and irreconcilable.

Moving ahead to 2019, and the instalment of a new governor. Keeping his promise, Governor Barbalho met with Hydro 15 January (Bjerknes & Klevstrand, 2019). The same day, SEMAS issued a technical notification saying that Alunorte can operate safely and lifted the production restriction previously imposed by SEMAS (Aass & Bjerknes, 2019). However, the embargo that was ordered by a federal court, still remained active. Barbalho published pictures from the meeting on Twitter (Bjerknes & Klevstrand, 2019), leaving the impression that it was a friendly meeting. Later, Barbalho publicly announced that the ten thousand jobs related to Hydro's resumption of activity was important for Barcarena. Barbalho also said that they (sick.) would give Hydro another chance, but that Hydro had to operate in a sustainable and responsible manner, as they did in Norway (Klevstrand, 2019c). I also interpret the publication of pictures and public speech about the case as a stunt to promote himself as a man of action and solutions. But even if it was a self-promotion, the support was crucial for Hydro's next step. Instead of reaching an agreement with MP and the governor before they went back to the court asking for removal of the embargo as previously intended, Hydro decided to take the case to court without an agreement (Klevstrand, 2019c). The positive signals from SEMAS and Governor Barbalho probably played a part in the decision. At this time, Hydro's relationship with MP was not reconciled, considering that after the public support from SEMAS and Barbalho 15 January, the state prosecutors made a public statement where they referred to the injunction from the Federal court, and Hydro's lack of providing evidence that Alunorte could operate safely, as the main constrictions for Hydro's return to full operational capacity. It was the same day that Barbalho declared his support for Hydro and said they were getting another chance. These diverging statements from public authorities indicates an internal power struggle. Hydro must have felt confident with their newfound support, enough to take the case back to court without the important approval from MP, who ordered the court injunction in the first place (Klevstrand, 2019c).

These aspects of the case raise interesting questions about power in GPNs. It is not only in between main actors such as state and TNC that the power relationship is relevant. The internal configuration of the actors, a network of micro actors one could say, and the following internal power relations and asymmetries are relevant for the outcome in conflicts between main actors on meso or macro level. Micro actors include the individual level, in

which personal honour, ambitions and humiliation becomes relevant aspects of power play at a larger scale. In this case, politicians had personal interests in the Alunorte-case, and their positions granted them enough power to affect the development of the case, within the boundaries of their main actor, the Brazilian authorities. Thus, this shows that micro actors also should be included in the GPN-literature, since they are relevant for the outcome of bargaining processes between main actors in a GPN. The state's internal network can be compared to the internal network of TNCs, which, according to Dicken (2015, pp. 136-141), link the various parts of the organization and explain their relationship to each other. In this case, the different Brazilian authorities, bureaucrats and politicians had diverging opinions and interests, and the power balance between them, which had previously been favouring MP and the court's injunction, was being put to the test by Hydro.

After Hydro decided to take the case to court, they experienced progression in the negotiations with MP. By the end of March 2019, an agreement was signed. It included a third-party evaluation of technical reports and amendments of the TAC. If the third-party assessment supported the conclusions, MP would file a petition confirming that they would not oppose lifting Alunorte's production embargo. On 12 April, MP and Alunorte provided the Federal Court with a joint petition to lift the production embargoes. In the middle of May, the first of two production embargoes are lifted by the Federal Court in Belém, Brazil. On 20 May Hydro see the second production embargo being lifted, and this allowed Alunorte to ramp up to full production again, after more than a year of producing at half capacity (Hydro, 2019e, pp. 15-17). It would take two months before Alunorte could reach 75-85 percent of its production capacity, and the challenge ahead was the embargoes on DRS2. DRS1 was at this point deemed to last for eight to eighteen months, and a license for using DRS2 was crucial for stable, continued production (Klevstrand, 2019b). After more negotiations, Hydro reached an agreement with MP and SEMAS (Frantsovold & Kaspersen, 2019). The 30th of August, Ministério Público Federal, Hydro and Alunorte provided a joint petition to the Federal Court of Belém, to lift the embargoes on DRS2. On the 20th and the 26th of September 2019 the Federal Court lifts Alunorte's two remaining embargoes, respectively (Hydro, 2019e, pp. 16-17). It is not clear exactly how the negotiations progressed in this time period. However, the uncompromising attitude towards Hydro that MP had maintained up until January, changed somewhere between the supportive actions from SEMAS and Barbalho in January, and when the first deal was made at the end of March. The balance of power had gradually changed, initiated by the sudden risk of losing employment. It was publicised by Hydro at a critical

moment for politicians that had an interest in prolonging the crisis until after the election, but not at the cost of losing a corner stone employer in Barcarena. By 2019, the election was concluded and there was little to gain politically on prolonging the conflict. A large amount of jobs were at stake, indicating that politicians and authorities actually had a lot to *lose* from prolonging the conflict. Hydro had paid reparations through fines, financial commitments and social investments, while losing large amounts of money and potential earnings (Hydro, 2019e; Klevstrand, 2019a). The bargaining process had rearranged the value capturing. The arguments that denied Alunorte full scale operations, were losing power, along with the local population who worried about environmental damages due to the local industry.

5.2.4 Phase Four: Final Embargo Lifted (26.09.2019-31.12.2019)

The court decision to remove the final embargo on Alunorte gave the company the opportunity to start using their newest bauxite residue deposit. This was critical for continued production, since the old one almost had reached maximum capacity. The 19-month embargo period had ended. As mentioned, Hydro was not relieved of the embargoes and granted licenses for free. Hydro had committed to paying around 220 million NOK over several years for the community development program “Sustainable Barcarena Initiative”. More than 300 million NOK were to be invested in housing and local infrastructure in the communities near Alunorte. Fines added up to 67 million NOK, and this included fines from emissions in 2009 (Klevstrand, 2019a). This unpleasant heritage from Vale’s days of operation provide even more empirical backing for the claim that path dependence was an important factor in the outcome of the Alunorte crisis. The total cost related to the situation in Brazil in 2018 and 2019 is estimated to 2,4 billion NOK (Klevstrand, 2019a). Not surprisingly, new CEO of Hydro, Hilde Merete Aasheim, and EVP of the Bauxite & Alumina business area, John Thuestad, express positive attitudes and gratefulness to the stakeholders who contributed to the positive outcome (Hydro, 2019a). Considering the company’s territoriality, the dependence on licenses and the possibility for future profits, the positive attitudes are perhaps justified. However, not everyone was satisfied. On the 27th of December, Ministério Público presented an interim account of what various decrees and agreements had cost Hydro. More than a thousand people showed up, and several protest banners could be seen. One banner said: “The TAC-agreement between the public prosecutors and Hydro is a violation of our rights. The people deserve respect”²². The payments Hydro made during the crisis, and those

²² This is from a Norwegian article, translated to English by the author.

they had committed to pay, were never based on admissions of environmentally damaging emissions (Nerdal, 2019).

6 Discussion

In this discussion chapter I aim to compare and evaluate views, arguments and findings from the previous chapter, while looking for answers to the research questions.

6.1 Path Dependence and the Local Context's Influence on the Case-Development

Seeing geography as spatio-temporal, instead of just spatial, helps to explain the constraints and choices faced by GPN actors. The longer a GPN is embedded in a place over time, the easier it is to perceive the impacts of time. This implies that relationships within extractive GPNs, often place-bound, should be considered both in relation to space *and* time (Barratt & Ellem, 2019, p. 1556). The spatio-temporal aspect in analyses of extractive industries has been missing in current policy debates. However, the GPN-approach opens up for relational analysis over time (Bridge, 2008, pp. 393, 401). As discussed in MacKinnon (2008, pp. 1458-1459), path dependence is not deterministic, empirically backed by the development in Barcarena during the 1980s. A new form of economic activity was created when Albras/Alunorte was initiated, and thus an example of *path creation* by exogenous change in line with Barratt and Ellem (2019, p. 1557). Since then, this exogenous change has had a strong impact on the demography, livelihoods and spatial configuration in Barcarena, illustrating *path dependency* (Nahum, 2017, pp. 11-21). According to Cornejo et al. (2010, pp. 35-36), the local community in Barcarena have a history of being dependent on companies for infrastructure and services, leading to the present culture of dependence and lack of social tissue. This institutional legacy is reflected in the unequal and complex conditions currently present in Barcarena.

Another factor that contributed to the reactions in the local community and from authorities after the heavy rainfall, was the legacy of tension and conflict from previous emissions at Alunorte, especially the one in 2009 when Vale was the majority shareholder. The mere fear of a similar situation was enough to cause anger in the local population (Leira, 2020a, pp. 25-26). Representatives for the authorities opt for serious reactions towards Hydro after the emissions in 2018, saying that they had been allowed to operate under too little regulation for a long time (Elvevold, 2018b). State prosecutor Negrini also proclaimed concerns regarding Hydro's gradual acknowledgement of emissions from Alunorte (Elvevold, 2018b). This line of action after accusations of emissions was similar to the way Vale reacted to the emissions

in 2009 (Leira, 2020a, p. 26). In addition to a justified concern for environmental emissions in the local population, it became obvious that there was a lack of trust in Hydro in the local population, going back many years (Bjerknes, 2018), thus strengthening the notion of path dependent and weak network embeddedness in the Brazilian node of Hydro's GPN. The legacy of previous incidents related to Alunorte impacted the process after the incident in 2018. Also relevant for the reactions in the local community, were local conditions in terms of livelihood, housing and (lack of) infrastructure. The changes that were imposed on people in Barcarena with the initiation of Albras/Alunorte, had led to difficult living conditions for many. People relied on the nature that was still possible to utilize, and pollution had severe consequences for their livelihoods and lives²³. Although Hydro did not participate in initiating and constructing Alunorte, Hydro's GPN was affected by the historical contingency of Alunorte, in essence illustrating the concept of *path dependence* in line with Barratt and Ellem (2019, p. 1557). A previous version of Alunorte's GPN, then controlled by Vale, impacted the current configuration of Hydro's GPN, and this is necessary to understand the contemporary arrangement, also exemplified by the BHP's Pilbara GPN-case in Barratt and Ellem (2019, pp. 1558-1562)

Pollution in Barcarena was not new, and the emissions in 2018 probably didn't have a large impact on the local environment. At least not compared to the bauxite residue spill in 2009, that according to Leira (2020a, pp. 168-169) led to dead fish floating in the river. This time there were additional forces at play. Temer's humiliation after his visit to Norway in 2017, led to rumours that the Alunorte-incident gave the Brazilian authorities an opportunity for revenge (Nerdal, 2018b). In addition, the cultural characteristics of Brazil; high power distance, high individualism and medium masculinity (Dicken, 2015, pp. 178-179), supports this standpoint. A culture with those characterizations is, according to Hofstede (2011) and his model of national culture, more prone to expect respect for authorities, protective of one's own interests, and reactions are more likely to be based on masculine values, such as being *strong* and *ambitious*. The critique from a small country like Norway must have been seen as inappropriate and the incident at Alunorte provided an opportunity to show muscles, reacting against the Norwegian company. The incident, along with the local context and legacy, were a "gold mine" for politicians pursuing victory in the upcoming election (Elvevold, 2018f). These aspects of the Brazilian node of Hydro's GPN illustrate the broader,

²³ Referring to chapter 5.1 in this thesis.

more complex network that Alunorte is a part of. GPNs are economic and political phenomena. Within the GPN, actors struggle over the construction of economic relationships, governance structures, institutional rules and norms and discursive frames (Dicken, 2015, p. 57). All global production networks operate within multiscalar regulatory systems, and for the Brazilian node of Hydro's GPN this meant that they had to oblige to Brazilian regulations and norms, Hydro was *territorially embedded* within Brazil. In this node, Hydro was subject to the state's particular political, social and cultural influence in line with Dicken (2015, p. 61). The Brazilian saying "Brazil is not for beginners" implies the tough conditions newcomers can experience if they don't know and understand the local practices. Hydro had had operations in Brazil for many years, but the crisis-management indicated a lack of understanding for local community, regulations and politics (Leira, 2020a, p. 61). Hydro's lack of cultural and structural understanding is also reflected in the case study about CSR and social conflict centred around Hydro and Vale in Barcarena, by Hoelscher and Rustad (2019, p. 107). Since Hydro's operations are territorially embedded in Brazil, the Temer-incident and the upcoming election became part of the intricate relationship between Hydro and Brazilian authorities after the heavy rainfall in February 2018. The complex structures within a GPN result in power play between firms and states (Dicken, 2015). These two discussed political aspects present in the Alunorte-case, can be seen as motivations for the authorities to take action, reinforcing the reactions from the authorities grounded in actual violations.

The election strengthened the position of the local community, because people were going to vote, not the company. Politicians showing concern and taking action in favour of the local community could lead to electoral support (Klevstrand, 2018e). This connects the history in Barcarena to the present situation. The poor housing close to the factory, the lack of sanitary infrastructure like piped water and a proper sewage is an inheritance from the lack of infrastructural planning and development. The industrial activity's footprint in the local community, the societal changes and rising inequalities that followed the expropriations are all examples of a development that led to the characterization of Barcarena as "a humanitarian crisis" in Elvevold (2018b). Contrafactual, if the local population had decent housing, publicly planned for at a distance from the industrial activity, sanitary infrastructure were in place, and people had jobs and access to a wage that could buy them food and drinking water, it is likely that the incident at Alunorte would have little impact on their lives and daily concerns.

These conditions in Barcarena, combined with the accusations of environmental emissions, provided an opportunity for politicians to show their ability to take action against a company whom many associated with negative local impacts.

According to Leira (2020b) corruption is common in Brazil, but Hydro has zero tolerance for corruption. In a study by Hoelscher and Rustad (2019, p. 105), local residents in Barcarena claimed that Vale paid off community leaders during the decade before Hydro's acquisition in 2010, in return for support for Vale's operations, or to avoid social conflicts. So there is the possibility, that the Alunorte-case would have ended in Hydro's favour sooner, if they had been willing to make illegal payments; although that would most likely have put them in an even worse situation later (Leira, 2020b). Hydro had previously been doing business with the local mayor's companies, mainly for the construction of DRS2 (Eraker, Sachse, & Kumano-Ensby, 2018). This unfortunate connection, and the general corruption in Brazil, were sources of distrust for the local community and in between actors in the GPN. The divergence of opinion within public institutions and local community, and the relationship between local community, authorities and Hydro, illustrates the complexity in the relationships that constitute a GPN. Overall, the network embeddedness of Hydro's Brazilian node seems weak. These interconnections empirically support the theoretical model of GPN, illustrating how flows, places and their dialectical relationship on several scales interact in relation to each other, in line with Dicken (2015, p. 71); Henderson et al. (2002, p. 438).

GPN has been critiqued for not looking closely at *intra-firm* relationships, as an important factor in the constitution of a GPN (Coe et al., 2008). I extend this critique to include the internal and personal relationships of all actors within a GPN. As illustrated here, each actor in a GPN have an internal constitution, including actors on micro level, with diverging motives and opinions. The internal constitution of each actor in a GPN is subject to an internal power struggle and this is decisive for the broader network dynamics. Territorial asymmetries in a GPN leads to complex bargaining processes where there is no unambiguous and predictable outcome (Dicken, 2015, p. 248). I would argue that diverging interests inside and in between actors also contribute to these complex bargaining processes. Next up, I will look into the implications of this for my case study.

6.2 The Dynamics of Bargaining Power

The bargaining process between states and TNC's is dynamic. In this chapter, I will explore how bargaining power was distributed between Brazilian authorities and Hydro for the duration of the Alunorte crisis until the end of 2019, and how the bargaining process was affected by historical and local conditions, as well as the case development in itself.

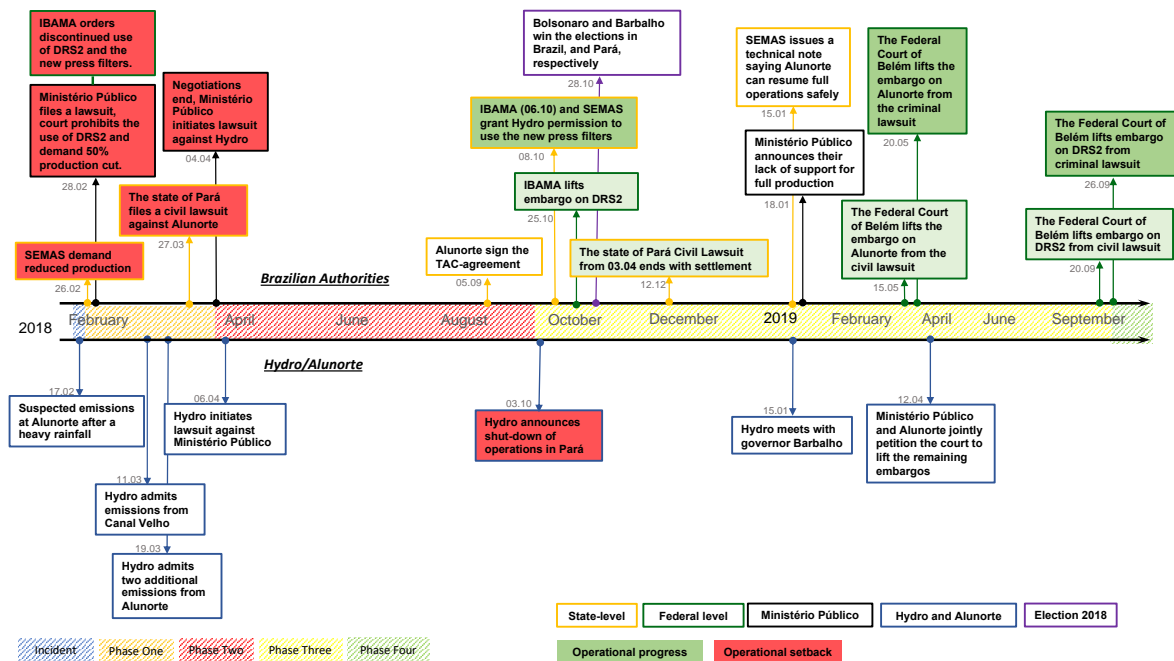


Figure 8 The dynamics of bargaining power²⁴.

6.2.1 Phase One (26.02.2018-03.04.2018)

According to GPN-theory and the concept of *obsolescing bargaining* discussed in Dicken (2015, pp. 245-246), Hydro's investment in Brazil in 2010 should lead to a shift in the bargaining power between Hydro and the Brazilian state. The heavy rainfall in February 2018 in Barcarena, along with concerns from local inhabitants and reports from IEC, (Elvevold, 2018d; NTB, 2010) can be seen as a catalyst for the Brazilian state to play out their bargaining strength. The geographically locked investment now became a source of bargaining strength for the authorities, illustrating *obsolescing bargaining* in line with Dicken (2015, pp. 245-246). The incident was an opportunity for Federal politicians, such as Filho, and candidates for the upcoming election, such as Barbalho, to gain personal or political advantages. Politicians gaining from a prolonged crisis and heavy sanctioning (Stefansen,

²⁴ The dynamics of bargaining power and the critical events in the bargaining process between Hydro Alunorte and the Brazilian authorities. Created by the author of this thesis. See Appendix A for larger version.

2018), weakened Hydro's bargaining position. In order for Barbalho, and other authorities, to politically benefit from this crisis, they had to gain support from the local community, by showing them that they cared about the locals' situation and taking action against a company accused of environmental emissions. The history and local context of Barcarena facilitated the possibility to politically gain from the Alunorte-incident, implying a strong sense of path dependency and its important role in the balance of power within GPNs. Brazilian authorities at different levels were also acting within this frame of historical development and local context. Ministério Público took legal action after the incident, and the authorities were granted injunctions against Hydro curtailing their production (Klevstrand, 2018f), illustrative of the authorities' bargaining power. However, the court's decision was largely based on the report by IEC, which IBAMA later renounced. The variety of government actors and opinions that Hydro had to relate to, illustrates that the internal constitution and power balance of actors is of high importance in bargaining processes.

The power balance clearly favoured the authorities immediately after the incident. The state and the Federal authorities already had Hydro "stuck" in Pará due to the territoriality of the bauxite and the 'sunk costs' of the investment, including the reliance on raw materials from their own value chain. A disruption in Hydro's internal alumina production, could threaten the consecutive production sites in Hydro's value chain. Then Hydro would have to buy alumina on the free market, likely to higher prices than normally expected (Hovland, 2018). These aspects were constraints for the company. The alleged emissions, violations of licences and court orders reinforced the authorities' bargaining position. This is reflected in the social measures and technical investments Hydro made or planned to make, much of it as required by various public actors in the GPN (Hydro, 2018b). Heddeland (2019, pp. 68-69) concludes that the most powerful stakeholder in the Alunorte crisis was the local community, because of Hydro's proactive stance towards CSR in Barcarena after the incident. Although it might be argued that the local community was an actor that got their bargaining strength increased due to this crisis, I would say that the actual strength laid in the hands of Hydro and the authorities. I argue this because commissions to the local community depended on the interests and bargaining strength of the authorities and Hydro. Hydro needed to gain political and public support for their operations in order to resume full production, and the authorities and the judicial system decided when and if Hydro had satisfied set requirements. There is of course the possibility that Hydro also would have taken similar measures of community action even if the state didn't require them to, but Hydro's goal was not to strengthen the local

community, it was to “*resume full operations at Alunorte*”²⁵. And the fact remains that most of the CSR-measures were taken due to agreements between Hydro and the authorities or court decisions (Bjerknes & Klevstrand, 2018a; Elvevold, 2018g; Klevstrand et al., 2018).

In this first phase, Hydro was dependent on, and was in continuous negotiations with Brazilian authorities after the embargoes were commenced. But the inconsistent admissions of guilt led to concerns regarding Hydro’s credibility within the Ministério Público (Bjerknes & Klevstrand, 2018a, 2018c). This inconsistency seems to have weakened Hydro’s bargaining position even further. In addition to the fact that Hydro was negotiating under *obligated embeddedness*, and thus dependent on the authorities’ approval to ramp up production, they did not possess enough bargaining strength to impose their will, at this point (Dicken, 2015, p. 233). This asymmetric power relationship was about to take a turn to the worse for Hydro.

6.2.2 Phase Two (04.04.2018-02.10.2018)

The negotiations ended in the beginning of April, on the terms of the public prosecutors (Klevstrand, 2018b). This was an impediment for Hydro’s progress in the case. The authorities’ bargaining power was strong, but not strong enough to get Hydro to agree to terms they strongly disagreed with. The problem for Hydro was that the authorities had little to lose on breaking off the negotiations, while Hydro had a lot to lose if they couldn’t even negotiate for an agreement to lift the embargoes. In addition to ending the negotiations, Ministério Público filed a lawsuit against Alunorte due to the alleged leakages. Left outside, Hydro must have considered the bold move to counter-sue a good option. Hydro sued for the right to negotiate based on a third-party evaluation (E24, 2018). At this point, Ministério Público even controlled the access to negotiation. The relative demand for resources that the authorities had control over, and the political situation representing a strength instead of a constraint, made the authorities the stronger part in the bargaining process. There were some protests by Hydro employees in Pará (Vosgraff, 2018), but it did not change the dynamics of the bargaining process. However, after lasting negotiations with various authorities, Ministério Público and local and regional authorities presented a suggestion for an agreement in August 2018. Hydro agreed to their terms with some adjustments, mainly over words expressing Hydro’s liabilities. The agreement had several commitments for Hydro in the local community around Alunorte, and was a step in the right direction to resume full operations

²⁵ Quote from the book «Kampen om Regnskogen. Sannheten om Norge i Brasil» (Leira, 2020a, p. 98)

(Klevstrand et al., 2018). The relative bargaining power skews slightly towards Hydro when this deal is signed. The local community is granted concessions, which the authorities consider sufficient to require from Hydro, and which Hydro consider acceptable to commit to.

However, the struggle towards full production was not over. And the approaching election in Brazil made no favours to Hydro's bargaining strength. Supporting the local community against Alunorte was important to gain electoral support. Hydro does not support any political candidates, which left politicians without connections and loyalty towards Hydro. In 2014, Vale for instance paid around 200 million NOK in electoral support (Dale, 2018). These connections must be included when looking for explanations of the different reactions after the emissions from Alunorte in 2009 and 2018. The effort to gain electoral support implies that the local community did have some kind of power and agency, and that their ability to get what they wanted was strong before the election. However, the development after the geographical reordering of Barcarena in the 1980s had led to a local community consisting of many factions with diverging interests (Nahum, 2017). There were in particular conflicting interests between those living under poor conditions close to the factory, and those that were working for Hydro (Krokfjord, 2018). This had implications for the next phase of the bargaining process.

6.2.3 Phase Three (03.10.2018-25.09.2019)

As stated in the analysis, when Hydro learned that they could no longer use their old deposit, DRS1, safely, the company immediately started the process of shutting down all operations at Alunorte. Due to the value chain of aluminium production and Alunorte's close ties with Paragominas and Albras, the shutdown had direct consequences for the operations at these two sites as well (Wig & Hovland, 2018b). In a way, this can be seen as a sudden, external shock changing the path or course of the case. Alternatively, the news rushed the development already underway with the TAC-agreement. However, the risk of losing more than 8000 jobs in an already poor and fragile community, led to immediate action from the authorities. As mentioned, Hydro got invited to meet with the leaders of both Ministério Público, SEMAS and the regional government. In line with Dicken (2015, p. 244), employment were progressing to become a more prominent power resource than environmental concerns in the local community, and operational licenses from the authorities; and this asset was controlled by Hydro. Both IBAMA and SEMAS quickly made allowances for Hydro in order to

continue production at 50% capacity (Hydro, 2019e, p. 13). But the most critical negotiation partner, Ministério Público, did not budge in their view of Hydro.

Just days before the Brazilian election, the sudden power shift led to a strategic change in governor candidate Barbalho's approach to the Alunorte-case (Elvevold, 2018f). While appearing to have been on the side of the environmentally concerned local community throughout the crisis, when large scale employment was at stake, he pronounced personal responsibility for solving the crisis, and thus saving the jobs, after winning the election. Local activists were disappointed and accused Hydro of using the situation as a power resource against the authorities (Latinamerikabrigaden, 2018). Even if Hydro denied any accusations of political schemes, the consequence was that both the authorities and the local community lost bargaining strength when Hydro put one of their most valuable assets into play. Although many aspects are present in an election, the Alunorte-case appears to have been an asset for Barbalho. Barbalho's promise to solve the situation probably strengthened Hydro's position, since it would make the new governor look bad if he failed in this. And immediately after his inauguration, he reached out to Hydro and opted for a solution to the production embargoes (Bjerknes & Klevstrand, 2019). The promise made by Barbalho implies that personal prestige is an important element in bargaining processes. At this time, it had been around ten months of reduced production and insecurity for Hydro at this point, and the company had made an effort to improve their relationship with the local community, in terms of communication, projects and investments. In addition, the election was over. The mere length of the crisis and the inherent cost for Hydro can also be considered an increasing strength for Hydro, since it eventually could lead to losses too great to bear, or weaken Brazil's position in international financial markets. This must have weakened the relative bargaining power of the authorities, and hence the local community. The biggest obstacle for Hydro at this point, seems to have been the irreconcilable attitude from Ministério Público, and the legally imposed embargoes. But gradually, since the announcement of production curtailment, Hydro's power assets augmented, strengthening their bargaining position.

Hydro made use of this increased bargaining power despite the lack of support from Ministério Público. After deciding to bring their case to the court, progress with Ministério Público followed. Details of this progress are not known, but from publicly available records this was the likely order of things (Hydro, 2019e). Hydro attained support from the public prosecutors to jointly ask the court to lift the production embargoes, which were lifted one

after the other from June to September 2019. Hydro's strongest power assets seems to have been the commissions to the local community, which facilitated the authorities' reconciliation with the company, and the employment their operations provided.

6.2.4 Phase Four (26.09.2019-31.12.2019)

So, when the final embargo was lifted, and Hydro could both produce on full capacity and use their newest bauxite residue deposit, the power balance between the authorities and the company seemed to be equalled out, back at the fragile equilibrium that existed before the Alunorte-incident in 2018. However, the Brazilian authorities certainly had showed their strength and capabilities, and considering the process and the cost it had for Hydro, the power balance after the crisis was settled, probably favoured the authorities. Hydro has reason to act responsibly, in compliance with legal obligations and licenses. An additional way to strengthen Hydro's bargaining power, is to better their relationship with the local community, continuing the work that was initiated after the crisis, especially the *Sustainable Barcarena Initiative* mentioned in Hydro (2019d). As already stated, this implies that the local community has power assets, such as securing Hydro social legitimation to operate. But representatives for the local community protested against the TAC, and made clear their disappointment in Hydro and the government regarding the solution to the crisis. Although both workers and those worried about environmental pollution in their vicinity got something out of the crisis (keeping their jobs and being granted concessions), the last group were not satisfied and were preoccupied with the same concerns as before the crisis as implied by Nerdal (2019). This indicate that the internal constitution of actors and micro-actors in a GPN is important when analysing power balances within a GPN. Due to the path dependency of Barcarena, the local community consisted of various internal groupings and individuals with diverging interests. In a way this implies that the local community was both an asset and a constraint, contributing to determining the bargaining power between the authorities and Hydro.

The ecological cost of extraction, the transformation or destruction of natural capital in order to produce goods, is favouring the TNC as long as the local community are not fully compensated for the damages generated by extraction and industrial production (Santos & Milanez, 2015, p. 763). The local community of Barcarena has lost value in terms of environmental degradation (Hoelscher & Rustad, 2019, p. 107), value that normally has been created and captured by the company and employees, but the Brazilian authorities have also

been on the receiving side of value. However, after the Alunorte-case and the following TAC-agreement and fines, more value has been captured by the local community and the government. The Brazilian authorities holds the ultimate power over both Hydro and the local community, as they control access to resources and must be considered responsible for regulations, the societal infrastructure and public financial prioritizations, in line with Dicken (2015, p. 244). However, as this case study illustrates, the value of power assets is dynamic and relative to each other. And these power assets, along with constraints, determined the relative bargaining power between the actors in Hydro's GPN.

7 Conclusion

The analysis provides empirical support for the GPN-theory. The network perspective is useful for analysing complex cases like the Alunorte-case, it would be insufficient to examine the case from a single actor's perspective. However, the approach has been backed by the concept of path dependence in order to provide explanatory power, thus expanding the application of GPN-theory. The network approach provided the complex constellations in the Alunorte-case with the opportunity to structure the findings into comprehensible sections. In addition, the GPN-framework opened up for an examination of the processes within the network, including the spatio-temporal development and bargaining process in this case. However, the network approach's advantage in Hydro's complex and extensive GPN, was also its weakness. Attempting to encompass all aspects of a GPN can end up with shallow results. Therefore, I found it necessary to identify a focal point, which in this case has been the power distribution between the authorities and Hydro within a specified timeframe. In order to make an analysis of the situation feasible, I defined a case, aspects and concepts that has shed light on my research questions.

7.1 The Research Questions

As illustrated by the four phases in the Alunorte-case, bargaining power is dynamic. The bargaining process between the authorities and Hydro was influenced by the case's corresponding history, meaning that it developed on the basis of previous conditions and actions. Figure 8 illustrates the four phases of power distribution identified in my research. In the beginning of the first phase, the authorities had most bargaining strength, relative to Hydro. Hydro's position was weak, both in the local community and within the authorities. Politicians recognized an opportunity, and used their influence to support actions against Alunorte's operating capacity, thus reinforcing the authorities' bargaining strength. Considering the local history with environmental emissions and lack of serious consequences for companies, in this phase it was legitimate for Hydro to expect a quick solution, and this can perhaps explain the company's insufficient reactions. The reactions, that also support a path dependent perspective, became another constraint on Hydro's bargaining power.

The bargaining process entered a new phase when Ministério Público chose to leave the negotiations. Hydro's way back to full operations was conditioned by progress in negotiations with the authorities. In phase two, the authorities used their bargaining strength to prolong the

curtailment. Hydro attempted to invalidate and contradict the reports from IEC, which might have negatively affected Hydro's bargaining position since they were perceived as arrogant and not willing to take responsibility for their violations. In phase three, employment became the most critical asset. This was controlled by Hydro. Other factors also favoured Hydro's bargaining power, since many concessions had been granted and it could not be proven that the emissions from Alunorte had caused damage. In addition, the decision to shut down came at a critical moment for politicians, only days before the election. The value of this asset is reflected in Figure 8, where the announced shutdown indicates a turning point in the bargaining process. However, I argue that it is the accumulation of measures during the bargaining process, and thus the combination of factors, that initiated the gradual return to full operations during phase three, although the employment asset triggered the change in bargaining power. Phase four started when all embargoes on Alunorte had been lifted. At this time, Hydro and the authorities had returned to a fragile equilibrium; normal industrial operations, operational licences granted and dissatisfied members of the local population. I would still argue that the relative bargaining power favoured the authorities in phase four, due to the power demonstration succeeding the heavy rainfall in February 2018. Brazilian authorities had proven their capabilities in controlling territorial access.

Many factors in the local history and local community affected the development in the Alunorte-case. Hydro's sunk cost could be considered a part of the path dependent, territorial embeddedness which was an *asset* for the authorities, and a *constraint* for Hydro. The uneasy history Hydro had with parts of the local community in Barcarena was another constraint. When Hydro acquired assets from Vale in 2010, they became *locked in* to a distinctive path, reliant on internal supply of bauxite and alumina. The sunk cost of the investment contributed to the path dependent lock in. Further, the legacy from the initiation of Albras/Alunorte, from the experienced environmental degradation, from the lack of community engagement and Vale's emission in 2009, is explanatory for the local community's reactions. The local community is a result of its own history, illustrated by the partly modernized and partly traditional community resulting in poverty and inequality. This context is imperative to understand why the Alunorte-case progressed as it did. The poor living conditions augmented the fear of contamination and thus this reinforced already present opposition to Alunorte and Hydro. In addition, the local population protested against the authorities. These factors can explain how it was possible for politicians to benefit from this case, opting for electoral support and personal prestige. This connects path dependence, sunk cost and local community

context and history with the power relations within a GPN. Combining these theoretical concepts with the GPN-approach has given this case explanatory power. The outcome of a process is contingent on its own history, and thus history conditioned the development in the bargaining process.

The aspects discussed and concluded with are all relevant in explaining why this situation became difficult and costly for Hydro. The identification of factors that led to, enforced and sustained Alunorte's crisis is a contribution to crisis management. The company's lack in understanding local conditions and adapting its communication strategy, historically a lack of community engagement and investment, lack of investments in the water treatment system, and actual violations of licences are illustrative of insufficient management. The legacy from the accumulated grievances in Barcarena and the legacy from Vale's emission in 2009 gave the local community reason to protest, and necessitated action from the authorities. Further, the upcoming election meant that politicians could benefit from the situation, especially if it continued until the election was over in October. International relations between Norway and Brazil also affected the duration and severity of the Alunorte-case. After the humiliating visit to Norway, politicians' personal prestige could be restored by punishing the Norwegian company. The Brazilian culture of corruption and connections between politicians and companies, alongside Hydro's zero-tolerance for corruption and political financial support, probably also contributed to a prolonged, and thus more costly, process. This implies that politics on three different scales, international, national/regional and personal level, complicated the situation for Hydro.

7.2 Theoretical Contribution and Generalisation

The results in this case study has theoretical implications for GPN-theory. The two core values under scrutiny, *embeddedness* and *power*, are interdependent. Although *value* has not been a focus here, it is also relevant. These principal elements are in themselves part of the network interconnectedness commonly described in GPN-theory. This case further illustrates the relevance of path dependence and sunk cost, and local context and history, as factors that influence power relations. The temporal aspect of a dynamic network should be included in analyses of power distribution, since the configuration at any given time has implications for the later development, as indicated by path dependence. Politics and network embeddedness impact power distribution within GPNs. Both the internal configuration of actors in the GPN,

and macro-scale actors such as countries and international relations, impact the outcome of bargaining processes in GPNs.

The bargaining power is also affected by embeddedness. Based on the results in this case, I would argue that a TNC's bargaining power is constrained by a high degree of territoriality and obligated embeddedness, but even further impeded if it is combined with a low degree of network embeddedness. This implies that companies with territorially embedded operations should take action to achieve network embeddedness in order to strengthen their position within the GPN. Thus, high degree of network embeddedness can be an asset for a TNC, just as a low degree of network embeddedness can be a constraint. Trust between actors in a GPN and cultural adaptation is important to achieve network embeddedness.

Path dependency accounts for why history and local context are important aspects in a bargaining process. When obligated embeddedness occurs within a spatial area, past and inherited grievances favours the bargaining strength of the state controlling the territory, and constraints the TNC. These two aspects can constrain the TNCs bargaining power in places with inherited grievances, inequality and environmental degradation. After a crisis has occurred, the reactions from the TNC will impact the bargaining process. The extent of impact is reflected in the degree of network embeddedness, past events and local context. The local history has shaped and constrained the present. Path dependence can lead to lock in and sunk cost, which constrain the TNC and becomes an asset for the state.

The results here imply that employment and territoriality are two of the most powerful assets for a TNC and a state in an extractive GPN, respectively. But both of these assets are influenced by a variety of other assets and constraints. Territorial lock in and sunk cost that follow path dependency lead to few alternatives for the TNC's investment unless it is willing to consider the investment a loss and *exit* from the territory. If the TNC decide to leave, or shut down, the state must reconsider the importance of the TNCs operations, relative to its requirements for territorial access.

Another interesting approach to this case, could be to map Hydro's dynamic GPN, and identify the consequences of the Alunorte-incident and how the network-configuration changed. Also, one could choose a similar situation with emissions by a different TNC, and do a comparative study between GPNs. This would be useful for making further theoretical

generalisations by confirming or contradicting the conclusions in my thesis. But for now, this thesis illustrates the value of combining concepts in order to provide the analysis with explanatory power. This analysis also provides useful knowledge for crisis management. And hopefully, the analysis of the bargaining process and the theoretical contribution can be useful to achieve sustainable, stable and profitable business operations.

8 References

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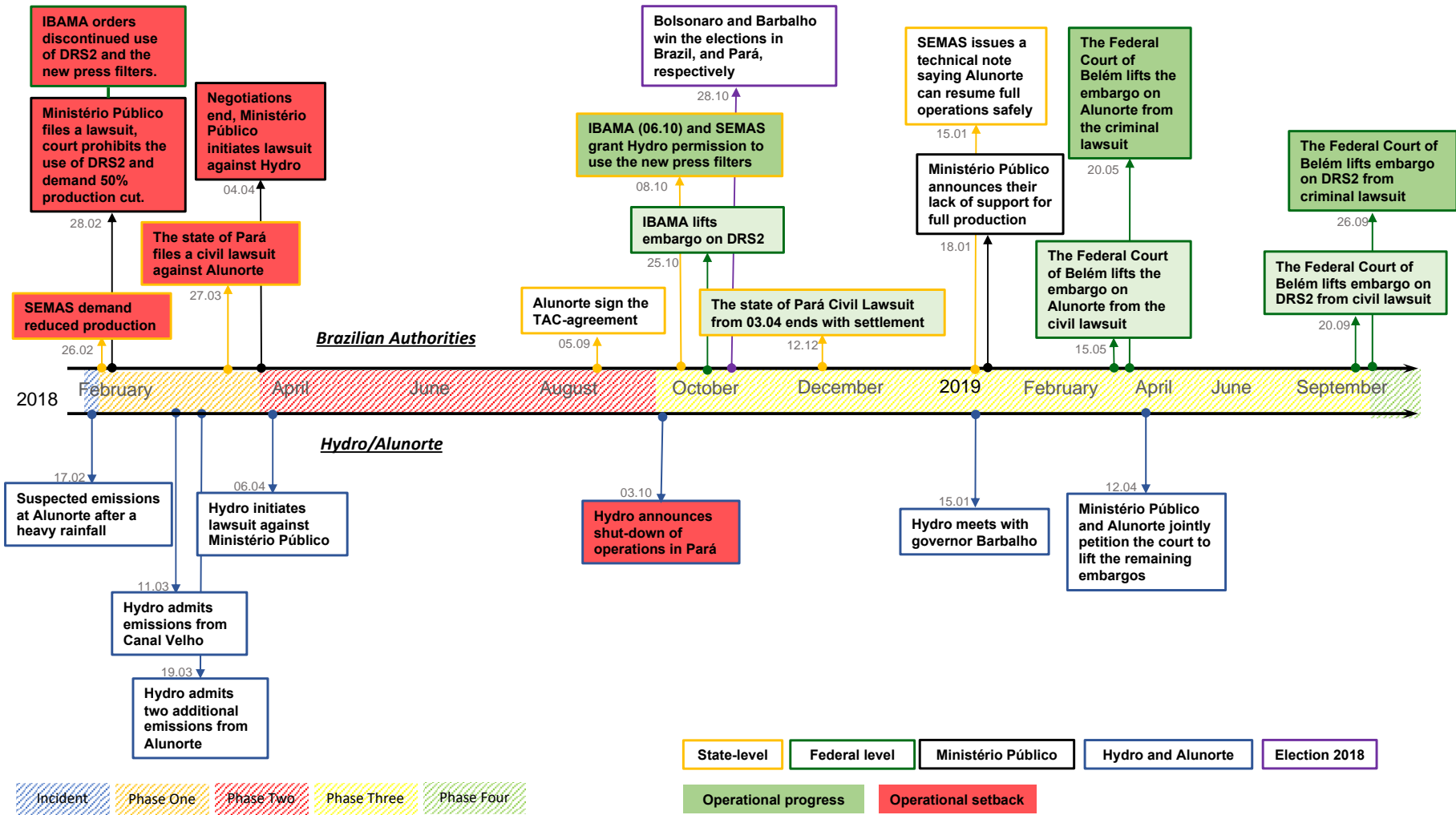
9 Appendices

Appendix A: *The Dynamics of Bargaining Power*

Appendix B: *Timeline Alunorte-situation*

Appendix C: *Transcription of answers from Torkjell Leira*

Appendix A: The Dynamics of Bargaining Power



Appendix B: Timeline Alunorte-situation

Working document

Local municipality-level

Regional government of Pará-level

State-level

Non-governmental organizations and institutions

Hydro – Company-level

Legal action

SEMAS – the Secretary of State for Environment and Sustainability (Environmental agency in the state of Pará) p. 73 Hydro report 2018

IBAMA – Brazilian Institute of the Environment and Renewable Natural Resources (a federal environmental agency under the Ministry of Environment) p. 73 in Hydro report 2018

SEMADE – the Secretariat of Environment and Economic Development of Barcarena (environmental agency in the city of Barcarena) p.73 in Hydro report 2018.

SGW Services – a Brazilian environmental consultancy p. 73 in Hydro report

Ministério Público – påtalemyndighet og ombudsmann

Dato	Hva	Aktør	Lenke
26.02.2018	SEMAS demand reduced production at Alunorte due to not reaching 1-metre freeboard in DRS1 within the given 48-hour deadline.	SEMAS, Alunorte	Hydro
28.02.2018	The State Public Prosecutor's office filed a criminal lawsuit against Alunorte alleging a leakage/overflow of the bauxite residue deposits to the external environment and environmental damage. Court determined prohibition on use of DRS2 and reduction of the production to 50%. Referred to federal court, who maintained the injunction pending further decision.	p. 260 Hydro report 2018	Lenke
02.03.18	Konsernsjefen i Hydro blir gjort oppmerksom på bruken av Canal Velho, ni dager før selskapet bekrefter ulisensierte utslipp i offentligheten.		E24
03.03.2018	Trade Unions requested an injunction to avoid dismissals at Alunorte without negotiating with the Union. The Labour Court of the district of Abaetetuba granted such injunction but was overturned by the court of Appeal.	p. 260 Hydro report 2018	Lenke
05.03.2018	Hydro får avslag på en søknad om å gjenoppta produksjonen på anlegget DRS2, i den lokale domstolen i Pará. Hydro fokuserer på å etablere dialog på føderalt og delstatlig nivå.		E24
11.03.2018	Hydro admits emissions from Canal Velho		E24
16.03.2018	CAINQUIAMA - Associação dos Cablocos, Indigenas e Quilombolas da Amazônia (local	p. 260 Hydro report 2018	Lenke

	community association Barcarena). Filed a lawsuit against Norsk Hydro Brasil, Alunorte and the State of Pará . Claims intentional discharge of chemical waste and that the bauxite residue deposits were in operation due to fraudulent license granted by the state of Pará . Claims deposits are located on ecological reserves. Judge partially grant injunction, companies must cover cost of health tests on people allegedly affected by the claimed pollution.		
19.03.2018	Hydro innrømmer nye utslipp fra Alunorte, selskapet har fått nye advarsler fra miljømyndighetene		NRK DN
27.03.2018	Collective lawsuit filed by IBS (Barcarena's Social and Environmental Institute) against Norsk Hydro Brasil, Albras, Alunorte, Imerys, Alubar, the Municipality of Barcarena and the State of Pará to seek remediation of the environment and compensation for material and moral damages. Referred to Federal Court 02.08.2018.	p. 260 Hydro report 2018	Lenke
28.03.2018	IEC legger frem sin andre rapport, som viser at utslippene er verre enn antatt		E24
03.04.2018	The State of Pará filed a civil class action to recover environmental damages allegedly caused by Alunorte , and indemnification for alleged material and moral damages. 09.04.2018: Court ordered Alunorte to present a guarantee BRL 150 mill. 12.12.2018: Settlement		Lenke
04.04.2018	Negotiations between authorities and Hydro end.		DN
04.04.2018	The State and Federal Public Prosecutor's office (Ministerio Público) files a lawsuit against Alunorte, Norsk Hydro Brasil and the State of Pará . 30.04.2018: The Federal Court partially grants the injunction, determining a similar embargo previously granted by a State Criminal Court. State of Pará was excluded from the lawsuit.	p. 260 Hydro report 2018	Lenke
06.04.2018	Hydro files a lawsuit against Ministério Público , in order to continue negotiations.	Hydro, Ministério Público of Pará	E24 NRK DN
09.04.2018	Hydro legger frem to rapporter som bekrefter tidligere uttalelser om at det ikke har vært overløp fra rødslamdeponiene, og at det ikke finnes indikasjoner eller bevis på at Alunorte har forurenset lokalsamfunnene i nærområdet etter det kraftige regnværet.		NRK
15.05.2018	CAINQUIAMA files a new lawsuit against Mineração Paragominas, Albras, Norsk Hydro Brasil, Alunorte, INMETRO (National Institute of Metrology), BVQI -CERTIFICADORA LTDA;	p.260 Hydro report 2018	Lenke

	<p>Federal Union of Brasil, National Department of Mineral Production («DNPM») in the Federal Court in Paragominas. Similar claims as before, in addition to claims against Paragominas, requesting injunction to stop the operation of Paragmoinas.</p> <p>18.06.2018: Court denied request.</p> <p>23.10.2018: Case referred to Belém pending further decisions.</p>		
05.09.2018	<p>Alunorte sign two agreements with the Government of Pará (TAC &TA) and Ministerio Público (TAC). SEMAS was also part of the negotiations.</p>	p.76 Hydro report 2018	<p>Lenke DN</p>
12.09.2018	<p>ADECAM (Association of Education, Culture, Protection and Defense of Consumers, Taxpayers and Environment of Brazil) filed a lawsuit in the Federal Court of Belém against Alunorte, Norsk Hydro Brasil, the Federal Union and Ibama (the Federal Environmental Agency) seeking compensation for alleged moral damages to the people of Pará, the heavy rainfall in February as main ground for the claim. Accusations of pollution (overflow and leakage of bauxite residue deposits), discharge of contaminated effluents in addition to claims from other lawsuits relating to this event. No progress in the case up until publication of Hydro's report from 2018.</p>	p.260 Hydro report 2018	<p>Lenke</p>
03.10.2018	<p>Hydro beslutter å stenge ned sine tre store anlegg i Brasil. Statsadvokat Ricardo Negrini fra Ministério Público reagerer kraftig.</p>	<p>Hydro, Ministério Público</p>	<p>DN E24 E24</p>
06.10.2018	<p>Hydro's unions mobilize employees and local people in a demonstration in Barcarena, after the news that Hydro will close their plants and leave thousands out of a job due to governmental restrictions.</p>		<p>DN</p>
08.10.2018	<p>Hydro meets with Semas, and got the permit they needed to continue with production at half capacity.</p>		<p>DN</p>
xx.10.2018	<p>The embargo imposed by IBAMA on DRS2 was suspended.</p>	<p>IBAMA, Hydro</p>	<p>Hydro</p>
31.10.2018	<p>CAINQUIAMA files a similar lawsuit as the one from March 16th against Mineração Paragominas, Albras, Norsk Hydro Brasil, Alunorte, State of Pará, BVQI – Certificadora Ltda in the State Court of Belém. Request suspension of the operation of the companies.</p>	p. 260 Hydro report 2018	<p>Lenke E24 E24</p>
24.05.2018	<p>Ordføreren vitner, forklarer hvordan bassenget fungerer, avviser overløp og rapporten fra IEC. Artikkelen bekrefter at ordføreren var byggherre for DRS1. Uenighet mellom leder i CPI og et kongressmedlem.</p>	<p>Gov. Of Pará, mayor, CPI (investigating the damages) Alepa (lovgivende)</p>	<p>Lenke Lenke</p>

		forsamling i Pará)	
12.12.2018	Alunorte and the State of Pará entered into a settlement agreement to end the lawsuit from 03.04.2018, with reference to the TAC and TC signed 05.09.2018. Alunorte agreed to cover public expenses related to inspections following the heavy rain in February 2018.	p.260	Lenke
15.01.2019	SEMAS issues a technical opinion confirming that Alunorte can operate safely.	SEMAS , Hydro	Hydro DN
22.02.2019	Marcelo Lima frifunnet i retten, etter anklager fra Hydro		E24
12.04.2019	Den føderale domstolen i Belém holdt en rettshøring mellom Ministério Público og Alunorte for å diskutere produksjonsembargoene. Både MP og Alunorte ga retten en anmodning om å løfte embargoene.		Hydro
15.05.2019	Sivil domstol dømmer i Hydro's favør	Domstol. Hydro.	DN Hydro
20.05.2019	Strafferettslig dom opphever embargoet fra 1.mars. Fremdeles ikke tillatt å bruke DRS2.	Domstol. Hydro.	DN
08.09.2019	Ordfører i Barcarena, Antônio Carlos Vilaça dør, 65 år gammel (hjerteinfarkt). Fungerende ordfører Paulo Alcântara. Nevner Hydro-saken, hvor ordføreren støttet Hydro og sa imot rapporten fra IEC.	Municipality, mayor.	Lenke
20.09.2019	Embargoen fra det sivile søksmålet på DRS2 blir fjernet.		Hydro
26.09.2019	Domstolavgjørelse som fjerner alle produksjons-og bruksforbud for Hydro .		DN

Appendix C: Transcription of answers from Torkjell Leira

Transkribering

Spørsmål til Torkjell Leira, svar under foredrag 19.mars 2020.03.19

1. Hvordan har Hydro sin nulltoleranse for korrupsjon påvirket prosessen i etterkant av hendelsene 17.-18. februar?

Leira: 17.-18 februar henviser til 17.-18.februar 2018, det var da det var kraftig regnvær over Alunorte, det var da utslippene begynte.

Og, kunne betalinger og politisk pengestøtte lettet problemene for Hydro i forbindelse med embargoene og rettssakene?

Leira: Embargoene er tvungne produksjonskutt og det var masse rettssaker i etterkant av det her.

Du spør jo om viss Hydro hadde prøvd å betale seg ut av det her, under bordet, om de hadde vært helt bevisst korrumpert. Ville det gjort det litt lettere for Hydro? Sannsynligvis, tror jeg.

Men, Hydro må jo selvfølgelig ha nulltoleranse for korrupsjon, og det veit eg at dei har gjort, dei sier det i alle sammenhenger. Det må man jo. Det er ekstra viktig i et land som Brasil, kor det er mye korrupsjon, for viss man vikler seg inn i det, da har man det gående. Da blir det utrolig komplisert å komme seg ut av det. Og det er veldig lett å bli vikla inn i det, sånn som Yara har opplevd.

Men, eg trur litt av problemet er at Hydro her har gitt litt uklare signaler, det var denne NRK-dokumentaren i fjor som viste det at Hydro har hatt kontrakter med ordføreren i Barcarena kommune, den kommunen der raffineriet ligg, og har jo et titall eller hundretalls millioner kroner i kontrakter til ordføreren, som var personlig ansvarlig for den prosessen med arealplanlegging, som førte til at Hydro kunne benytte et nytt avfallsdeponi. Så her er det veldig tydelige personlige økonomiske interesser for ordføreren. Både Transparency International og andre korrupsjonsekspertar har kritisert den handlinga, det mønsteret der fra Hydro. Hydro har gitt litt uklare signaler og det trur eg har bidratt til litt av problema. Eg tru ikkje man skulle betalt seg ut av det, det ville ha komnt frem, helt sikkert, og man ville havna i stor trøbbel.

2. Hva vil du legge mest vekt på som årsaker til de operasjonelle og økonomiske konsekvensene for Hydro i etterkant av hendelsene 17.-18. februar?

Leira: Eg vil først si noko i forkant, man må være i forkant. Her har altså Hydro eid hele Alunorte i sju år før utslippene skjedde. Man hadde hatt sju-åtte år til å bygge opp kapasiteten på rensanlegga, man tok et valg, nei det utsetter vi. Sånn at når man ser på trøbbelet, der starta det. Og det er en helt bevisst avgjørelse, ganske høgt opp, sannsynligvis helt opp på topp i Hydro-systemet.

Men la oss gå i etterkant. Utfra folk eg har snakka med i Brasil både i statsadvokaten og i media og litt i lokalbefolkningen, så har Hydro blitt oppfatta både før, og delvis etter utslippene, som ganske arrogant. Man har ikkje ordentlig villa engasjere seg med lokalsamfunnet, man har ikkje ordentlig gått i dialog med lokale styresmaketer eller rettsvesen. Og det, viss man blir oppfatta som arrogant i Brasil, det er ikke noen god start. Da får folk fort piggene ut, og det blir vanskelig å gjøre noen ting. Så trur eg også i etterkant av hendelsene, mitt inntrykk hvertfall, er at Hydro har ikke helt visst hvordan man skal angripe det her, det har vært ulike fraksjoner her, og det at Hydro, sånn som eg ser det, det har vært litt sånn good-cop bad cop samtidig, noen har villet legge seg flat, litt sånn i god norsk tradisjon, og beklage at vi har gjort det her, og det var jo på en måte når Brandtzæg,

konsernlederen i Hydro havna på forsida av Dagens Næringsliv og sa «vi har innrømme ulovlige utslipp», litt seinare kom dem og beklaga seg for ulovlige utslipp. Så det var å legge seg flat, i god norsk tradisjon. Men bare litt etterpå går altså Hydro ut og saksøker, personlig, forskningslederen til brasiliansk helseinstitutt, for undersøkelser dei har publisert. Som Hydro da var uenige i. Dem mente at det ikke var bra nok. Men dem ender opp med å saksøke han personlig, for det. Og det mener eg er helt uakseptabelt i norsk, og veldig uvanlig, med norske øyne. Men kanskje sånn, at hardlinerane som kanskje sitt nede i Brasil, det veit ikkje eg så godt, men det er sånn eg tenker. Så man har liksom vingla litt. Og det trur eg har bidratt til at det har tatt lang tid å få nøsta opp i det her. Så i etterkant og, så er det det her med at man har prøvd å holde ting hemmelig. Og der er det jo det eg syns er kremeksempelet på det, er at i det samme oppslaget i Dagens Næringsliv, journalisten til DN var der, og intervju kommunikasjonsdirektøren til Hydro. Og sier, har dere holdt sannheten skjult. «Nei, sier kommunikasjonsdirektøren. Vi har informert miljømyndighetene om det her. «Ja, men koffor har dere ikke sagt det her på spørsmål fra lokalbefolkning og presse. OG da blir svaret, nei vi har ikkje. Påstandane har vore ukontrollerte utslipp, det her har vore kontrollerte utslipp. Og for meg er det en sånn syltynn begrunnelse, at eg syns det er helt flaut, på vegne av AS Norge. Man har holdt ting hemmelig, og så har man blitt tatt med buksa nede. Delvis er det kanskje fordi man ikke har hatt all informasjon på toppnivå i Norge, men da har man i så fall hatt et problem med kommunikasjonsflyten internt i selskapet, og det er jo faktisk toppledelsen sitt ansvar.

3. Mangler Hydro kontakter og nettverk inn mot offentlige myndigheter etter utskifting av både ansatte og politikere? Hvordan kan det ha påvirket prosessen?

Spørsmålet her er om Hydro ikke har god nok kontakt inn mot myndighetene i Brasil. Eg trur det er riktig. Fordi store internasjonale selskaper som opererer i Brasil, inkludert Norsk Hydro, opererer ofte litt som sånne øyer i lokalsamfunn. Det er ganske godt beskrevet fenomen i litteratur om den type økonomiske investeringer og etableringer. Man på en måte en øy i et lokalsamfunn. Så klart man har masse lokale ansatte, men ledelsen har stort sett vore utfra. Dem har ikke vore fra den byen, den delstaten, Pará, eller fra Nord-Brasil. Dem har komme sørfra. Og har nok vært litt sånn frakobla lokalsamfunn og lokalpolitikere. Så eg trur at litt av løsningen på det er mer lokalt engasjement, engasjerer seg mer i lokalsamfunn igjen, der har ikke Hydro helt fått det til, men dem er på god vei nå. Man må tenke på å få lokale folk inn i ledelsen i Barcarena og i Brasil, og man må nok kanskje ha flere som kan Brasil inn i organisasjonen i Norge. En helt åpenbar ting er at Hydro har nok ikke vært helt... Mitt inntrykk hvertfall, det er en del ting i lokalsamfunnet, i politikken, i rettsvesenet, og sånne ting, som man ikke har helt oversikt over, ikke helt har hatt forståelsen for.

https://www.youtube.com/watch?v=nNN2UnUt7dg&feature=youtu.be&fbclid=IwAR038Rfm a95xvNg2D6Dm8-JeYjmbmh_AGrNkkQvBosje4ZXUC1M4J_8Wb_U

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