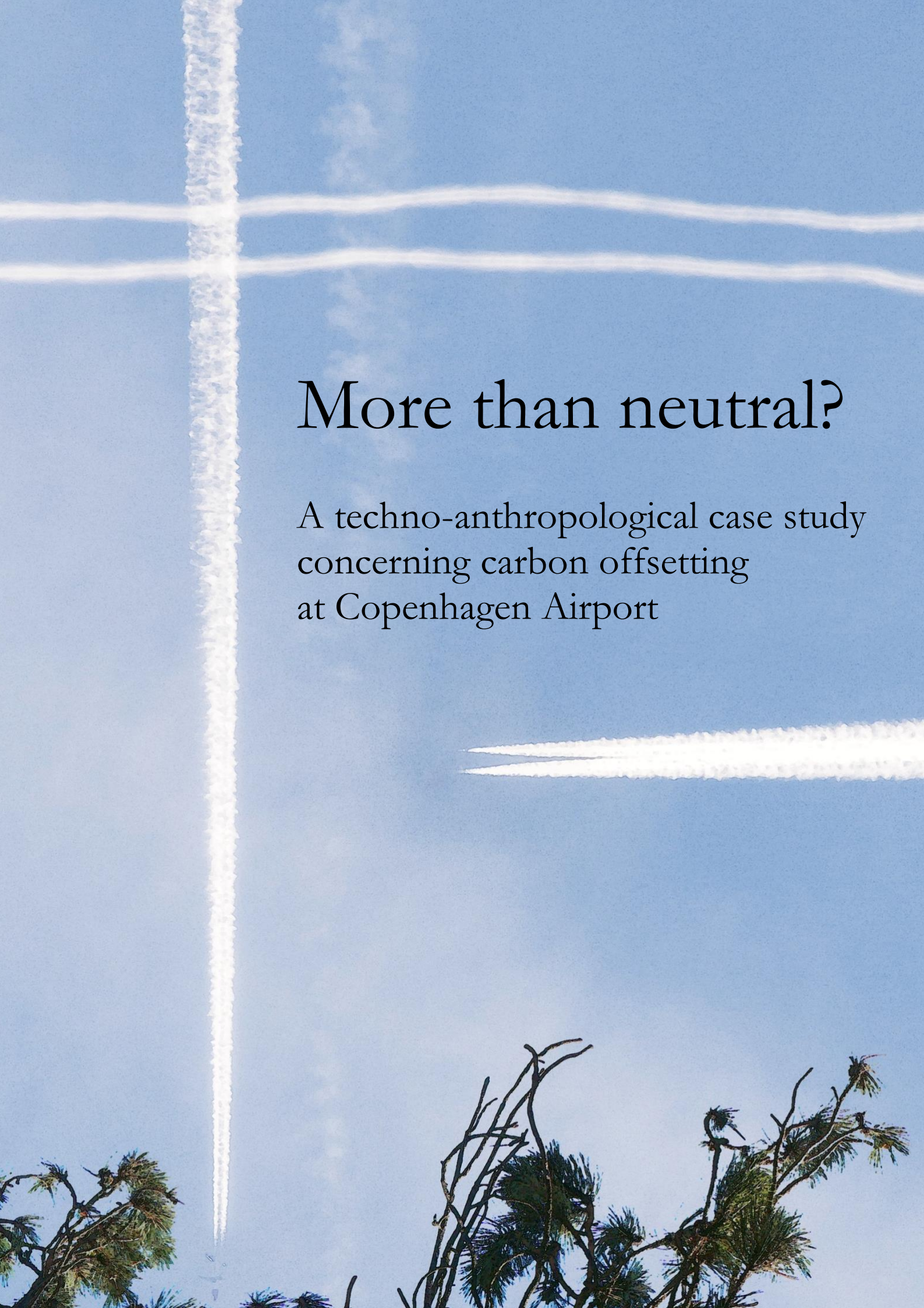

More than neutral?

A techno-anthropological case study concerning carbon offsetting at Copenhagen Airport

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Abstract

This paper investigates how Copenhagen Airport (CPH) practices carbon offsetting as part of its climate strategy of 2019, and how this relates to concerns of environmental activists. The ethnographic case study draws on various qualitative sources such as documents, interviews and participant observation, which were carried out during March and May 2020. Inspiration from actor-network theory and related developments, particularly the application to economic markets, is combined with Boltanski and Thévenot's 'orders of worth' framework to show what kind of hybrid offsetting project emerges. The study demonstrates how carbon offsetting relies on very practical translation and framing activities, through which climate issues emerge as controllable and manageable, as they are transformed into a tradable good. As part of this, the idea of growth is recognised as the unnegotiable fundament to which the climate strategy adapts to. A set of actors and devices make it seemingly feasible for CPH to bridge industrial, market, green and civic valuation registers all together and stabilize moral reputation. The study particularly contributes with detailed description of the Airport Carbon Accreditation scheme as well as the offsetting standard Gold Standard in partnership with the Sustainable Development Goals. Yet, attempts to bring the climate and sustainable development into the calculable frame seem to constantly spill over into unaccounted concerns. Furthermore, the paper engages with environmental activists, which challenge CPH's taken-for-granted assumptions about the right way to react to climate change. As activists distribute values differently, the paper shows how divergent visions of the future emerge. As such, carbon offsetting seems to be born from and intertwined in ongoing concerns and compromises about the proper way to react to climate change in the very moment. The paper recognises the relevance to engage with the multiple ways the climate is made present and translated into practice, thus urging for heightened sensitivity for how concerns around the climate are entangled in, made to fit, or left out of otherwise stable practices.

Resumé

Dette speciale undersøger hvordan Københavns lufthavn (CPH) bruger karbonkompensation (Carbon offsetting) som del af deres klimastrategi for 2019, og hvorledes det relaterer sig til klimaaktivisters bekymringer. Det etnografiske casestudie beror på adskillige kvalitative kilder såsom dokumenter, interviews og deltagerobservation udarbejdet i løbet af Marts og Maj 2020. Der er fundet inspiration i aktør-netværk teori og relaterede videreudviklinger, i særdeleshed de grene af teorien der udvikledes til økonomiske markeder. Dette kombineres med Boltanski and Thévenot's 'orders of worth' framework for at demonstrere hvilken typer hybride kompensationsprojekter der opstår. Studiet demonstrerer hvordan kulstofkompensation afhænger af meget praktiske oversættelser og framing aktiviteter, gennem hvilke klimaproblemerne fremtræder som kontrollerbare og manageable som de transformeres til handelsvarer. Som del af dette, bliver ideen om vækst anset som et uomsætteligt fundament hvilket klimastrategien tilpasser sig til. En gruppe aktører og devices tillader øjensynligt CPH at forbinde industrielle, markeds, grønne og borger-orienterede værdiregistre og dermed bliver deres moralske omdømme stabiliseret. Indeværende speciale bidrager specielt med detaljerede beskrivelser af Airport Carbon Accreditation scheme, tillige med kompensationsstandarden Gold Standard som er udarbejdet i samarbejde med verdensmålene for bæredygtig udvikling (SDGs). Men forsøg på at bringe klima og bæredygtig udvikling ind i beregnelige rammer synes konstant at forplante sig i uforklarlige bekymringer. Ydermere beskæftiger specialet sig med miljøaktivister, der udfordrer de, af CPH taget for givne, antagelser vedrørende den rigtige måde at reagerer på klimaforandringer. Specialet viser hvordan divergerende versioner af fremtiden fremtræder, som aktivisterne fordeler deres værdier forskelligt. Således synes kulstofkompensation at blive skabt fra og forbundet til pågående bekymringer og kompromiser vedrørende den passende måde at reagere på klimafordringer, i øjeblikket. Specialet anerkender relevansen i at beskæftige sig med de multiple måder klimaet præsenteres på og oversættes til praksiser. Dermed tilskyndes der til en forøget følsomhed for, hvordan bekymringer vedrørende klimaet bliver viklet ind i, tvunget tilpasset eller ladt ude af ellers stabile praksiser.

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TABLE OF CONTENT

Figures

Abbrevations

ACA	Airport Carbon Accreditation
ACI	Airports Council International
ANT	Actor-network theory
CPH	Copenhagen Airport
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CSR	Corporate Social Responsibility
GHG PROTOCOL	Greenhouse Gas Protocol
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IPCC	Intergovernmental Panel for Climate Change
KLM	Koninklijke Luchtvaart Maatschappij (Royal Dutch Airlines)
RFI	Radiative Forcing Index
SDGS	Sustainable Development Goals
STS	Science and Technology Studies
UNFCCC	UN Framework Convention on Climate Change
VER	Verified Emission Reduction
WBSC	World Business Council for Sustainable Development
WWF	Worldwide Fund For Nature

1. Aviation between peak and contestation

July 2019 was a historical moment in the aviation industry. According to FlightRadar24, a global flight tracking service, July 24th hit the greatest number of flights since the beginning of their flight recording in 2006. On one single day, 225,000 aircraft crossed the sky (Slotnick 2019). This came not as a surprise; several international civil aviation and airport organizations had predicted the future of aviation as continuously growing. Following an analysis of ICAO, the International Civil Aviation Organization of the UN, global passenger traffic is expected to grow at 4.3% annually until 2035 from 2015 (ICAO 2015). The International Air Transport Association (IATA) expected an annual growth rate of 3.5% of air passenger traffic over the next two decades back in 2018 (IATA 2018). Growth was mainly expected from so-called emerging and developing economies, mainly in the Asian-Pacific area and the Middle East (Airports Council International 2018). Even though profoundly disturbed by the Covid-19 pandemic, which brought air travel to a historical low, IATA expects a "strong recovery" in 2021 and 2022 (IATA 2020a). Most airports had been preparing for these scenarios for a long time, resulting in expanded facilities for the air travelers of the future (Rodrigue, Comtois, and Slack 2009).

But the year 2019 was also the year of increasing protests by environmentally concerned individuals and groups. Worldwide, young and old gathered for climate strikes, demanding more action to be taken by governments and businesses to prevent a climate crisis (Sengupta 2019). It was the year in which the young environmental activist Greta Thunberg was honored as the Times Person of the Year for her encouragement to fight the climate crisis (The Times 2019). In her home country Sweden, the terms 'Flyskam' and 'Tågskryt', Swedish for flight shaming and train bragging, had become more popular since 2018, highlighting the high amount of emissions which air travel releases in the atmosphere and urging for travel via land. This has indeed influenced the Swedish Air travel business, and numbers of passengers flying through Swedish airports dropped 4% (Lund 2020). Anti-airline sentiments have also raised worries amongst aviation representatives, with IATA's head Alexandre de Juniac notably saying "Come on, stop calling us polluters!", to reporters at IATA's 'global initiative' conference during the 75th Annual General Meeting mid-2019 (Goldstein 2019). Worldwide, anti-airport movements throve, led by the discontent of various planned airport expansion projects. In the UK, activists have intensively

campaigned against the expansion of Heathrow airport during the last year. In 2020, the Court of Appeal ruled the government's decision to expand as unlawful, as it did not take into account the country's commitments to reduce greenhouse gas emissions in line with the Paris Agreement (Espiner 2020). A third runway could only go ahead when it respects the country's climate commitments. Vienna, Istanbul, Berlin, Copenhagen, are just a few of the locations where groups of citizens mobilize against planned airport expansions.

These events signpost that climate protection has been increasingly recognized as a concern of global significance. Airports have become a central target within this 'anti-polluter sentiment', as it is the infrastructure unity which connects air travel to the ground. The expansion of airports thus might seem for some as the epitome of lifestyles which surpass environmental boundaries. The shared concern between movements is that global warming will increase if no new strategies are being found to counter the rising development of air travel. Jet fuel burning, for instance, results in CO2, NOx (= NO + NO2) emissions, and the formation of contrails and emissions of water vapor, sulfate, and soot, most of which have a heating effect on the atmosphere (Azar and Johansson 2012). Yet, also some uncertainties exist as to their different effects in height and season (Azar and Johansson 2012). In turn, it raises the question of how the aviation industry, and an airport in particular, positions itself towards climate measures, and which strategies they choose to do so. What arguments do they use to influence the debate? What facts and values are these based on? How do their 'green strategies' look like, and how are these compatible with an airport's role as a company?

The aviation industry has reacted to develop strategies to make the business prepared for modification (Daley and Callum 2011). While some energy efficiency improvements have been realized, 'radical' technological solutions to limit emissions are said to not be viable in the near future (DfT 2004; Daley and Callum 2011; Bows-Larkin et al. 2016). Rather an exceptional example of a reaction to climate change, the Dutch airline KLM decided to replace planes from Amsterdam to Brussels with high-speed trains, in order to limit short-haul flights (Coffey 2019). Another popular option is carbon offsetting, used by many airports under the Airport Carbon Accreditation (ACA) scheme, and IATA's carbon offsetting and reduction scheme CORSIA. The basic functioning of such offsetting schemes relies on a market, the carbon market, in which a certain amount of 'excess' greenhouse gas emissions are bought and sold, aiming to compensate emissions in one

location through emission reductions in another location (Lovell and MacKenzie 2011; Bumpus and Liverman 2008). This procedure often allows companies to call themselves 'carbon neutral' (Valiergue 2019). Commitments to carbon offsetting schemes, however, often leave open questions around issues of definition and coverage (Daley and Callum 2011). The next chapter will zoom into the case of Copenhagen Airport as it builds the entry point for the research field of this paper. Here, some of the above described movements are mirrored.

2. A Danish context – Copenhagen airport

2.1. History of airport expansion

To give an impression of airport expansion at Copenhagen Airport in Kastrup (CPH)[1], the following shall present some of the activities influencing it. Copenhagen airport was founded in 1925 and looks back on a history of new terminal and airport buildings throughout its lifetime (Westphall 1975). These developments were influenced by for instance the establishment of Scandinavian Airlines, the development of Charter Tourism and increasing privatization of CPH, which started in 1994 (Laursen 2020). In 2019, the company CPH is listed on Nasdaq Copenhagen[2], and holds 59,4% of shares, followed by the Danish state with 39,2% (Copenhagen Airports A/S 2019a, 50). The rest of shares are divided between Foreign and Danish private and institutional investors (Copenhagen Airports A/S 2019a, 50). CPH is Denmark largest airport, and was Europe's 11th busiest airport in 2016 (Statista 2017). In the whole airport premises, including all ground handlers, around 23,000 people are employed (CPH environmental advisor 2020).

The latest expansion plan 'Expanding CPH' was adopted in 2016 with the goal of handling 40 million passengers in the future, with a total investment of ca. 20 bio. DKK (Copenhagen Airports A/S 2016). This makes it one of Denmark's largest privately funded civil engineering activities (Copenhagen Airports A/S 2016). The project is planned to expand on one of the terminals by 80.000 square meters, planned to be "equivalent to a small super hospital" (Copenhagen Airports A/S 2019d). The initial work for a new

1 CPH also incorporates Roskilde Airport, yet, CPH in this case study refers to the main business in Kastrup.
2 Nasdaq Copenhagen is part of Nasdaq Nordic stock market.

infrastructure project, the 'Luggage factory West' started in summer 2018 and had been planned to be operational in summer 2021 (fig. 1). The complete first phase was aimed to be finished in 2023; the second phase in 2028/29[3] (Copenhagen Airports A/S2019b).

Figure 1 - Overview over active building projects in 2019. (Copenhagen Airports A/S 2019b)

2.2. "No expansion of Copenhagen airport!"

In a Danish context, too, airport expansion has caused concern. A group of citizens has joined forces to mobilize against the strategies and rhetoric of Copenhagen airport, demanding limits to air traffic and stopping the work against airport extensions. A local citizen group in Amager, the island on which the airport is located, is concerned with the locally felt side effects of air travel, such as noise and air pollution (Kiil 2019). Next to the local group, another in particular shares the above indicated more globally felt concerns about climate change. This group is called 'Bevar Jordforbindelsen', founded in 2018 (Bevar Jordforbindelsen 2018b). Translated to English, the group's name resembles the one of its umbrella organization 'Stay Grounded', a self-declared science and activist group from 2016 with more than 150 local groups worldwide (Stay Grounded 2020a). The shared

3 With the onset of the Covid-19 pandemic, construction work was limited, yet it was not specified in detail to what amount plans will be changed in the long term (Copenhagen Airports A/S 2020a).

idea is to foster alternatives to flying and to "engage in fighting problematic climate strategies like offsetting emissions and biofuels" (Stay Grounded 2020b). A mix of technical info material and more bodily interventions such as a human chain at the airport were part of the Danish group's repertoire, as an attempt to limit airport expansion and foster alternatives (Bevar Jordforbindelsen 2018a). Seen through the eyes of the activists, the expansion plan causes various concerns which are not combinable with their vision of the future.

2.3. Problem area

An assumption in this thesis is that the increasing awareness and protest, both in a Danish context but also in different locations, pose a challenge to the airport, and a field of tension arises as to how to enact the concern around climate change in the airport's practice. In addition, the question comes up as to how the airport justifies its future and expansion in the light of recent contestation. Next, the environmental considerations of the airport will be presented, with a particular focus on the airport's climate strategy. This very recent strategy adds to other environmental considerations at the airport and builds the focal point of the analysis.

The airport's climate strategy of 2019 is one of the variables in which climate issues are meant to be addressed. While CPH undertakes other measures in the area of the environment, such as waste and water management, the general name *climate* strategy hints to the idea that the issue is not local air pollution, but a more global climate perspective. Here, a long-term plan is provided until 2050, with an ultimate goal of having more climate-friendly technologies such as so-called sustainable fuels (Appendix A). The climate strategy is said to be part of the airport's 'Green Transition' (Copenhagen Airports A/S 2019a).

Currently, the airport is in the first step of the climate strategy, set from 2019-2030. Part of the first stage is a reduction of local emissions; the other part is, to offset those emissions through carbon offsetting. In 'airport terms', this means that Scope 1 and 2 emissions are included, which are direct and indirect carbon emissions from the airport's activities on the ground (Copenhagen Airports A/S 2019a). This strategy gives the airport the label of a 'carbon neutral' airport and relies on engagement of various actors, which standardize and invest in the savings of emissions in another location. The idea of carbon offsetting raises

many intriguing questions as to how this is very concretely translated into practice. The motivation for this thesis became to dig into the phenomenon of carbon offsetting with more depth to unravel patterns and standards not visible on the first sight. In times when climate subjects and sustainability are more urgently demanded and discussed, it is important to find out, how a business such as CPH practices carbon offsetting as part of a climate strategy, and how this can be critically discussed against other points of views. These ideas led to the creation of the following problem formulation:

How is carbon offsetting practiced in the case of Copenhagen Airport's climate strategy, and how does this relate to concerns of environmental activist groups?

- Which valuation registers does CPH mobilize, and how do these relate to each other in the case of offsetting?
- Who are the actors and devices, what are their concerns, and how do they translate, frame and valuate the carbon offsetting project?
- How do environmental activists distribute values differently, and what tensions arise?

The focal field of this thesis, the carbon offsetting project, is located in the first part of CPH's climate strategy from 2019. The other part of the thesis discusses the gained insights by staging a meeting point with concerns of activists, since the idea is that these meeting points can shed a new light on the taken-for granted framing of CPH's carbon offsetting project. As it would exceed the scope of this paper to address both airport and activist network fully, a decision was made that the larger part of the paper focuses on CPH's offsetting project, and activists play the role to elaborate on three criticisms.
To prepare for a reading of the airport's carbon offsetting scheme, the next chapter will present how offsetting has been discussed in the literature.

3. Carbon offsetting and the carbon market

Carbon offsetting is a complex techno-scientific practice which relies on the existence of a carbon market, where emissions are traded as a good. The overall goal of carbon offsetting follows the assumption that emissions can be made neutral on a global balance (Taiyab 2006). An organization or individual can pay other actors to compensate a certain amount of emissions through reductions in another location, often in the Global South (Lovell and Liverman 2010).

3.1. A polarized field

Carbon offsetting has been written about from various angles, including perspectives of NGOs, practitioners, Political Science, Market Studies, Political Ecology[4] and Science and Technology Studies, showing how the field embodies interdisciplinary perspectives. These fields have partly very different approaches, the discussion around offsetting is often led along the lines of proponents or opponents, which shows how difficult it is as a researcher to intervene in this field. For instance, there is a strong ethical critique about offsetting, mainly deriving from the area of Political Ecology, pointing to the idea that emission trading is seen as paying for the 'indulgencies' of the Global North, for example when considering flights seen as unnecessary (Davies 2007). Other points of concerns, are unfair terms of trade between the North and South, lacking participation in local decision making and local struggles over land (Murphy 2017), as well as seemingly false claims about reduced emissions in offsetting projects (Lohmann 2005). These criticisms have indeed maligned the character of offset mechanisms and have led to a 'credibility crisis' of renown offset projects (Michaelowa et al. 2019; Valiergue 2019). Lovell and Liverman (2010, 255) however point to the fact that the discussion around carbon offsetting "is polarized, either for or against offsetting, often on principles and values rather than detailed empirical investigation or a careful assessment of different types of offsets". Similarly, Lehmann (2019, 146) states that "the mechanisms that keep the carbon market running, (…) have

4 Here I refer to Political Ecology as a field concerned with power relations in environmental knowledge and management. Research has mainly originated from an interest in the political struggles over the environment in the Global South, coined by for instance Arturo Escobar or Raymond L. Bryant.

rarely been scrutinized by scholars and NGOs", pointing to a lack of detailed research about the intricacies of a complex phenomenon.

The next chapter aims to draw on diverse literatures, to unfold some of the crucial internal dynamics of the carbon market, which shall provide the reader with some basic information as to what happens during carbon offsetting. While the internal mechanisms of the carbon market are highly complex and should not be taken for granted, the chapter will show some of the principle parameters the market's functioning in theory relies on. In addition, the chapter draws on interview data with a practitioner in the carbon market who works with CO2 reporting in the NGO atmosfair[5] (Zijderveld 2020). This information will be important to understand how CPH navigates in the carbon market and the choices made in practice.

3.2. Technical, scientific and institutional framework

To name just a few, carbon offsetting involves activities of converting, monetizing and standardizing greenhouse gases and has become one of the most prominent approaches to mitigate climate change during the last decades (Carton 2020; Lovell and MacKenzie 2011). Carbon offsetting was established as a practice to mitigate climate change, after high scientific consensus of the IPCC (Intergovernmental Panel for Climate Change) stated that several greenhouse gases are a main driver in global climate change (Taiyab 2006; MacKenzie 2009). The IPCC (2007, 2), widely regarded as a main authority in regard to climate science (MacKenzie 2009), lists CO2 as "the most important anthropogenic greenhouse gas" in the atmosphere. The carbon market nowadays often not only trades carbon itself, but also other gases (Taiyab 2006). The Kyoto protocol for instance lists various other greenhouse gases next to CO2, such as methane (CH4) or nitrous oxide (N2O); the terms 'greenhouse gases' and 'carbon' are often used interchangeably in the literature (Taiyab 2006; Lovell and Liverman 2010). If other gases are included, the effect on global warming is then calculated in comparison to CO2 in order to make gases commensurable (Bumpus 2011), which itself is a complex process relying on multi-layered translations between standards and authorities such as the IPCC (MacKenzie 2009). Such

5 Atmosfair is a German offsetting NGO, which has repeatedly won prices for Transparency and Accountability (e.g. Atmosfair 2018). See Methodology chapter.

processes rely on complex infrastructures to bring carbon and other gases into the calculable frame of the carbon market (Lippert 2015). It is through these technological-discursive carbon-data practices between spreadsheets and nomenclatures, that carbon is made 'available' for being used in the market sphere (Lippert 2015). Standards for how to approach this, also depend on changes of scientific standards, for instance as to which 'conversion measure' to follow when converting CO2 and other gases to make them commensurable, and which emissions count as relevant to include (Zijderveld 2020). which This represents some of the complex dynamics and subtleties the carbon market faces.

Briefly speaking, there are two offset markets: the 'compliance market' under the Kyoto Protocol, and the 'voluntary market'. What is now widely known as the compliance market was set out in the Kyoto Protocol, according to which countries were for the first time allowed to trade emission permits to countries which are over their national target (UNFCCC 2020). Briefly speaking, the compliance market allows countries to buy carbon credits in other countries rather than reducing domestic emissions, a process highly controlled by international climate regulations and the UNFCCC (Lovell and Liverman 2010; UNFCCC 2020). The Kyoto Protocol also lays the basis for the Greenhouse Gas (GHG) protocol, the most widely used corporate standard (Ranganathan et al. 2004).

The market in which this case study is nested is the voluntary market. It is sometimes referred to as a parallel market, where individuals, organizations, organizers of international events and businesses can trade emissions mostly as Verified Emission Reductions (VERs), a form of tradable credit with the 'value' of a ton of CO2 or the equivalent amount of greenhouse gases, yet in a much looser manner than in the compliance market (Taiyab 2006). Voluntary in this regard means that carbon credits are not bought for meeting regulatory emission reductions, but that emission reductions go beyond legally binding targets (Taiyab 2006). Since the obligation for governments within the Kyoto Protocol expires in 2020, only the voluntary market will remain (Zijderveld 2020). Yet, this market leaves many questions open as to how to agree on relevant definitions for trade (Zijderveld 2020). The widely unregulated nature of the voluntary market can be found for instance in the broad variation of carbon and emission calculators offered by various offsetting companies and NGOs, and the absence of a standard definition for carbon credits (Lovell and Liverman 2010). The majority of clients are in the transportation, event and finance sector, often guided by 'sustainable development' consultancy (Valiergue 2019). Many

businesses look to the voluntary market as a fast way to do environmental action (Lovell, Bulkeley, and Liverman 2009). Between 2005 and 2015, the volume of carbon credits in the voluntary market has risen from 12 to 84 million, demonstrating their popularity (Valiergue 2019). The 'Greta-effect' in addition could have led to increased popularity of the market (Zijderveld 2020).

A guiding principle when it comes to carbon offsetting is the principle of *additionality*. When emissions are deemed to be 'too many' in one location, and shall be sequestered in another location, it depends on a variety of standardizing agreements of how to measure such an exchange. The additionality principle means that emission reductions through an offset project must have taken place only through the involvement of an offsetting project and not otherwise (Bumpus and Liverman 2008); non-additionality would mean to 'pretend' having reduced emissions through a project, while sequestration would have happened anyway. Additionality also incorporates an estimated - practically non-existing - future-scenario of emission savings (Bumpus and Liverman 2008). This means, whether a project can be called 'carbon neutral', is dependent on which baseline criteria is used. For instance, from which month to start measuring emission savings and in addition, how emission savings are extrapolated to happen in the future. This principle points to the fact that there is an effect on the climate in the meantime until the project has sequestered the carbon which it aims to reduce, a factor for many not visible from the outside (Zijderveld 2020).

The carbon market is based on various intermediaries which trade and standardize carbon credits in a market. One of these is the standardizer Gold Standard, which aims for rigid criteria to prove local benefits for the local communities where the respective project is acted out. This standard has been formed as a reaction to the widespread criticism that offsetting projects have a detrimental effect on local livelihoods in the Global South (Lehmann 2019). The standard works to verify the 'positive side effects' of carbon credits in the voluntary market, since co-benefits for poor communities in the Global South and their local environment play a significant role as selling points (Lehmann 2019). A popular example are energy-efficient cookstove projects, the benefit of which is said to lie in various additional benefits for communities, for instance having the potential to reduce indoor air pollution (Lehmann 2019).

3.3. Inspiration from Science and Technology Studies

As can be seen, carbon offsetting and its reliance on a carbon market is a phenomenon which blends science on the climate effect of gases, agreements on trade-regulations, legal regulations, standardizing institutions, consumption patterns between North and South and many more aspects, and thus asks for an interdisciplinary angle. It is exactly this hybridity which Techno-Anthropology aims to embody. A main inspiration in Techno-Anthropology derives from a pragmatic orientation of the field Science and Technology Studies (STS), an interdisciplinary field which Elgaard Jensen (2016, 332) describes as the most relevant source for Techno-Anthropology, due to its commitment to more-than-human encounters, a "not-really-separate-viewpoint" on science, technology and society, and a focus on processes, on things-in-the-making.

Briefly speaking, this view is inspired by Dewey's pragmatism (1927), who rejected dichotomies such as nature vs. culture or individual vs. society. Everything existing in the world is defined by the associations it has with other members of a collective, making such strict distinctions redundant. Dewey argues that phenomena should be analyzed by their consequences (Dewey 1927); different than imposing strong a-priori normative claims, he would focus on values-in-practice, and on the effect these processes have in the world (Dewey 1939). This perspective has inspired STS and Techno-Anthropology, and also shares many similarities with the theories chosen in this research.

Based on this practice-based view, carbon offsetting in this paper is regarded as a practice which blends 'not-really-separate' social, technological, political and technical aspects within the carbon market. The next chapter introduces socio-technical theories which will provide resources for answering the problem formulation of this thesis.

4. Theoretical approach

A toolkit is needed to understand and explain the complex relationships between different actors involved with offsetting. This first part of the chapter will introduce actor-network theory (ANT), also known as the 'Sociology of Translation'. Since this approach has inspired many of the following theories and the methodological procedure, the basic assumptions shall be presented. From here, market-based ANT and the 'orders of worth' framework will be introduced, as well as aspects about nature and (ac)counting. Lastly, the chapter will broaden the analytical framework by introducing perspectives beyond the network-approach.

4.1. 'Classical' actor-network theory and late Latour

ANT builds on a body of literature developed since the late 1970s, primarily established by STS scholars Latour, Callon and sociologist Law, together coining a 'classical' ANT approach (Farias, Roberts, and Blok 2020; Vikkelsø 2007). Even though no uniform ANT exists, there are some general characteristics to be explained.

4.1.1. Heterogeneous and relational networks

Law and Singleton describe the most important characteristics of ANT based on the fact that it teaches that the world is heterogenous and relational (Law and Singleton 2014). Generally speaking, ANT is a non-essentialist approach and as such refrains from seeing entities as pre-existing the world. It has an element of constructivism, in the sense that it looks at how things become truth, and an element of realism, in that it considers phenomena not only as mental constructions, but also includes physical and biological conditions (Egholm 2014). In ANT, everything we observe in the world is owed to continuous 'construction-work' between human and non-human actors. An important part of this is the commitment to material semiotics, which encompass the non-human aspect of our lifeworld. Material semiotics is a set of tools to trace both the physical, material components that constitute life (such as CO2, databases, stoves…) and the semiotic, since phenomena exist within relations and carry meaning (Law 2009). Thus, one of the benefits

of an ANT approach for this thesis, is the possibility to foreground often hidden objects and processes.

It has been argued that ANT should rather be seen as a toolkit than a theory, a sensitivity to follow the actor closely, in an almost 'agnostic' way, by witnessing the making and breaking of the relationships between actors (Callon 1984; Latour 1999). In so doing, for ANT, there is no strong difference between a descriptive and normative intervention (Vikkelsø 2007). In this perspective, a detailed description of socio-material relationships and their performative effects might open up for action, as one can understand what holds a network together, but also, how surprising gaps between actors might arise.

Multiple networks can be present in an actor-network, but are often simplified as one 'actor' or 'network' to reduce confusion (Bielenia-Grajewska 2009). In this thesis, a main focus is on following the emergence of the carbon offsetting project of CPH, the airport, which in itself exists of multiple actors and networks. When I therefore refer to CPH, I relate to a heterogeneous actor-network which constitutes the processes linked to the airport.

Agency in ANT is not based on actors having an essence, but it is a relational effect within a hybrid constellation of human and non-humans participating in a project (Latour 2005). This perspective focuses analytical attention towards the heterogenous ways of developing and maintaining a network in which carbon offsetting can exist.

ANT refuses an a-priori judgement on who wins or loses the game, who is powerful or not. For Latour (1990, 130) "domination is an effect not cause". Here, it can be seen how ANT shares many similarities with a pragmatist stance. In ANT, there is no difference between the macro-and micro perspective, which is why some refer to ANT as having a 'flat ontology' (Law 1992).[6] With the perspective on controversies for instance, institutions and organizations are not assumed as per se 'big' or 'small' actors, but only become as relevant as they establish relations that have an effect on framing the issue (Nold 2018).

[6] With this, ANT scholars are distinct to many other sociological theorists such as, for instance, Émile Durkheim (1897), who relied on a division of micro and macro structures when studying the explanation of suicide.

4.1.2. Principle of symmetry

Because things without inherent attributes cannot be put into predetermined categories, ANT assumes the principle of symmetry (Callon 1984). How this is different to a principle of asymmetry, can be explained with the following example (Blok and Jensen 2011): Proponents of diffusion theory would explain spreading of a technology as a per-se natural event, where 'good ideas' would spread by their own force. In this view, the explanation of diffusion is found in society: some people resist the technology, some accept it. Society is the medium through which ideas travel, and either the idea is disseminated, which is then seen as the natural flow of dissemination, or it is not disseminated, then the problem is explained with societal resistance. Diffusion theorists therefore build on an asymmetrical analysis: if the diffusion works, it is due to the genius of the inventor, if it doesn't, social factors need to be found to explain *why not*. On the other hand, Latour, building on the work of David Bloor, suggests a symmetrical analysis of both success and failure of dissemination in the same terms (Blok and Jensen 2011). The same type of factors should explain the development in an actor-network. Whether an idea spreads or not, needs to be explained by looking on how the idea is built in and translated through a network. In turn, how carbon offsetting emerges, should be understood in light of how it is passed on between different actors. What is to do for the researcher in ANT then is to describe how a phenomenon establishes an order between different actors, the price which has to be paid for this, and how the order might subtly come under threat (Vikkelsø 2007).

4.1.3. Translation

A central part of ANT is to understand how actors connect and how they mobilize one another, which can be described with the concept of translation, a central aspect for this thesis (Callon 1984)[7]. Law (1992) calls a focus on translations the core of ANT. This concept is guiding for data collection and analysis in this thesis, as it points to the idea that specific phenomena, such as the carbon offsetting project, come to form a unit between actors. In an organizational context, translation can be seen as "always part of (a) slowly changing constellation of manifest and latent power processes in organizations" where

[7] Callon (1984) described different steps of translations. Yet, this case study will deal with a large number of translations and thus will not go through all steps but remain with a broader perspective on translation.

"certain conceptions of reality are 'organized in' while other possible perspectives are excluded" (Doorewaard and Van Bijsterveld 2001, 61). Latour (1999) describes translations by following scientists in the Amazon forest, who organize and negotiate scientific practice between spreadsheet, color-codes, instruments and soil, and eventually agree on which type of soil they find. A whole ecosystem can be translated into a specific thing, the name of a soil type, and the result of this process is now readable as one name to the outside. This means, parts of the 'natural' context, the links to the ecosystem the soil was embedded in, gets lost in this name (Latour 1999). Thus, translation is an activity which means that an actor, for instance a soil name, can speak for a network, in this case, the whole ecosystem where the soil was taken from (Law 1992).

The idea of delegation, of delegating duties, tasks or roles to other actors, can play a role in this too, as this represents a decisive moment of translation through which actor-networks distribute significant tasks to other actors (Law and Hetherington 2000). Translation and delegation are often used interchangeably (Allen, Brigham, and Marshall 2018); therefore, when I point to delegation, I just want to elucidate the shift of tasks within a translation process, to make more visual how central chores are being allocated to another actor.

4.1.4. From matters of fact to matters of concern

Much of Latour's earlier work engaged with understanding how scientists construct matters of fact. For instance, Latour and Woolgar (1979) give an account of the multiple interconnected processes that make a scientific fact regarded as stable. In this view, facts are not just found by the scientist, but researchers need to mobilize a multitude of resources and tools to make the scientific network hold together. For instance, a combination of biochemical and biological material, academic rules, publication guidelines, laboratory material, knowledge practices, need to be enrolled for a scientific fact to acquire truth-status. This net-working is performed by a variety of durable materials that make it stable (Law 1992). Only this embeddedness in a stable network allows researchers to establish an orderly scientific practice (Latour and Woolgar 1979). The wider and larger the network which creates and translates these findings, the more 'real' they become (Egholm 2014).

In his later texts, Latour moves away from the idea of facts towards issues which evoke worry or concern. In his text 'Why Critique has Run out of Steam: From Matters of Fact to Matters of Concern' (Latour 2004), he states that matters of facts are only very partial readings of the world; in a following text, he notes "a matter of concern is what happens to a matter of fact when you add to it its whole scenography, much like you would do by shifting your attention from the stage to the whole machinery of a theatre" (Latour 2008, 39). These matters of concern challenge the dichotomy between facts and values in emphasizing uncertainties and indeterminacies, since concerns are based on fragile associations (Latour 2008). While matters of facts seemed indisputable, matters of concerns are disputable, and can be invoked by a multitude of voices (Latour 2008). This also has consequences for introducing actors; "When agencies are introduced they are never presented simply as matters of fact but always as matters of concern, with their mode of fabrication and their stabilizing mechanisms clearly visible" (Latour 2005, 120). In other words, the actors and their objects are not rendered as mute, soulless matter, but as lively and something which is potentially vulnerable (Puig de la Bellacasa 2011). This then doesn't mean to get rid of explaining the stabilizing mechanisms described above, which hold and distribute such concerns. Matters of concern can likewise be stabilized by enrolling other actors, by creating attachments, and distributing the concern more and more, for instance by reinforcing it in documents. However, different than the notion of a matter of fact, the affective charge is altered when actors are introduced bearing their concerns in mind (Puig de la Bellacasa 2011), which serves as an inspiration for this thesis when introducing actors.

4.2. Market-based actor-network theory

Around 2000, ANT has been applied to a wide variety of research fields, and perspective has also shifted towards analyzing economic markets, to which Michel Callon has largely contributed (Farias, Roberts, and Blok 2020). As this case study focuses on a phenomenon drawing on a carbon market, a market-ANT-inspired approach can help crystallize some key notions of this particular market and its devices.

4.2.1. Framing and overflow

In his article "Actor-network theory – the market test" Callon (1999) describes ANT studies on the market as an extension of classical ANT work; while the market is also a network of human and non-human relations, the issue with markets is the diversity of the relations which allow them to act as something stable. He describes how economic markets are based on a complex variety of technologies, sciences, political representation, standards, etc. which need to be mobilized to make commercial transaction (Callon 1999). Framing a financial transaction is a central part of establishing rules between actors. For calculations to be performed efficiently, it is necessary to frame, or disentangle, a good from its environment, thus allowing for commodification and implying that certain ties are discontinued (Callon 1999). The commodification of greenhouse gases in form of a market good is an example for such. Somewhat similar to the example of the soil which is taken out of the entire ecosystem to be treated by scientists (Latour 1999), gases are taken 'out' of the atmosphere and made tradable on a market. This also means that an economic exchange is based on a judgement of the quality of an object as some relations are deemed as more relevant than others (Callon, Méadel, and Rabeharisoa 2002). There needs to be an agreement that a greenhouse gas is a qualified object to be reduced in the atmosphere, for instance.

Callon (1998a) also points to the fact that markets are endless sources of (negative) externalities, which he calls overflows, encompassing everything which is actively put outside of such framings. A classic example for an overflow is air pollution. Often not inside an economic calculation, it is excluded from the economic framing, since air pollution doesn't bare a cost for the economist (Callon 1998a). This makes it an overflow; as such, overflows cannot be prevented by design, they are part of the framing process; "it is one and the same movement" (Callon 1998a, 38), because there will always appear new overflows, since every frame has an 'outside'. Callon (2009) points to the idea that spokespersons from the outside can make those overflows visible, thus potentially destabilizing framings.

4.2.2. Concerned markets

Markets in which overflows are constantly discussed, have been regarded as 'concerned markets', or 'civilizing markets' (Geiger et al. 2014; Callon 2009). An example for such markets are the palm oil market, or indeed the carbon market (Geiger et al. 2014; Callon 2009). Because the mechanisms of these markets have been triggered by criticism, for instance because they overlook human-rights issues, they have developed more 'moral' or 'ethical' market practice, and activities to change their framing by developing new criteria for how transaction should be undertaken or validated (Callon 2009). Drawing on Latour's notion of matters of concern, according to Callon, a civilized market is one,

> "that organizes the discussion of the matters of concern produced by its functioning and the framings/overflowing that it entails. It takes those matters of concern into account and sets up procedures and devices designed not only to encourage the expression of problems which arise but also to facilitate the design and evaluation of theoretical or practical solutions to those problems." (Callon 2009, 541)

Overflows, or matters of concerns, can be constantly renegotiated in such markets. Market mechanisms might adapt from a challenge from the outside, in order to maintain or improve functioning. This then makes a market more 'civilised'. When markets are challenged from the outside, one could speak of a 'hot' situation (Callon 1998a). If such concerns are taken seriously, and new practical solutions are developed, these markets can, so to speak, cool down. The carbon market as a concerned market also plays a central role in this case study. The criticism brought forward by different actors, has contributed to its development in a novel direction, and it will be investigated how CPH navigates in such a market.

4.2.3. Valuation studies and role of devices

How goods receive or loose 'worth' is a curious question, and particularly so in the carbon market. Such questions are followed by the interdisciplinary field of Valuation Studies, a field sharing many similarities with the previous approaches, as much of the work in Valuation Studies draws on pragmatist, ANT-inspired inquiries into the market and its objects of exchange (Helgesson and Muniesa 2013). A main focus is to follow valuation-in-action, to understand how actors create, maintain, or challenge diverse values in moment-to-moment practices (Helgesson and Kjellberg 2013).

The role of devices in stabilizing and specifying what is considered worthy in a market and in other locations, is a central study object in the field of ANT-inspired market studies and valuation studies. Devices can perform valuation for actors, for instance in the form of a set of labels, judgements or rankings. In this view, they stabilize, reflect, shape and perform particular valuation criteria in the market and other locations (Muniesa, Millo, and Callon 2007). While devices in everyday language might be imagined as a concrete artifact, such as a headphone or a TV controller, here these refer to a broader system of relationships between human and non-human entities (Lury and Wakeford 2012). In this perspective, devices do things, they categorize, exclude, list and probe, always drawing on heterogeneous actors (Lury and Wakeford 2012). A sensitivity to objects, characteristic for ANT as well, is visible here, as devices encompass hybrid material-discursive assemblages (Muniesa, Millo, and Callon 2007). In a market context, Muniesa et al. (2007) describe the notion of devices as objects with agency, either nudging or forcing actions. Devices can also intervene in dispelling uncertainty (Barman 2015), for instance, when a certain label is used to 'proof' to the outside that a product is to be considered 'environmentally friendly'. With this example it becomes clear that devices don't only represent an outside world, they are not neutral; they perform a reality, they render explicit and produce objects, rationales and orderings (Muniesa, Millo, and Callon 2007; Law 1994). This is possible since devices are said to "operate on multiple spaces and are attentive to the empirical intricacies of agency. They pay particular resistance that defines the reality of the world surrounding them" (Muniesa, Millo, and Callon 2007, 1). Muniesa et al. (2007) point to the fact that devices are reactive to their environment, for instance, they might have been designed as a reaction to criticism from the outside of the status quo of a market. The role of devices will be a focal point of this study, as they can 'nudge' carbon offsetting in a particular direction.

4.3. Navigating on plural valuation registers

A theoretical framework to deal with the plurality of values in the market is offered by Boltanski and Thévenot's book "economies of worth" (Boltanski and Thévenot [1991] 2006). Their perspective shares some similarities with Latour's standpoints, together, Boltanski, Thévenot and Latour are considered the core of what is called French

pragmatism, as they for instance all embrace the situational material constraints in which actors find themselves in (Blok 2013). Yet, also some potential challenges need to be discussed when combining these approaches.

4.3.1. 'Orders of worth' framework

In a series of empirical studies, Boltanski and Thévenot (2006) describe how people justify their actions in a wide variety of situations. According to their model, actors constantly look for the common good in everyday interactions and draw on a plurality of moral evaluations. The authors describe six common worlds, to which people mostly resort to when encountering dispute; these are the market (valuing competition, money, profit), industrial (valuing science, productivity, planning), civic (valuing civic solidarity, the collective, equality), fame (valuing reputation, success), domestic (valuing attachment, tradition, honesty) and inspired (appreciating charisma, creation, uniqueness); later, a green order was discussed (valuing ecosystem, sustainability, future generations) (Lafaye and Thévenot 1993; Thévenot 1996). These common worlds justify what should be done or not, what is more valuable or less valuable to the actors.

Yet, it has been discussed whether the green order might pose a challenge to another consideration; whether or not it is actually compatible with other orders of worth is potentially problematic, since consideration of future generations and a worldwide ecosystem might surpass time and space horizons of other orders of worth (Banoun, Dufour, and Andiappan 2016). This challenge cannot be fully discussed here, but hints to some of the inherent tensions one needs to be aware of when considering actors trying to combine various orders of worth.

I recognize a challenge when combining (market-)ANT and the orders of worth approach. While ANT follows actors in an agnostic way and refrains from rigid theory-building, Boltanski and Thévenot build more generalized categories of justification. Being aware of this tension, I acknowledge orders of worth as a useful compass when following the actors. They support this study as practical categories when it comes to grasping the hybridity and multiple values they navigate between, yet, I do not intend to carry out a study fully compliant with their very rich framework. I will refer to these common worlds as orders of worth or valuation registers by which the actors navigate.

4.3.2. Homo carbonomicus

The notion of the multiple spaces on which actors operate on, speaks to the plurality of values in economic markets, also in the carbon market. Being tied to various ideas of what is considered valuable or not, Blok (2012) describes a new form of market actor, *homo carbonomicus,* which can be enacted in a business context, but also on the side of consumers. This actor positions itself against different values, aiming to combine market, green, and sometimes industrial values, a price and carbon-calculating agent. S/he is therefore the ultimate hybrid; a techno-ethical figure entangled in political, market, and environmental concerns (Blok 2012). The *homo carbonomicus* might thus count as the epitome of the destabilization between environmental and economic valuation, as this figure acts across seemingly divergent values, rendering them commensurable. Thus, when referring to *homo carbonomicus*, I point to the idea of an actor navigating between these plural values.

4.4. Quantifying the environment: examples

Accounting and numbering can play a role when it comes to how nature is being transformed and reinforced through particular interventions. Here, two ANT-inspired case studies shall be presented to give an example of how a material semiotic and network-based perspective can serve as inspiration to understand the role of data-practices in relation to the environment.

Inspired by pragmatist conceptions of politics, many contributions in STS have turned to the idea of an 'issue' (Marres 2007), a term which shares similarities with what Latour described as matters of concern. When 'issue-framing' activities take place, companies, individuals or civil society groups mobilize attachments to make their issue heard. In an environmental context, Asdal (2014) asks how the Norwegian Ministry of Finance takes an emerging climate issue into account. She argues, while a pollution control office would be issue specific – it should reduce emissions – the finance institution in her case is issue non-specific, it rather acts as a machinery in which all sorts of unspecified issues need to be fed through. In the particular ministry, Asdal shows, how an abstract 'climate issue' became transformed into an 'oil issue', as it was enacted through various accounting and planning technologies. As such, it became a 'fixed' object rather than a form which is constantly changing. She urges researchers to be alert how issues enter, emerge or get

transformed within an administrative setting. In this view, accounting practices do not only describe and deal with already pre-existing entities, they also help perform realities. Thus, Asdal states, we shouldn't take 'the climate' in discourses for granted, but be attentive to how, in practice, this is performed within accounting and administration. Her perspective is inspiring for this case study, as it makes curious how a 'climate issue' might be performed by CPH.

When it comes to 'what counts' in relation to nature, Whitney and Kiechle (2017) give an insight about the various roles numbers can play when actors are considered in their concerns. In their text 'Counting on Nature' (Whitney and Kiechle 2017), the authors build on a field of STS-inspired number-studies which has established the view that organizations not only make nature quantifiable, but that numbers can inscribe stories of how to approach the future. With the example of demonstrations at the 2015 United Nations Climate Change Conference, they show how demonstrators signposted numbers to support the idea of two climate futures; green signs showed that an increase of global temperatures by 1.5°C degree would signify 'hope', whereas red signs with the number 3°C would stand for 'doom'. The different numbers were meant to influence the political decision-making towards the desired number, 1.5°C degree. Thus, the authors regard them as carriers of moral-political messages during the controversy, they are not 'just' numbers, but tell a story. They ask:

> "Are numbers merely fact and/or rhetoric, or are they available as meaningful bodily experiences and stories about the past, present, and future? How do conflicting forces attempt to make different meanings from numbers? How does the practice of quantifying nature differ between corporate, state, and non-state actors?" (Whitney and Kiechle 2017, 4)

These questions shall inspire the analysis when it comes to numbering, as they shift attention towards what numbers can tell, which concerns are brought forward, and how they shape what is at stake. In this view, numbers can carry more value than a 'mere' number value, numbers do not act as mute facts, but can speak for a broader concern around the future.

The next section will move beyond the network approach and bring ideas of how to deal with a plurality of voices, which this case study aims to include.

4.5. Moving beyond one network

The following chapter will introduce two notions which can bring additional perspectives on to how to grasp the complexity of this case study. This is due to the fact that the study aims to include various perspectives, as it aims to also include viewpoints of environmental activists, which can not only be explained from a perspective from 'within the network'. To begin with, I would thus like to introduce some criticism of ANT and a perspective on 'tension zones'. Annemarie Mol's notion of multiplicity follows.

4.5.1. Starting from tension zones

Criticism has been raised against ANT for its primary focus on 'within the network', thus, for not paying enough attention to questions of exclusion (Star 1991; Haraway 2018). In ANT, those actors are regarded as powerful, which are enrolling in a large network. Instead, Star (1991) suggests a starting point from 'tension zones', moments which challenge networks, which in turn also allow to make more visible what is inside the other seemingly stabilized network. Good points of departure could be those points where translations are perceived as frictions (Star 1991), where these become matters of concerns. These occasions would remind us that it could always be different (Bowker et al. 2015). I align with the idea to include destabilizing perspectives from outside the network to acknowledge the diversity of standpoints, beyond only focusing on the CPH network. These perspectives can point to exactly the idea that other ways of engaging with the world exist, potentially subverting seemingly stable framings. In light of potential alternatives, the concept of multiplicity shall elaborate on how such different realities could come across.

4.5.2. Multiplicity and multiple orders of worth

While the classical ANT-perspective tends to see actors as living in one shared world altogether, Post-ANT, or multiplicity-oriented ANT, proposes the view that people live in *different* realities, a stance which is referred to as the ontological turn (Farias, Roberts, and Blok 2020; Mol 2018). The concept of multiplicity can be seen as a key difference to what is called more 'traditional' ANT research (Gad and Bruun Jensen 2010). This concept has been brought forward largely by Mol, who described the multiplicity of medical practice in

her work on the illness Atherosclerosis (Mol 2002a). A phenomenon, in her case the illness Atherosclerosis, is enacted differently through a range of tactics and ways of treating the body. Activities such as measuring, taking pictures, sending files, and holding scientific conferences would enact very different illnesses (Mol 2018). She argues that different versions of the world don't just come across due to different interpretations of one world; instead, all actors live and act in multiple realities, in the plural. Following Vikkelsø (2007), integrating a multiplicity perspective does not need to be at odds with basic ideas of more classic ANT (Vikkelsø 2007). Instead, it means expansion of the analytical focus on multiple realities, a relocation of not only following a 'within' the network, but also tuning into how other actors enact coexisting realities (Vikkelsø 2007). This perspective thus seems to align with Star's perspective as mentioned above.

An example of multiplicity and the orders of worth framework has been put forward by Anders Blok (2013). He elaborates on a major stumbling block when thinking about the common good in relation to ecology; namely, whether there actually is *one* unified green order. In a comparative analysis of the role of ecology in writings of Thévenot, Boltanski and Latour, he states that

> "it is not simply that 'nature' is valued and tested via different co-existing orders of worth (…). On top of this pluralism, we need to add the multiplicity suggested by the observation that what qualifies as 'ecological' is both more loosely codified, and more politically diverse" (Blok 2013, 494)

than either of the writers would suggest. Following Mol, he refers to bringing forward the multiplicity of natures, in an ontological sense, where different processes of material-discursive ordering of nature are not fully overlapping or equivalent. Different to what Thévenot and co-authors imply when conceptualizing a new green order, Blok states that this green order can be very distinctly furnished. He shows that "sustainability is a fragile grammar" (Blok 2013, 500), torn in between at least the worlds of differently equipped green, market and industrial worths. This perspective sharpens the view to be critical about the very particular way a potential *green* order is enacted in the respective situation during this case study.

The next chapter shall give an overview of the methodological approach to address the research question which deals with, to remind the reader, of how carbon offsetting is

practiced in CPH's climate strategy, and how it relates to concerns of environmental activists.

5. Methodology

In the following chapter, I will illustrate the methodological framework which guided my way in and through the field. Here, considerations to approaching and entering the field, data collection and analysis will be presented, and what role the choice of methods plays regarding the empirical findings.

5.1. Ethnographic approach

In line with a constructivist understanding of socio-technical matters, it was important to approach the field not as pre-given and absolute, but to let the field unravel itself (Tjørnhøj-Thomsen and Whyte 2007). The network view of ANT inspired the access to the field and the methodological choices undertook. ANT comes with a degree of methodological flexibility, but the ethnographic case study approach could be called 'a classic' (Elsayad 2017). An ethnographic approach to case studies brings the advantage of being able to follow the heterogeneous practices between actors and devices in multiple locations and pay attention to their unfolding (Law and Singleton 2014); suitable for a context in which one needs to be attentive to very detailed steps of translations (Baiocchi, Graizbord, and Rodríguez-Muñiz 2013).

The ethnographic approach follows George Marcus' mode of 'multi-sited ethnography' (Marcus 1995). Challenging the established idea of single-sided ethnography, Marcus makes the argument that fields are often very fluid and rely on the circulation of objects, identities and meanings in diffuse time-spaces (Marcus 1995). A mobile approach to exploring the field works well in the context of this case, if one considers that carbon offsetting is per se a multiply situated practice, depending on the imagined 'displacement' of its objects, emissions. In this study, I combine Marcus' suggestion to follow stories (such as stories about a 'greener' future), things (such as CO2), and conflicts (such as anti-airport movement groups) (Marcus 1995). These aspects are interrelated and help to understand

the carbon offsetting scheme and its embeddedness in a controversy, where metaphors, emissions, money, planes, narratives, and standards travel through the network.
Rather than covering a broad area of research, the starting point was a specific phenomenon and thus builds on a case-study format (Flyvbjerg 2006). This is a relevant method in the range of social science research, as it provides in-depth knowledge of a particular case, from which profound insights into dynamics and rules can be gained which surround a phenomenon (Flyvbjerg 2006).

5.2. Entering and navigating in the field

Different routes exist to enter the field which can be considered as often the most demanding part of the anthropologist's fieldwork (Tjørnhøj-Thomsen and Whyte 2007). The anthropologist needs to make strategic considerations about the viability and advantages of access points, which shall be explained below together with the different practices undertaken.

5.2.1. The airport network

The primary focus for approaching the network of CPH were texts. According to Dorothy Smith, texts are vital when doing institutional ethnography, as they are a central part for the organization to replicate information, which in turn constitute the organization itself (Smith in Widerberg 2004). Documents seemed relevant for anthropological inquiry, as the airport itself is hardly accessible to an outsider. Documents build a major part of their external communication which is indicated by the large digital archive. According to Smith (2001), texts and documents are not merely information *about* the institution, but they need to be seen as coordinators of other people's actions. Texts allow to reproduce words, images, and statistics in various spaces, thereby authorizing and spreading institutional logics to the outside (Smith 2001). One of my entry points to texts formed the news-collection of the airport's webpage, as here the carbon offsetting project was advertised. Links were followed to other documents which included planning and development plans, financial statements and annual reports. The material was collected and structured in a separate table after document type, year, content, and target group (Justesen 2005, Appendix B). Together, 29 documents were analyzed. Documents were in Danish and

English language; relevant quotes were translated. With this collection, a point of satisfaction was reached, as new documents did not deliver surprisingly new material. As the carbon offsetting project was advertised in 2019, most data collection revolved around this year. Earlier publications of CPH were also taken into account, as these would allow to trace potential shifts in communication, a few sources during 2020 complemented the search.

Besides the available online material on the airport's main website, contact was sought with the planning department with the goal to engage with emission tables for understanding framings and potential overflows; however, the request only resulted in a generic Annual Group Report copy being sent. Not finding what one asks for in itself can reveal information about the field (Hammersley and Atkinson 2007), as it teaches the anthropologist to understand potential boundaries or sensitive information. In this case, it reinforced the boundary felt from the outside to engage with material used inside the corporation, but also meant to be even more critical over the digitally mediated information. I followed Rajak's (2011) advice for anthropologists dealing with Corporate Social Responsibility (CSR), to be critical about CSR and see it as performative valuation-in-practice, in which the institution reinforces itself to the outside through often 'glossed over' values.

Besides, a request for an interview[8] was re-directed to an employee having worked with the airport's environmental issues (Appendix C). This also shows how responsibilities are distributed in the field, as the environmental department itself forms a different unit than planning. The employee working in a managing position asked for anonymization and will be referred to as CPH env. advisor, Copenhagen airport environmental advisor.[9] For the interview, descriptive questions were chosen (Spradley 1979). Descriptive questions bring the advantage of less likely reflecting the ethnographer's culture, but leaving it to the interviewee to elicit "a large sample of utterance in the informant's native language" (Spradley 1979, 49). The interview sought to ask for instance, how the offsetting project was approached, and gave the opportunity to ask questions around definitions which remained open after document analysis. The interview allowed to find a story and native

[8] For all interviews conducted in this report, oral and/or written consent was sought from the interviewees. All interviews with airport and activists were conducted in English and made use of the platforms zoom or skype for business.

[9] Due to the on-going Covid-19 pandemic at the time of data collection, the airport's, as well as the activists' responses were significantly delayed, as their aviation-related work tasks were heavily disturbed by the circumstances.

language in addition to the documents, which was regarded as very beneficial. Besides, the interviewee yielded the impression, that carbon offsetting is not a stand-alone project, but that it mattered for the airport to see it in context to other energy-saving practices. This became obvious since the interviewee spent much time explaining a range of other energy-related practices. It was kept in mind that the respondent is likely trained in answering research or journalist-questions, which means that the researcher needs to be aware of rhetoric spins (Rajak 2011).

Besides this, traces were followed from the web content to partners involved in the specific carbon offsetting project; additional 11 documents were scrutinized (Appendix D). It was expected to obtain a better idea of how the project transforms between the actors. Further requests for interviews with a standardizer and an NGO involved in the project, did not yield responses. This also reflects limits of this approach. The aspect of relational work, the negotiations between the various actors CPH engages with, might be hardly accessible as a researcher, and thus only as far reachable as they are presented in CPH's web content.

ANT comes with the methodological challenge to stop research at some point, as chains of translations go on endlessly. Research stopped when the relevant actors and devices in the formation of the project were identified; thus, research excluded in-depth inquiry of actors in the local carbon sequestration project, for instance. This represents a potential further trace to better understand how the carbon offsetting project is put into practice, for grasping the full 'life-span' of the project.

5.2.2. The environmental activist network

An entry point into the controversy around CPH's environmental strategies, was the environmental activist network of Bevar Jordforbindelsen. Contact with this group was meant to give rise to the multiplicity of concerns, and an appointment for participant observation during a group meeting was arranged. Participant observation proved as a rich method to sharpen awareness of internal group dynamics; it was possible "to tune in things usually tuned out" (Spradley 1980, 56). For instance, observation helped to understand that some members spoke in rather 'technical terms' about aviation, while others chose a more emotional register. This impression also guided the selection of quotes in the analysis, in order to show different patterns. Besides, participating in a group allows the researcher to

get an impression of routines and emic vocabulary (Spradley 1980). Emic vocabulary from the activist groups also helped to be more attentive to the vocabulary the airport uses in contrast.

Contact was established with two members for follow-up interviews (Appendix E). The interviews were based on descriptive questions (Spradley 1979), in order to find out what motivated the members to join the group, and to investigate their knowledge claims. The interview as well focused on imagined futures, as this could give a general impression of the activists' values and framing of the situation

In addition, a web search was conducted into documents of the group's online communication. Many of the linked webpages of Bevar Jordforbindelsen reference Stay Grounded, the umbrella organization. These links were followed and complemented the online literature of the Danish group. Reference between two groups can be seen as a sign of organized collective activity (Hammersley and Atkinson 2007), which confirmed the impression that the networks work closely together. Together, 7 online documents were analyzed deriving from Bevar Jordforbindelsen's and Stay Grounded homepages (Appendix F). In addition, a written interview was conducted with a Stay Grounded member (Appendix G). Questions were chosen to describe what CPH is doing in relation to carbon offsetting, allowing to establish a form of dialogue between the two networks. The interviewees are pseudonymized as 'Member of BJ A/B' (Member Bevar Jordforbindelsen A/B), and 'Member Stay Grounded' for the member of the umbrella organization.

5.2.3. Interview with a professional in the carbon market

An interview with a person working in the carbon market should yield knowledge on different standards, calculations, practical considerations, and current trends within the carbon market. Conducting interviews with professionals can shorten otherwise extensive research in a field, and is especially relevant in fields regarded as intransparent (Bogner, Littig, and Menz 2009). It became clear that access towards practitioners in the carbon market is difficult, hence, only a very transparent organization would reveal practical information, a quality the German offsetting NGO Atmosfair was appraised for in several tests (Atmosfair 2018). An interview with Edwin Zijderveld working in business

development and CO2 reporting provided in-depth insight into practical procedures, metrics and guidelines in the area of CO2 offsetting (Appendix H). Yet, interviews with people considered as experts run the risk of accepting this knowledge as undisputed (Bogner, Littig, and Menz 2009). In this case, insights were used in addition to the academic literature for the scientific-technical introduction and for background information, while practical insights into calculations was double-checked with emission tables which the interview partner provided. The interview was conducted in German.

All ethnographic fieldwork took place during March and May 2020. Figure 2 shows milestones of the data collection process.

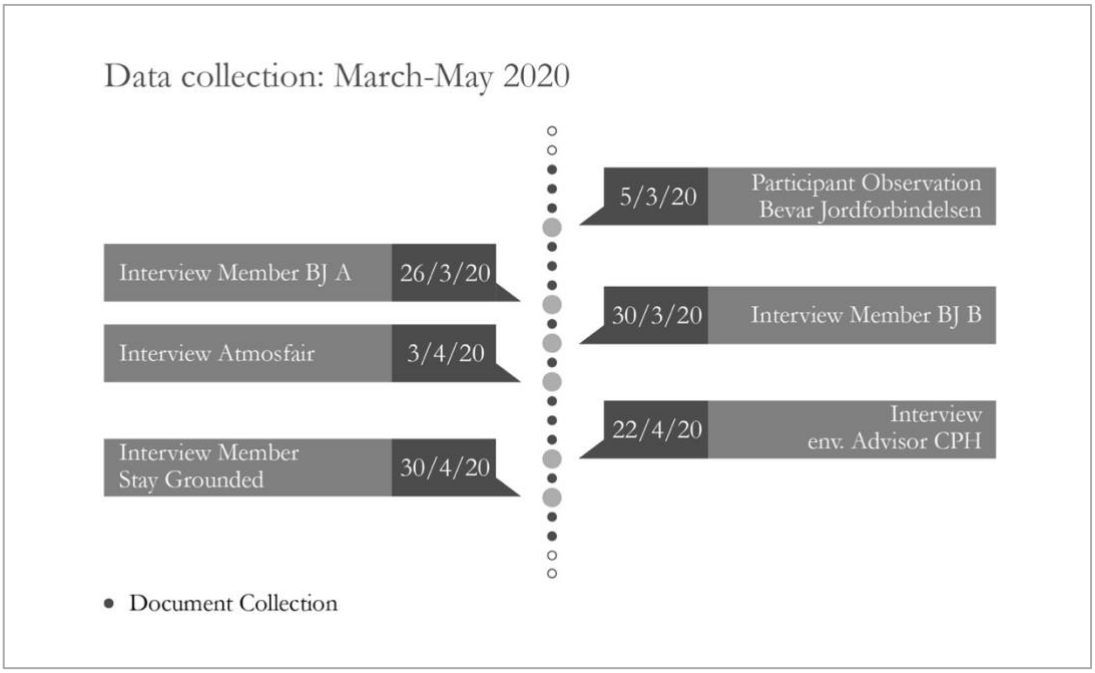

Figure 2 - Overview over data collection.

5.3. Data analysis

The gathered data encompassed documents (n=47), field notes from observation (n=1), one written and several transcribed oral interviews (n=5). Data was coded with inspiration from analytical perspectives. The expert interview was scrutinized for trends, guidelines, uncertainties, and specific vocabulary used in the carbon market. What was looked for were ways in which the data speaks within the theoretical discussion and what new insights it provides into the field (Hoek 2014). For the airport and activist interviews, recognizing

patterns of temporality was guiding, for instance a focus on 'the now' and 'the future', allowed to understand the temporal composition of narratives (Wutich, Ryan, and Russel 2015). In the analysis, attention was paid to what is left out in the framing of the airport or activists and understand if this gap is covered by other actors.

Making categories was inspired by the orders of worth framework (Boltanski and Thévenot 2006) in order to make multiple positions visible. When categories were built, it was however important to understand those as constructions from within the field. This comes with a potential difficulty, as it misses shades or subtleties. Yet, the categories helped to make clearer the hybrid values which actors refer to and how they define these differently.

6. Analysis and discussion

This thesis seeks to answer the question, how the carbon offsetting project is practiced at CPH, and how this relates to concerns of environmental activists. The first part will show the complexity and subtle issues of this phenomenon by following actors and devices, and what happens in between them. With this, the analysis seeks to exemplify that carbon offsetting is not an abstract concept, but nested in various decisions and framing processes which form its shape and outcome. Following Latour (2008), agencies should be introduced bearing their concerns in mind, by making their stabilizing mechanisms noticeable. These modes of stabilization are to be traced. As a compass, Boltanski & Thévenot's orders of worth will be written in italics, when I identify the actor relating to one or the other category. This will later help to put the gathered orders into dialogue with activists. The insights of this analysis shall then be discussed with chosen meeting points with environmental activists.

The next part will investigate the valuation registers which are present in relation to CPH's climate strategy, in which offsetting is nested.

6.1. CPH: "Growth must be sustainable"

CPH's Annual Report 2018, the annual summary in which CPH presents various CSR and financial achievements, is named 'take off for a sustainable future'; it is the first one ever

carrying the name 'sustainable' in its title. The report starts with the following perspectives from the Board of directors:

> „Everyone should have the opportunity to experience the joy of travel, to experience new cultures, exchange knowledge and goods and to grow as citizens of the world. This creates development for both the individual and society in general – and it generates progress and wealth. But the growth must be sustainable. That is why we are focusing on a new climate strategy." (Copenhagen Airports A/S 2018, 5)

The climate, CPH notes, has taken a more relevant position in international and their own agenda (Copenhagen Airports A/S 2018a). This is a moment, in which an old arrangement seems to be called into question – a matter of concern sets things in motion, the aviation industry reacts. Sustainable growth stands on equal terms with the climate strategy.
Before going into more depth with the climate strategy, the next part will explore how CPH establishes this growth register and links to various actors, which seems central for understanding how the climate strategy will be addressed. The following will elaborate on the stabilizing mechanisms which play out in CPH's material, and which different valuation registers are mobilized in relation to growth and airport expansion.

6.2. Taking things for granted: Growth

In CPH's Masterplan Authority Report (Copenhagen Airports A/S 2019c), a report describing and visualizing the expansion by drawing on several statistics, the need for expansion is invoked with the explanation that growth has happened almost continuously during the past. And thus, it says, will continue to do so in the future. The report's name hints to fact that such calculations indeed are to be seen as a higher authority. The parameters used for prediction are based on the assumption that there is a 'demand' out there, which CPH needs satisfy (Copenhagen Airports A/S 2019c, 46). Callon (1998a) points to the fact that the idea of supply and demand relies on complex forms of agreement-making between the actors, which need to agree that a tradable good is considered worthy. Seen in this perspective, CPH appears to have agreed to the idea that the worthy good is aviation, and that this should continue to be so. Referring to calculations of the International Air Transport Association (IATA), Airport Council International (ACI), and historical developments within Copenhagen, the airport performs a viewpoint in which 'demand' increases rapidly (Copenhagen Airports A/S 2019b, 19; fig 3). IATA is

a body which aims to represent and lead the aviation industry, and has the role of "serving" (IATA 2020b) the industry. ACI's primary goal is "to advance the interests of airports" (ACI 2020). These actors work together and offer technical support to aviation policies decided by the International Civil Aviation Organization (ICAO). Thus, these actors also have their own concern in promoting the aviation industry. The numbers and figures help perform an authoritative instance out of which CPH translates the necessity to expand (Copenhagen Airports A/S 2019c).

Figure 3 - Yearly passengers as calculated by CPH in millions starting in 1990 with different projections until 2045 of IATA and ACI. 1,9 and 2,5% growth per year represent the airport's own calculations (Copenhagen Airports A/S 2019c).

It becomes visible in the figure that the airport plans for a long-term future and follows the idea of extrapolation by assuming that past trends will continue in the future. Here, the airport enacts an *industrial* order through the notion of a probabilistic future, in which planning horizons for a reliable infrastructure project are crucial. This also relates to a certain imagine of the future of global tourism and business in which the idea of unlimited connection through air travel is accepted, seen as possible and necessary – to which

certainly the growth of airports and flight connections contributes to. While passenger-growth is mirrored in the historic numbers, exceptions of such have also occurred before, visible in the shortened bars in figure 2[10]. At the current situation of data-collection, numbers of passengers dropped to a statistical low due to the Corona pandemic, which could be seen as another outliner (Copenhagen Airports A/S 2020a). However, this event might also point to the weakness of linear predictions; an example making clear how passenger growth is not only a fact, it is potentially a fragile issue, a characteristic of which matters of concern are made of (Latour 2004). It is a concern for the airport to grow, in order to maintain relevant in the future. It became clear during the Covid-19 crisis that the aviation sector is indeed more fragile than these number suggest. The airport is in potential risk, and linear predictions more tenuous than one might think. Inspired by Whitney & Kiechle's (2017) questions about who counts and to what purpose, one might ask, why the airport calculates; the graph actively performs a story of the future of the industry – in this context, this performs a vision in which there remains little doubt that the future could come otherwise; they play part in the legitimation process that the airport has to expand (Copenhagen Airports A/S 2019c).

As a business, CPH also clearly acts within the *market* order. In various news reports between 2014 and 2016, the need for a strong market position is put forward (Copenhagen Airports A/S 2014b; 2016). CPH states that it is Northern Europe's preferred airport and wants to keep this position and can only remain relevant in the European airport business, if it stays financially strong (Copenhagen Airports A/S 2016). In a business release, the airport states that it is still "hungry" (Copenhagen Airports A/S 2019j) to fill unserved routes*;* more routes mean more passengers, and thus will give the airport a better market position, as explained in an Interim Report to the Copenhagen Stock exchange CPH (Copenhagen Airports A/S 2016). As part of the stock market, it is guided towards capital-accumulation and therefore follows the established market-rule of competition, which defines the relations between actors in a market-network (Callon 1998c). As a market actor, the airport also has to satisfy investors, it needs to project itself into the future and invokes the idea of a trustworthy business.

10 For instance, due to the September 11 attacks in 2001 and the economic recession in 2008.

Its financial responsibility as an actor is also linked to satisfying other financial actors, who are bound to the airport through financial ties, such as Foreign and Private Investors, and notably the Danish state as an actor, the second-largest shareholder at CPH. At the same time, CPH is also liked to the Danish State through a National Aviation Strategy Plan (Ministry of Transport, Building, and Housing 2017). This plan plays a role in CPH's network, in so far as the Danish state supports growth of Danish and International aviation in the coming decades, as it is deemed beneficial for the country's economic growth and employment (Ministry of Transport, Building, and Housing 2017). The ties to the Danish state become clear when the airport actively draws on numbers which shall prove its value as a responsible employer (Copenhagen Airports A/S 2016; 2019a; 2018). Relating to the *civic* order, the airport is actively proving its own value in relation to job creation for Danes, which would become more plentiful through expansion (Copenhagen Airports A/S 2016). Thus, the airport also invokes the notion of a moral actor towards the citizens of Denmark. This perspective can be found in various other new reports and Annual Group reports (Copenhagen Airports A/S 2018; 2019f; 2019a; 2020c); in a state based on a market economy, creating jobs can likewise be seen as a stabilized state of affair - a necessary and accepted requirement for people sustaining their everyday lives. CPH thus acts as an actor concerned with its own growth, but also partly as state-actor, since the Danish state owns 39,2% of shares of the airport (Copenhagen Airports A/S 2019a). This means the airport is a hybrid in the sense as it has a formal responsibility towards the citizens of Denmark, and own financial interest.

Civic welfare is also mobilized through other notions, the idea of flying as a form of connectivity. In a news release, CHP states that "new routes give Danes better access to the world and the world better access to Denmark" (Copenhagen Airports A/S 2016). Thus, also here, the idea of growth becomes visible as a stable, accepted condition, that the Danes would accept from the airport. CPH mobilizes the idea of connectivity as part of collective welfare for Danes, it frames that new flight routes would give "better connectivity builds wealth for all" (Copenhagen Airports A/S 2019a, 24), this vision is mobilized by a world map (fig. 4). Likewise the passenger growth prognosis of above, it could be seen as a tool to make the vision of the future stable; following Law, the map could be seen as a durable material which contributes to stabilizing CPH's network, and its relevance in the future (Law 1992).

Figure 4 - CPH's idea of the future, planned route development around the Globe. Figure subtitled "Better connectivity builds wealth for all" (Copenhagen Airports A/S 2019a, 24).

This notion is invoked in several other examples when the airport mobilizes the vision of "cultural and human values" (Copenhagen Airports A/S 2019c) which travel brings. The common good which is referred to is made up of a form of united world in which air travel would be essential for human wellbeing (Copenhagen Airports A/S 2020c). It seems to be regarded as unnegotiable that Danes would reduce flying in the future.

Out of the material emerges that CPH performs a hybrid of *industrial* and *market* orders, together with *civic* registers, where growth comes across as taken for granted. Similar to the scientists described by Latour and Woolgar (1979), which relied on a stabilized network to establish an orderly scientific practice, one could argue that the embeddedness in these hybrid links allows CPH establish an orderly airport-practice. Changes in parameters would mean a risk to its functioning, and thus need to be actively maintained by performing a world in which the airport projects relevance into the far future. By reciting these growth-perspectives in various organizational documents, and reiterating that the future airport requires more space, passenger growth and expansion seem as a given (Copenhagen Airports A/S 2014b; 2014a; 2016; 2018; 2019h; 2019a; 2019h; 2020b; 2020c); Following Latour, one could argue that these reproducing mechanisms are stabilizing growth in a heterogeneous network (Latour 1999). In such a perspective, according to Blok and Jensen (2011), the more often a condition is reiterated, the more it enrolls in an organizational

network and becomes taken for granted. This view is also conveyed here; it could be argued that the distribution of facts and values, of statements, graphs, and numbers makes the idea of growth appear as a stabilized goal. Departing from this insight, the next chapter will move further into how the climate strategy is nested in this context.

6.3. The shape of a climate concern

In relation to the initially mentioned idea of "sustainable growth", CPH elaborates on how this reflects in the climate strategy. Here, an apparently abstract concern regarding the climate, is brought into a concrete strategy, a seemingly *industrial* way of approaching and measuring it. The following statement makes clearer how the climate is addressed by CPH.

> "Our core business is air travel, and we are very concerned about how we take on our responsibility and contribute to the industry to jointly create real improvements to reduce carbon emissions and other elements affecting the climate." (Copenhagen Airports A/S 2018, 20)

The responsibility to "the climate" is framed as a concern – being concerned about the climate comes across as a mix of elements within the industrial, market and green orders, since the airport sees climate-related efforts as a joint undertaking to "contribute to the industry" and stay with its "core business". It becomes clear that CPH's business model, based on growth, is the stable component, elements of the *green* order appear as an add-on. The goal is to "explore how the industry can transform to stay competitive in the future" (Copenhagen Airports A/S 2019k), thus the climate shall fit into the *market* and *industrial* orders. This is defined by a reduction of carbon and "other elements", indeed a big translation process, since an abstract environmental problem is pinned down to a reduction of carbon emissions and an inexplicit formulation of additional elements – which remain open. As with Asdal's (2014) example, in which an abstract notion of a 'climate issue' was translated into an 'oil issue' within a ministry, here it could be said that CPH pins down the concern around climate change to a concrete 'carbon' issue. Rather than seeing climate change as a multi-layered, complex phenomenon, CPH performs a view in which the climate can be controlled through the right technologies. This framing also articulates which kind of action is to be taken.

Bearing the previous insights in mind, the next chapter will show how carbon offsetting is practiced within CPH's climate strategy. Thus, the chapter will follow the actor's traces

into the carbon market. It will show how the form and shape of the offsetting project and its boundaries are negotiated and specified in practice, which translations and framings take place, and which valuation processes give it its particular character. The first focus is the target to become a 'carbon neutral' airport.

6.4. Towards 'Neutrality'

CPH is member of ACI, Airports Council International, the main trade representative for airports (ACI 2020). This is the same actor which appeared in the passenger-growth statistic above, notably giving the highest calculation of passenger growth numbers. This actor is thus also nested in its own concern in airport and aviation growth and acts as a body which gives recommendations for airport management (ACI 2020). In 2009, ACI had launched a scheme called Airport Carbon Accreditation (ACA) scheme, a voluntary scheme for airports to work with carbon emissions (ACI Europe 2009b). This scheme can be considered as a concrete device, which directs action into a particular direction (fig. 5). The goal of this scheme is to allow airports to become 'carbon neutral'. CPH had already been involved in this scheme for several years, yet, without reaching the goal of neutrality. As the first milestone of the climate strategy, however, it says to commit to this goal. (Copenhagen Airports A/S 2019i). As the scheme is based on voluntary commitment, this could be seen as a sign, that CPH reacts to the heightened awareness around sustainability-concerns and 'upgrades' to 'carbon neutrality'.

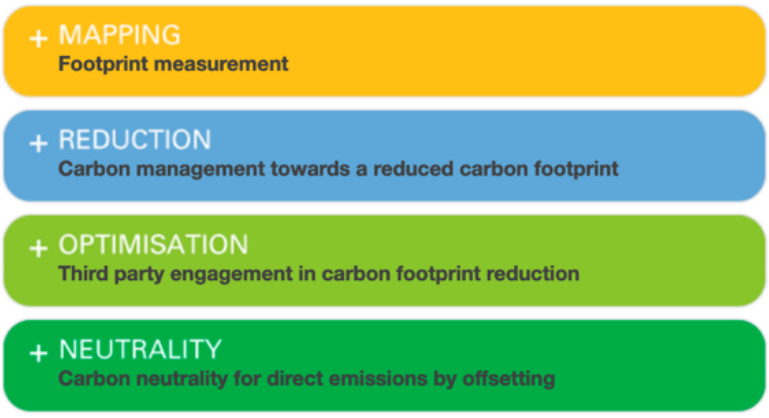

Figure 5 - Ranking of carbon measures of the ACA scheme. (ACI 2020a)

The 'carbon neutral target' is embedded in a hierarchy of measures. As the color code suggests (fig. 5), 'carbon neutrality' stands as the 'greenest', as if the best, of measurements; a perspective inspired by valuation studies can show that rankings are an indicator to see what is considered as valuable according to specific standards, having the power to render explicit what is considered the highest possible achievement for actors (Strandvad 2014). As a device for valuation, the ACA scheme hints into the direction to what is regarded as the 'proper' way to act in the world (Barman 2015). Seen in this light, the set of parameters defines what is considered as worthy in the *green* order. In this case, 'carbon neutrality' is ranked as the best option, being achieved through offsetting. However, offsetting is not a stand-alone; it is embedded in a wider net of concerns around energy-saving measures which are framed as previous measurements of mapping, reducing and optimizing the carbon footprint. This also makes all the practical steps towards 'carbon neutrality' seem as the only logical choice for fulfilling what the colors promise, making the airport 'greener'; thus, having a stabilizing function on how to very practically approach what the airport would consider as responsible behavior in the *green* order. The scheme articulates action, it conveys a specific type of action – but it should be noted it could have come otherwise, another measure could be set on top for instance. With this practical device, CPH can prove to the outside, that the airport is green. Thus, seen in the perspective of a valuation device it could be seen to have the power to dispel uncertainty (Barman 2015), performing the airport as an environmentally responsible actor.

The next part will show, how the *green* order becomes distinctly equipped, as it is embedded in other concerns, and how the climate will be translated to a tradable good into the carbon market in the form of Verified Emission Reduction.

6.4.1. "The final part of the solution"

The following shall explain how carbon offsetting itself is bound to various actors and their concerns, in which the carbon market becomes relevant. As now ACI's ACA scheme speaks for defining 'carbon neutrality', CPH's offsetting project follows their definition.

> "Carbon neutrality is when the net carbon dioxide emissions over an entire year is zero (i.e. the airport absorbs the same amount of carbon dioxide as it produces). Achieving carbon neutrality for an airport is in almost all cases impossible without external help. For this reason, airports, among many other industries, look to carbon offsetting as the final part of the solution. Carbon offsetting is providing funds or resources to other projects that reduce carbon dioxide so as to make up for the emissions that one is not able to eliminate." (ACI Europe 2009b)

The definition reminds of the idea of a grand narrative of a mathematical, quantifiable climate system, a system which can be stabilized when input and output are correct. The definition of 'carbon neutrality' is based on a net-zero balance projected over the entire globe over one year. Yet, the definition is also an act of framing - for instance, it sets a particular timeframe for when emissions should (not) be counted. It is an interesting spin that the definition states that it is an airport itself which absorbs the same amount of emissions as it produces; from another point of view, it could be said that the task of emission reduction is undertaken by engaging *other* actors in the project. Stating that airports, likewise many other industries, engage with carbon offsetting, performs a vision of offsetting as a widely accepted, even normal, practice for businesses.

The *market* order is now introduced as "the final part of the solution" – some things have clearly been settled and are non-negotiable, certain emissions are seen as stable if the airport is to continue. In order to succeed in the *green* order, the ACA scheme thus provides a procedure for linking the *green* order with the *market* order, combined with what is framed as necessary for the *industrial* order. The fundamental growth-narrative thus remains. The establishment of the ACA scheme could be described as what Callon (2009) calls a 'civilized market'; a market which takes the matters of concern which it produced, here, an excess of carbon emissions, into account, thereby allowing market mechanisms to continue in the future. This market also facilitates the practical solutions to the problem by defining how to address the issue; carbon offsetting appears as a practical 'solution' to the climate issue.

6.4.2. Emissions under control - framing processes

To understand how carbon offsetting is practiced, it is first relevant to consider the exact boundaries. During the interview with CHP's environmental advisor, it became clearer how the airport frames its zone of responsibility.

> "If you look at Copenhagen airport as a company, we have for many years worked with the climate and energy optimization and stuff like that. And when it comes to emissions and energy consumption that we are responsible for as a company, and that we have direct control over, in that context, we are quite mature (…). But what we added last year is that on top of the work we have done already, we aim at becoming climate neutral." (CPH environmental advisor 2020)

The advisor stated how CPH regards its environmental achievements in relation to what it can do "as a company", a new reference not visible in the Annual Reports. The advisor actively invokes the zone of responsibility in relation to CPH as a market actor. In Callon's (1998a) terms, defining boundaries is seen as an active framing process, and this always creates overflows, elements outside of the framing. All parts of the transaction outside the airport building overflow CPH's transaction, they seem to not bear a cost for the market actor. This might come across as surprising, as earlier the airport mobilized the notion of providing its service for "cultural and human value" (Copenhagen Airports A/S 2019c), where it enacted a responsible actor towards Danish citizens. Instead, the environmental responsibility performed here is bound to what the airport says to control as a market actor and other measurements are excluded, for instance no limit on domestic flights. Instead, other on-the-ground energy saving measures are drawn into the frame, which make CPH's environmental performance seem stable.

6.4.3. Embedded in carbon-concerns

Whenever carbon offsetting is explained as part of CPH's so-called "green ambitions" (Copenhagen Airports A/S 2019h), CPH additionally adds explanations of energy saving measures which are undertaken. As mentioned above, carbon offsetting is not a stand-alone project, but is embedded in other concerns: "In 2018, we implemented energy saving measures totaling to 7.2 GWh. Since 2013, our energy savings amount to 30.8 GWh. As a result, CO_2 emissions declined from 1.3 kg CO_2 per passenger in 2013 to 0.96 kg in 2018 – a 26% decrease" (Copenhagen Airports A/S 2019h). As put forward in chapter 4.4., Whitney and Kiechle (2017) ask why numbering nature could be used as part of a storyline. Seen in this perspective, an unspecified environmental concern can be proven with seemingly 'firm' numbers. Reduced GWh, kWh/m2 and CO2 seem to perform a world in which the airport can demonstrate that the business is *really* concerned about the climate, strategies have been translated into its operations and CPH is able to proof that the strategy

is successful. In the words of Blok (2013), the airport could be called to enact a *homo carbonomicus*; a not only price, but also carbon-calculating actor, which renders seemingly disparate concerns around *market* and *industrial* orders as combinable with the *green* order.

What this practically means for CPH is for instance planning more electric vehicles and solar panels as part of renewable energy measures (Copenhagen Airports A/S 2019e; 2019a; 2019i). Within the next decade, the airport aims to increase the amount of emission savings, and thus plans to make offsetting redundant (Copenhagen Airports A/S 2019i). This shows how offsetting heavily depends on the involvement of other actors as well, solar panels, electric vehicles, which are stabilizing its existence now, but will substitute it in the future - perhaps CPH sees that offsetting for some reasons is not a long-term solution:

> "We are focusing particularly on increasing the percentage of renewable energy and on established partnerships, in order that the Airport can expand in an environmentally and climate friendly way. We are also working to come up with new, sustainable fuels and to use both existing and new technologies to help find new ways of limiting emissions." (Copenhagen Airports A/S 2019g)

The goal to reach sustainable fuels is connected to other business and scientific actors, yet the available quantities are said to be not available on the market in the moment (Copenhagen Airports A/S 2019a). This is part of a long-term goal of the climate strategy, likewise, proving that the vision of the future is clearly based on the assumption that the *industrial* order remains up and running. In addition, it remains unclear how practically feasible such goals are on a broader scale, and in which time frame. The outlook towards sustainable fuel technologies could be seen as a legitimization why carbon offsetting is undertaken at the moment. It presents a way to achieve a supposedly 'green' label in the now, as it relies on the idea of a market which carries out climate action at the very moment, which will become clearer in the following. One could argue in Callon's (1998a) terms, that the situation is 'hot', and market actors are already taking measurements to react to a heated sentiment. The quote also makes it obvious that other energy-saving technologies such as solar panels are not independent from the planned airport expansion, they seem to legitimize the *industrial* and *market* order. In other words, a vision of green growth is created because energy-saving measures justify expansion, thereby also confirming the impression that CPH is aware of the tension between expansion and environmental issues.

Bearing this embeddedness in various energy-saving concerns in mind, next, we come back to the actual offsetting project to look into how in practice, *homo carbonomicus* climbs higher in his evolution to become carbon neutral.

6.4.4. Adaptation of the Greenhouse Gas Protocol

Following the relations within the ACA scheme further, some crucial framing practices should be elaborated on for understanding how the carbon offsetting project is enacted. For fulfilling the carbon-neutral target through the *market* order, the environment needs to be translated into the calculable frame. In order to make a good marketable, Callon (1998a) stated how a good needs to be disentangled from its 'natural' environment through various processes. This gives an insight into the various processes taking place here. Following Callon, Méadel, and Rabheharisoa (2002), this process relies on a judgement of an object's quality, as some relations are deemed more relevant and valuable than others, which guide the process of framing a good for market transaction. This process of defining what is worth being counted in the carbon offsetting project is curious in this case, and here the role of another actor becomes relevant, the Greenhouse Gas (GHG) protocol.

The GHG protocol was developed by the World Business Council for Sustainable Development (WBSC) in the late 1990s, providing measuring and calculation tools according to which companies and organizations measure their greenhouses gas emissions, but also advertises to make businesses more "prosperous" (World Resource Institute 2020), thus also positioning itself towards the *market* order. It appears to be one of the most widely used corporate standards by businesses (Lippert 2017). As described in chapter 3.2., gases need to receive a conversion factor in order to be tradable on the carbon market (MacKenzie 2009). In the GHG protocol, these are measured in CO2 equivalents (CO2e), which means that gases other than CO2 are converted by a specific measure, the Global Warming Potential relative to CO2 (Ranganathan et al. 2004). The GHG protocol includes five gases other than CO2 which rely on the Kyoto Protocol[11].

Based on the fact that the ACA scheme says to be based on the GHG protocol (ACI Europe 2009a), it is interesting to note that, being a *Carbon* accreditation scheme, it renders

[11] These are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PCFs) and Sulphur hexafluoride (SF6) (Ranganathan et al. 2004). The webpage also lists a seventh gas, nitrogen trifluoride (NF3). (Greenhouse Gas Protocol 2020)

all other emissions which are proposed by the GHG protocol out of the calculable frame – they overflow what the scheme aims to cover. The interview gave the opportunity to go into more detail with such questions. The definition of carbon and its relationship to other emissions, seem not as clearly determined: "There is a lot of confusion, what you mean with climate neutral and emission free, and carbon neutral and all that" (CPH environmental advisor 2020). As described by Blok (2013), what is qualified as 'nature' might be more multiply defined between various actors. Even within the airport, there seems to be no uniform definition. Even though widely known as *carbon* offsetting, organizations usually include other emissions as CO2e, as mentioned in 3.2. (Taiyab 2006). This might be particularly surprising considering that CPH at times refers to carbon offsetting as "*climate* compensation" (Copenhagen Airports A/S 2020d; 2019i), not even carbon offsetting. CO2 seems to speak for what counts as the climate in a "climate compensation" program.

In addition, the GHG protocol distinguishes emissions in so-called Scope 1 and 2 emissions, covering direct emissions from owned and controlled sources and indirect emissions from generation of purchased electricity, steam, heating, cooling. Besides, there are Scope 3 emissions, including so-called indirect emission of a company's value chain (Greenhouse Gas Protocol 2011). What a company includes, heavily depends on how they frame their area of operational boundaries. Here, the ACA scheme suggests a specific framing activity. It lists that out of the GHG protocol, only Scope 1 and 2 need to be included in the offsetting project (ACI Europe 2009b); CPH notes that ACA, while building on the GHG protocol, "has been adapted to the operational and organizational characteristics of airports" (Copenhagen Airports A/S 2019a, 49) – which speaks for the idea that the standard is oriented towards the *industrial* order. All of CPH's carbon and non-carbon emissions counted under Scope 3, emissions in the air, are excluded from the calculation (fig. 6).

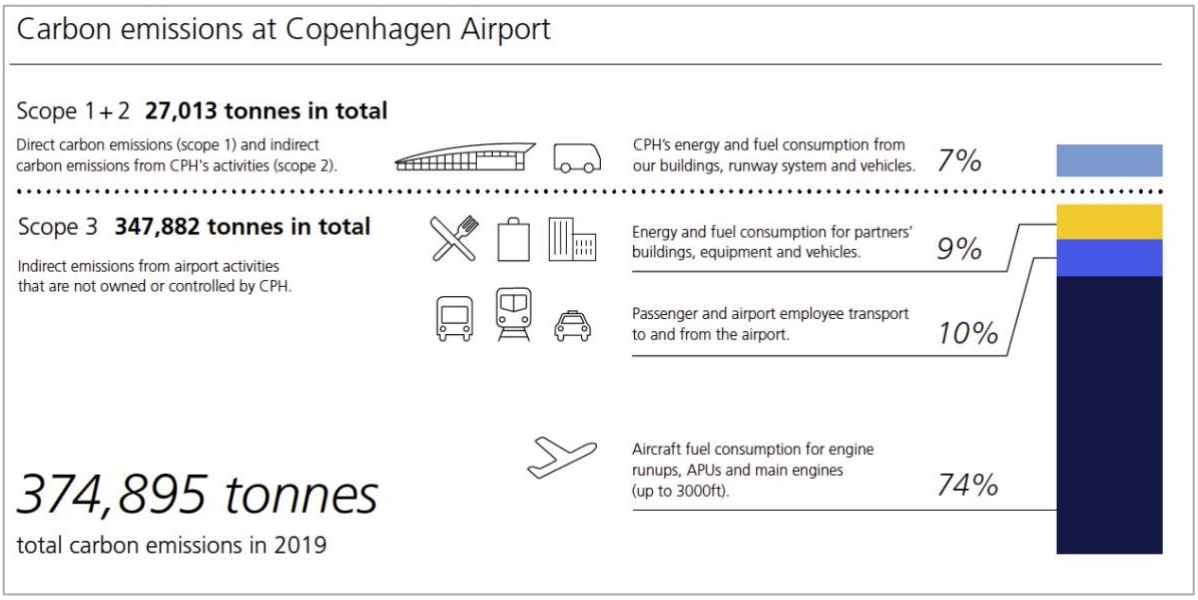

Figure 6 - How CPH defines "Scopes". Above the dotted line represents the amount which CPH says to have "under control" and takes into account for the offsetting project. (Copenhagen Airports A/S 2019a, 34)

This comes across as a surprising framing activity, considering the fact that the airport stated that its "core business is air travel" (Copenhagen Airports A/S 2018, 20). Thus, all emission in height, overflow the calculation. The adaptation of the GHG protocol thus align with the definition of CPH's operational boundaries, as defined earlier by the environmental advisor. In relation to the offsetting project, CPH acts within the defined boundaries of what it says to have "under control", and the ACA scheme mirrors these boundaries. This reminds of the issue Asdal (2014) described in her case study, where accounting practices helped perform a very specific form of nature, rendering it manageable through numbers and articulating what the 'climate issue' at stake is. Here, a graph such as the one above, determines the reality and size of the issue which is taken into account. The climate becomes a fixed, calculable object and controllable by the right industrial measures. As such, the possibility to enact environmental change is also transformed, directed towards a reduction of these very defined CO2 parameters.

The boundary framing activity comes with an economic advantage for the business in the offsetting project, as more emissions would mean higher costs, but also means that CPH disregards all carbon emissions indirectly linked to its business, following the graphic, 93% of carbon emissions (Copenhagen Airports A/S 2019a). What counts or not in the *green* order seems to be made to work in the *industrial* order. One could argue that the airport as a company is also responsible for enabling a large amount of emissions attached to its

business; however, in the case of the offsetting project, these emissions are framed as being 'out of control'. Thus, on the one hand, the GHG protocol emerges as a relevant actor, as it provides general definitions and conversions factors for businesses. Yet, the ACA scheme appears to have significant power to frame how the GHG protocol is to be enacted in an airport context, making it appear as an influential device in regard to the offsetting project.

6.4.5. Translation into Verified Emission Reductions

Carbon offsetting as a market-based practice, relies on the emergence of a tradable commodity in the carbon market, for which other actors are enrolled. After having defined what counts as valuable emissions to be reduced, which could be seen a highly discussable activity in itself, other actors are enrolled in order to fulfil the goal of 'carbon neutrality' at CHP. As part of this process, the ACA scheme suggests four different types of offset instruments as the marketable commodity on the voluntary carbon market. One of these are Verified Emission Reductions (VERs). As explained in chapter 3.2., VERs are the common tradable unit in the voluntary carbon market, being measured in a metric ton of carbon dioxide equivalents (CO2eq) (Taiyab 2006) – in this case, only CO2. Thus, an environmental responsibility is translated into the commodity VERs, which can be seen as a 'currency'. This is an example of how the different characteristics of atmospheric gases, their origin and their relationships in the atmosphere, are disentangled; a tradable unit was gained, an abstract notion of "the climate" can be traded between market actors. Latour's (1999) example of the transformations between heterogenous actors, which scientists engage with to translate a specific part of a rain forest ecosystem into a soil type, showed, how broader relationships, the embeddedness in an ecological system, gets lost, while a readable soil type name is gained. In the case of CPH, the manifold relations within a climate system, are disentangled in VERs; at the same time, this currency will speak in for this complex network of relations, it can travel in the carbon market between different actors involved in the offsetting process.

Since a tradable good in the *market* order was gained, it becomes clear that carbon offsetting is a process heavily depended on delegation, as other actors are enrolled to fulfil the task of reducing emissions on the ground by engaging in the transaction. Those will be

commissioned to buy and trade this – seemingly – stable unit. As described by Law and Hetherington (2000), the act of delegation is not simply an amoral matter, but a question of practicalities. Given the fact that CPH and ACI, through the ACA scheme, position themselves towards the *industrial* and *market* order, offsetting seems to pose a practical pathway within these registers; further emission reduction does not need to be carried out locally at and by CPH itself, it can be shifted to another place and be postponed to the future, while at the same time the business receives the label of 'carbon neutrality' in the moment. How VERs will be 'upgraded', will be part of the next chapter.

6.4.6. Interim summary

CPH enacts a specific kind of hybrid, navigating between issues of upholding the industry and bringing climate matters into a calculable frame. While energy-saving measures are undertaken locally, other environmental tasks are outsourced to the carbon market; within this perspective, the growth-narrative and expansion plans remain stable, aspects regarding carbon-saving are used as a legitimization for expansion. Questions around environmental responsibility were added on the stable component of growth under the label of 'carbon-neutral' airport. As CPH enrolls with the ACA scheme, this scheme delegates and defines action. Yet, what counts as worthy in the green order seems negotiable, to which the adaptation of the GHG protocol to an industrial context hint to. The relationship between these emerged as relevant, as they perform what the issue is and how it can be addressed – an abstract idea of the climate became translated into a scheme which neatly defines what should, and should not, be taken into account, making climate change appear manageable through a climate strategy. Carbon offsetting, as the highest of measures in the ranking, shows how the initially by CPH mentioned concern around environmental responsibility is adapted to industrial terms, and translated into a commodity tradable on the carbon market.

The next chapter aims to show how new concerns come into play and make CPH navigate within even more hybrid roles, when enrolling with a new actor. It will follow VERs into the hands of a new actor, the Gold Standard, which sets new translations in motion.

6.5. Towards 'sustainable development'

As described before, the carbon market has received considerable criticism from both activists and academics, for instance being accused of being 'unethical' in the sense that many projects have been proven to disregard local conditions where offsetting projects take place. This chapter will show, how CPH navigates in this controversial market. Here, another actor and device will play a crucial role in bridging the so-far gathered orders of worth, reshaping the form and outcome of the offsetting project. The chapter will contribute to understanding the multi-layered valuation processes and entanglements which keep the carbon market running.

6.5.1. "More than just compensate"

In the carbon market standardizers take the role of managing verification and criteria-setting for projects where emissions can be sequestered (Lehmann 2019). Owing to the unregulated structure of the voluntary market, these standards can be freely chosen by companies. ACI suggests five different standardizers for airports[12]; this means, it is up to CPH to which of the actor to link to. The five potential standardizers have different ways of how and where to choose a project, verify and price the carbon commodity (Lovell and Liverman 2010); thus, the choice will make a difference in practice, as the offsetting project will be evaluated according to these criteria.

CPH states they were looking for "a project that could do more than just compensate for the climate" (Copenhagen Airports A/S 2020d). This is interesting, as it challenges the previous definition of carbon offsetting as a way to 'just' neutralize carbon emissions over a year in a calculable manner, which shows, how boundaries of what could count as a valuable project are fluid. What this means in practice here is a decision for enrolling with a specific standardizer. CPH lists as a first criteria for finding a project, that it should be Gold Standard certified and take place in one of the least developed countries (Copenhagen Airports A/S 2019g). This means, it delegates the process into the hands of the actor Gold Standard, which will now speak in for a range of criteria for the project, thus, will shape how the offsetting project comes into being in a particular way.

12 These are under the Clean Development Mechanism, Verified Carbon Standard, Gold Standard, Climate Action Reserve, American Carbon Registry (Airport Carbon Accreditation 2018).

The Gold Standard claims having the most rigorous valuation standards amongst standard setters, whose principles are guided by the idea that a project should not only prove adequate accounting and transparency, but also must contribute to 'sustainable development' in the Global South which needs to be verified in a particular way (Gold Standard 2019d). The Gold Standard was developed after criticism on reported negative local effects on communities where offset projects have taken place, and that such projects included industrial gas projects, rather than renewable energy or energy conservation projects (MacKenzie 2009). After accusation of 'Green Washing', several NGOs, notably the WWF, developed the Gold Standard to manage 'best practice' offsets, in order to guarantee so-called sustainable development co-benefits of such projects (Lehmann 2019; MacKenzie 2009). Gold Standard works in "strategic partnership" (Gold Standard 2019c) with the UN Framework Convention on Climate Change (UNFCC) secretariat, having the mission to promote the 17 sustainable development goals (SDGs; fig. 7), such as 'good health', or 'affordable and clean energy'. By drawing on the authority of the UN, the SDGs form a widely accepted valuation device. The SDGs can be seen as a device, since they entail a set of relationships, they point to what is regarded as valuable, thus, directing action for other actors such as businesses or NGOs.

Figure 7 - United Nations 17 sustainable development goals, serving as valuation device for the Gold Standard (United Nations Department of Economic and Social Affairs 2019).

What Gold Standard does, is, to provide a guideline for converting these goals into a monetary price of VERs (Gold Standard 2019b). For this, every goal is listed with several sub targets and equaled with a monetary price (Gold Standard 2019a). This calculation comes with a cost; CPH would pay considerably more money for VERs than it would through other standards, as Gold Standard counts as by far the most expensive standard setter on the market for including such 'sustainable development' in its practice (MacKenzie 2009; Lehmann 2019) – a large framing and exclusion process in itself, making sustainable development of not only nature but also livelihoods tradable in the *market* order.

6.5.2. "Added value"?

Choosing a highly renown standard setter is linked to the idea that CPH "wanted to make sure (to) follow the highest possible standards for the project" (CPH environmental advisor 2020). As CPH's webpage documents show, a project should contribute to "benefits in terms for climate, health and the local community" (Copenhagen Airports A/S 2019f), an indication that carbon offsetting should bridge to new values within the *civil* order, where community and equality play a role. Another actor is commissioned by CPH to fulfil these goals on the ground, the NGO Nexus for development, a project partner in Asia who carries out cook stove projects (Nexus for Development 2020). Cookstove projects (fig. 8) are a popular technology under the Gold Standard guidelines (Lehmann 2019), as they use less wood fuel than traditional stoves and are thus said to be more energy-efficient, reduce household air pollution due to smoke of indoor burning, and extend market participation for women in rural areas – so the equation goes (Copenhagen Airports A/S 2019g). Nexus for Development provides the link between Gold Standard and the local site of where cookstoves are installed, yet, its work-progress is fully directed to the requirements of the Gold Standard (Nexus for Development 2020), which makes the standard setter appear as a powerful actor, as it determines what should be counted or not in the local side.

Figure 8 - Picture in brochure "Cutting carbon in Laos Kitchen" (Nexus for Development 2019)

The UN SDGs as a device play a decisive role for CPH. This new component in how carbon offsetting is practiced, was mentioned by CPH's environmental advisor as follows:

> "I think, of course the main goal for us was to find a project that made a difference with regards to carbon emissions but we were very happy to see that the project we found also makes a difference in other aspects, when you look at for example the UN sustainability goals. So the project we chose in Laos where we support the development of better ways to cook, not only makes a difference in terms of carbon emissions but also makes a difference when you look at the local air quality within the area, and when you look at for example conditions for the women, who work out there. So, they have some better working conditions (…). So that's kind of added value I think in this project." (CPH environmental advisor 2020)

Reducing CO2 emissions through offsetting seemed as the main priority for the advisor, which reinforces CO2 as a qualified good in the *green* order. Yet, in relation to the widespread criticism which carbon offsetting projects have encountered, it could be argued that the advisor is aware that the project should do 'more' than dealing with carbon emissions alone.

Considering that Muniesa et al. (2007) describe devices as sensitive to the resistances which delineate the reality around them, the SDGs could act as a set of mechanisms attentive to the criticism around potential accusations of 'Greenwashing'. Drawing on the Gold Standard and the SDGs can be describe a way of 'cooling' the debate around carbon offsetting in Callon's sense (Callon 1998a), as the SDGs allow bringing concerns around

whether offsetting schemes are considered as worthy or not, into the calculable frame, making it seemingly easy for CPH to demonstrate that the project is qualified as a 'good' project; not only in terms of CO2 emissions, but also "in other aspects".

This relates to Callon's (2009) question around the matters of concern which the carbon market produces and the practical pathways it takes to incorporate such. Gold Standard not only reacts to these concerns by drawing on the SDGs, the SDGs also perform the answers towards what a 'good' offsetting project could and should be, as it determines a pathway to how all range of issues can be taken into account. In a perspective of valuation devices, it has been argued that labels have the agency to dispel uncertainty and increase accountability (Barman 2015). This is visible here too in the case of CPH, as the environmental advisor seems to rely on the SDG's meaningfulness as a well-known and widely accepted value-compass, they contribute to render the project as accountable and valuable to the outside. The use of the widely acknowledged SDGs in the project, can act as a stabilization of moral reputation of the business. The claimed additional benefits seem to legitimize the project, it could be said, the carbon market has been recognized as a 'concerned market' (Geiger et al. 2014). The 'added value' which CPH's environmental advisor referred to, could thus likewise be understood as a value for CPH for being able to perform a more ethical company. The SDGs thus provide a practical way to make disparate concerns commensurable by translating these into seemingly measurable goals, which for CPH makes it possible to address the idea of 'sustainable development' in a *market* logic. Thus, CPH becomes enabled to bridge *green*, *market, industrial* and *civic* values all together, thereby legitimizing the performance of a 'win-win' offsetting project. In addition to the previously described *homo carbonomicus*, one could say, CPH enacts not only a carbon-calculating, but also an SDG-counting actor, navigating across even more multiple values and producing new hybrid relationships.

This also raises several new issues about valuation in practice; for instance, how to practically agree on a financial price on "better working conditions for women"? It also offers another interesting perspective. While it was mainly Danes, their job and travel experience, who were part of the *civic* order described in the beginning of the analysis, the new idea of including women's rights in Laos might seem like a stretch, as Laotian women have not been part of CPH's network before, unconnected to the services of the Danish airport.

In addition, when the advisor states that the project should indeed "make a difference" in regard to CO2, it could hint to the awareness that it is indeed difficult to account for such gases. One needs to remember that calculations are highly complex and depend on various decisions and uncertainties, as for instance with the principle of 'additionality', described in 3.2. (Bumpus and Liverman 2008). As an example, what starting point is chosen for the measurement of CO2 reduction of the stoves, how this is calculated and monitored to fulfil the desired amount of carbon emissions which one demands to neutralize, depends on a practically non-existing future-scenario to measure against (Bumpus and Liverman 2008). This is because, once installing the cookstoves, it is not the case that emissions are in the very moment 'reduced'. Clearly, the airport's emissions have still taken place, thus an effect on the climate is unavoidable. This in itself shows the fragility any project is based on, depended on the many intermediaries and uncertainties. These ambivalences are not visible to the outside in a label of 'carbon neutrality' together with SDGs.

6.5.3. Interim summary

These paragraphs have shown how CPH acts across divergent values to practice a very specific carbon offsetting project by engaging with other actors and devices. The Gold Standard contributes to stabilizing and specifying the carbon offsetting project by translating the SDGs into a concrete framework. Thus, it offers a basis for what could and should be counted by CPH, thereby also practically facilitating the pathway to higher moral reputation and allowing the project to come across like a win-win situation. The idea of growth has remained untouched, aspects of gender-equality and market-participation are added on top of 'carbon neutrality', likewise being addressed through the market. The link to Gold Standard and the SDGs also comes with a reformulation of the issue at stake – carbon offsetting is not only about the net-zero balance of CO2 over a year but is enacted very much like a development aid project. The initial climate concern is outsourced to standardizers who advertise projects under the label of Gold Standard and people in Laos are claimed to benefit from this endeavor.

These actors and devices, which emerged from the material as relevant for understanding how CPH's offsetting project is practiced, as they rank and specify what counts or not for the carbon offsetting project, could give an example of how carbon offsetting relies on

complex decisions made in practice. The offsetting project emerges as relational and depended on other practices taking place, be it energy-saving practices, counting and converting CO2 into a good, standardizing valuation criteria, or the distribution of cookstoves, which can only give a small perspective on the various actors and devices, in which offsetting projects are nested in and which keep the carbon market up and running. Before turning towards the activists to discuss these insights, the following perspective shall give a brief impression towards how priorities are allocated in CPH's climate strategy, of which carbon offsetting is part of.

6.6. Perspective: After Covid-19?

The Covid-19 pandemic has challenged the stability of the climate strategy (Copenhagen Airports A/S 2020a). The moment of crisis brings an additional perspective on the interplay of the described orders of worth, showing that the relationships with the above-mentioned actors are potentially fragile. This can be exemplified with the following quote of CPH's Interim Report of early 2020, under the headline 'Green Transition not forgotten':

> "CPH also intends, until further notice, to continue the climate strategy for Copenhagen Airport (…). However, the pace in the crucial green transition will depend on how we get through the crisis. The more economic muscles CPH has, the greater strength CPH can put into the sustainable transition of aviation once the world reopens for trade, travel and air traffic." (Copenhagen Airports A/S 2020a)

Only if CPH is financially strong, the environment can be taken into account as planned. Relating this statement back to the orders of worth, CPH's *green* order comes across as the more fragile one, as to now running "until further notice". The whole climate strategy, thus also the carbon offsetting project, appears as fully depended on the *market* order, showing a clear hierarchy for CPH. This view was also confirmed during the interview with the environmental advisor. Regarding the stated end of carbon offsetting project by 2030, the advisor stated: "That's the ambition at least. Then I hope that it's also realistic and possible to do so" (CPH environmental advisor 2020). The time span of how long the carbon offsetting project will run, appears as uncertain, the project seems highly depended on CPH's business performance. At the same time, the quote reinforces the impression that

offsetting is not planned as a long-term solution, other climate-related measures might be deemed as more trustworthy for the future.

Based on the orders gathered by following the actors, their interwovenness and ordering principles, the next chapter will discuss these results with insights from the activist network. When discussed with different ontologies, it will allow the reader to understand the airport's framing clearer, since environmental activists play the role in this thesis of bringing 'overflows' and new matters of concerns into the discussion, thereby challenging seemingly stabilized framings.

6.7. Concerns of environmental activist groups

Stepping away from CPH, the next chapter introduces and discusses arguments of an environmental activist network. Members work together towards limiting aviation and airport expansion projects and voice criticism towards strategies such as carbon offsetting. Following what Star (1991) calls a starting point from 'tension zones', the activists play the role to challenge perspectives of the airport network; to put into perspective, contrast and discuss the gathered insights and suggest thinking the *green* order differently. The following points will be discussed: how activists relate to different number values in relation to aviation; how they allocate responsibilities towards climate change mitigation; and what alternatives are suggested. As a guiding compass, their perspective will be discussed with the most salient points of the previous analysis, gathered as orders of worth, in order to see how the networks distribute values and priorities differently. The section is inspired by a perspective on valuation-in-practice, in order to see, how the actors make their value judgements and will discuss what tensions arise.

6.7.1. Introduction of the network

Stay Grounded has emerged in 2016 as a reaction to the increased growth of global aviation. The group works as an umbrella organization for various subgroups mainly based in Europe, and follows the vision of a mobility system which "rests inside the planetary boundaries and allows a livable future for us and our children" (Stay Grounded 2020a). A reason for their engagement is a concern around the environmental impacts of flying, and is also linked to an inequal distribution of who has access to flights, and who bears the consequences of environmental pollution (Heuwieser 2017). Criticism of airport practices play into a broader picture around who in their view should take responsibilities regarding emission reductions. This view is put forward in Stay Grounded's documents, in which activists engage with a study demonstrating that only 5% of the world's population have ever sat in an aircraft at the turn of the millennium (Heuwieser 2017); the low numbers speaks for an inequal access to flying, and this plays into their perception that responsibilities for climate change mitigation should be distributed differently as well.

The Danish group Bevar Jordforbindelsen is part of the international network of Stay Grounded, and locally organizes campaigns against the expansion of Copenhagen airport since 2018 (Bevar Jordforbindelsen 2019). A member describes the group and the Stay Grounded network as "too radical for some other organizations", they themselves would be "more visionary" (Member BJ B 2020) than other environmental organizations, as their demands for degrowth of aviation are drastic.

The document to which both activist groups activists frequently refer to, in the web, interviews and during observation, is called 'The illusion of green flying', published by Stay Grounded (Heuwieser 2017). The front cover portrays a person painting an airplane green – literal 'Greenwashing'. Here, numbers of Biofuelwatch, an NGO critical of biofuels and land grabbing, are quoted, which state that greenhouse gas emissions from aviation will increase four-to-eight-fold by 2050 with an anticipation of 4.3% passenger growth, a number taken from ICAO, the International Civil Aviation Organization (Heuwieser 2017). Growth is never seen as disassociated from environmental pollution, and thus the activists request a limitation of aviation. The ecological vision invoked here comes with different attachments than in the airport network; attachments to the melting of arctic ice, dried-out land, conflicts around water, food scarcity, future generations, come to speak for

a broader issue around livelihoods and environmental destruction mainly in the Global South (Heuwieser 2017). These strong symbolic frames hint to the awareness of living in a climate *crisis* (Heuwieser 2017; Bevar Jordforbindelsen 2020b). According to a member, the planet would be "like a battery", in which "you have some limited amounts, and then you have to use it carefully" (Member BJ B 2020). The limits of resources, the shortage of water, the fragility of the ecological system, point to the idea that the state of the planet is a vulnerable concern, something that is in great need of care when thinking about the future. The following will discuss some key differences in relation to the airport network, in order to see how the activists destabilize the airport's framing.

6.7.2. The better numbers? - "the real climate effect"

When engaging with airport politics in their documents, the activists deal with different numbers. This provides an example of how the *green* order is distinctly equipped for the activists. Several webpages and publications scrutinize the technical background of calculations in the aviation industry (Heuwieser 2017; Kampfinger 2019; Bevar Jordforbindelsen 2020a; 2020c). For instance, different graphics and numbers can be found, according to which the effect of gases on the atmosphere is considerably higher than the aviation industry would suggest. Another framing would come to a very different outcome of the climatic effects of aviation, according to the activists.

How facts and values melt together to a differently equipped concern around the environment becomes clear in the following dialogue during an interview with a member of Bevar Jordforbindelsen:

> Member BJ A: "We like to talk about climate effect, when we talk about aviation. And the airport and aviation industry is talking about CO2 emissions (…). We would say that the best estimate is still 2.7 more than CO2, or you have to multiply the CO2 emissions by 2.7 in order to get the real climate effect from aviation."
> Corinna: "Where do the 2.7 come from?"
> Member BJ A: "It comes from one of the IPCC reports (adds a link in the chat)[13]. That's the state of the art at the moment. If you take the water vapor, sulfate, aerosols, soot, linear contrails, then it will be about twice as much as CO2 emissions. And then also, when you add the best estimate of this induced cirrus clouds, then you get the estimate of 2.8." (Member BJ A 2020)

13 Lee, David S., David W. Fahey, Piers M. Forster, Peter J. Newton, Ron C. N. Wit, Ling L. Lim, Bethan Owen, and Robert Sausen. 2009. "Aviation and Global Climate Change in the 21st Century." *Atmospheric Environment* 43 (22): 3520–37.

Callon (1998) points to the idea that spokespersons from the outside can make overflows visible, thus potentially challenging framings. In this case, the activist could be seen as such a spokesperson. By adding another view from the outside, the seemingly stable numbers of CPH might seem less so for a moment. Quite a different picture emerges; CO2 is not the only relevant gas, according to him, but would be 'worth' more - it has to be multiplied to get "the real climate effect". This number points to a different metric, the RFI, Radiative Forcing Index (Bevar Jordforbindelsen 2020c) and the activist draws on the authority of the IPCC to support his knowledge claim. The publication from the peer-reviewed, renown scientific journal *Atmospheric Environment* speaks for the fact that the metric is also known in academic circles. Following this report, the commonly used measure of Global Warming Potential and a focus on CO2 only, do not take into account the short-lived of many other emissions of aviation.

One might ask, why the activist argues with 'hard facts'. In this perspective, it seems as if the activist spoke the language of the airport in a rather rational way, pointing to the fact that the airport is - technically speaking - miscalculating. A parallel could be drawn here to the example of Whitney & Kiechle (2017), where signs of 3.5 degree warming during demonstrations signified 'doom', carrying moral-political weight to urge politicians into practice. In this case, the number 2.7, carries such moral weight by pointing to the severity of the environmental problem. 2.7 is not only a matter of fact, it is a matter of concern – it speaks the language of 'doom'. The number signifies a feared future, in which the climate crisis would be by far accelerated, thus also mobilizing a different material-emotional engagement with the environment.

In comparison, while the carbon offsetting scheme would only take into account CO2 on the ground, the activist suggests considering by the airport excluded altitudes and emissions – he draws into the frame what CPH called its "core business", making overflows visible. Not only the offsetting project, also many other calculations in the aviation sector would not take into account a broader view on emissions (Member BJ B 2020). The activist thus even goes 'further' than the widely used GHG Protocol, which mentions six long-lived greenhouse gases of the Kyoto Protocol - emissions which stay in the atmosphere for a comparably long time. The RFI would take into account also the short-lived emissions of aviation. Indeed, even the environmental advisor noted how carbon neutrality or emission neutrality might not be uniformly defined, which might give an idea about the vagueness

of definitions and a 'grey zone' in regard to what counts and doesn't. Here might lie a tension for the aviation businesses as well, as considering "the climate" beyond CO2 emissions, will complicate the idea of a marriage between the *green*, *market* and *industrial* order, as long as business is based on fossil fuels.

This perspective also plays into the importance of what counts in the *green* order, its multiplicity, as mentioned by Blok (2013). This is present here, as the activist creates a value tension of what qualifies as worthy in an ecological perspective. In the words of Blok, ecology "emerges as a world of inherent moral and cognitive tensions" (Blok 2013, 507). In this case, the *green* order is distinctly equipped for the activist, different number values point to the idea that there is not only one, but several ecological worlds.

This aspect is also interlinked with different ideas of how to act upon climate change, which will be elaborated on next.

6.7.3. Who should act - "…And that's us"

A new view of who is in charge to reduce emissions emerges, as space is seen as the limiting factor, and access to flights seen as unequally distributed around the globe (Heuwieser 2017). Thus, the group challenges responsibilities as to who should respond to climate change. As a member of Bevar Jordforbindelsen stated, "we don't have enough sustainable space to allow everybody to fly. And those who should be restricted the most, are those who are flying the most at the moment. And that's us" (Member BJ A 2020). Thus, the *green* order sets the guiding boundary, the member engages with a view of sustainability which is unnegotiable and needs to be stabilized first. The responsibility for taking action, according to the member, lies with those, who are mostly taking part in aviation – quite a different view than in the airport's case where flight connection was seen as the unnegotiable parameter and responsibilities for climate-related action outsourced.

The difference in articulation of who is responsible to act in the light of climate change, was mentioned by another activist in relationship to carbon offsetting. Here, different emissions are brought into the frame. This can be seen in the following quote by a member of Stay Grounded.

> "It is a dangerous development that emissions from flying or expanding an airport in the Global North are compared directly with emissions for necessities such as cooking from countries in the Global South. People in countries with an already low per-capita emission - and lower historic emissions - should further restrict their everyday lives for an airport in Copenhagen, and at best at a very low price?" (Member Stay Grounded 2020)

The activist's argument comes forward in relation to different numbers – in CPH's offsetting scheme for instance, these would overflow the calculation, historic emissions are not drawn into the frame. This juxtaposition also questions, who should take action.

With Gold Standard, it seemed, offsetting activities could be regarded as a combination of *market*, *industrial, green* and *civic* orders. CPH shows it as a surplus that the project would not only include CO2, but also benefit the local Laotian population, the issue was framed as a form of 'sustainable development' where women would benefit from cookstoves. The airport and activists distribute values differently, the 'added value' which the environmental manager mentioned, doesn't count for the activists, as historic and per-capita emissions are brought forward as inequal already (Member Stay Grounded 2020). The whole chain of translations of comparing emissions, and creating 'sustainable development', on which the devices in the carbon market are based on, would thus be per se inacceptable here. This might point to the fact that carbon offsetting will always be entangled in concerns for those who principally reject the idea of commensurability on a carbon market, where emissions are made tradable in order to be independent from their context. The activists create a different link, the Global North would be responsible for emissions through cargo transport of luxury goods, fashion products and tourism (Member Stay Grounded 2020; Heuwieser 2017). Thus, a new concern emerges; rather than distributing stove technologies, those who emit should first reduce their emissions.

It becomes clear that the activists' concern around offsetting is closely interlinked with a connection to airport expansion plans. While the airport indeed performed a world in which it showed itself concerned about the climate, by stating carbon-emission savings for instance, these were seen as necessary in order for the expansion to take place. Expansion was the stable parameter; the ACA scheme gave one example of how the vision of 'sustainable growth' was practically made to fit into the *market* order. As a *homo carbonomicus*, the airport seemed to make disparate values around the *green* and *market* order

commensurable. In this perspective, it seems as if CPH can let passengers know that the airport is 'carbon neutral' and continue with an orderly expansion practice.

Following the view of an activists, carbon offsetting for airport expansion would be seen as a compromise (Member BJ B 2020), in other words, a compromise between the *market* and *green* order not willing to be paid. For a member of Stay Grounded, the creation of carbon offsetting projects, leads to an assumption of the future that, if the airport simply continues carbon offsetting, it can expand and cater more flights, yet distract from the responsibility of those who are using flights the most to change behavior (Member Stay Grounded 2020). Only this would mean, according to an activist, to work on "real solutions" (Member Stay Grounded 2020) - changes with more immediate emission cuts. As "real solutions", the activist suggests reduction of flights, and a different way of how to think mobility, which will be discussed next.

6.7.4. Alternative visions - towards "climate-safe travel"

When considering the *green* order as guiding principle, the activists put forward a vision that goes beyond the framework of an airport by promoting a completely different mobility system. In other words, "climate-safe travel" (Stay Grounded 2020b). Alternatives such as night trains, passenger ships, and coaches, are mobilized, in order to perform a vision for "a world in which we can travel in a way that our children can still travel, too" (Stay Grounded 2020b). To assemble this perspective, the activists refer to a graphic of modes of transportation where flights are ranked as the most pollutant modes of transportation, and other modes of transportation seem to prove 'better'. Also, here, the number 2.7 plays a role in compiling this argument for emission-reduced travel, borrowed from the environmental ministry Austria (fig. 9). The activists draw attachments to alternative modes of transport into the frame, which seem to devalue flying in comparison to other modes of transport, when linked with their emissions.

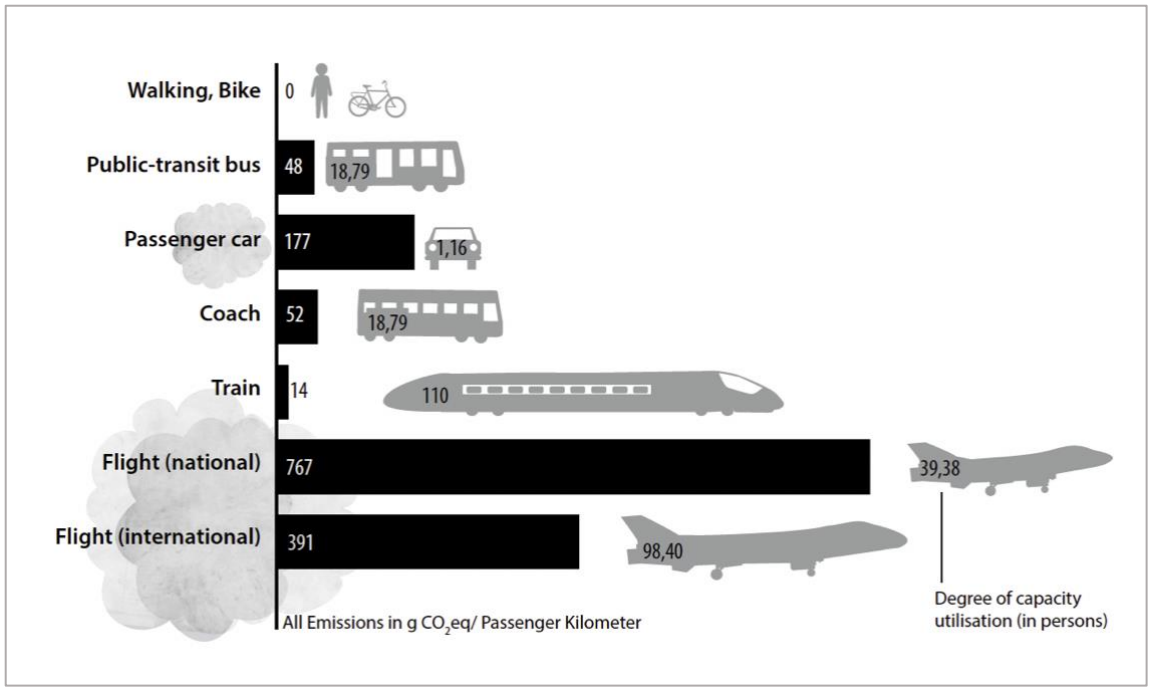

Figure 9 - Modes of transport compared. Data refer to UBA Austria, which calculates the climate-effect of non-CO2 emission with 2.7. Passenger occupancy factors considered in each mode of transport (Heuwieser 2017, 20).

Following this view, imagined boundaries of the *green* order are the determining factor, and the desire to travel would adapt to this – according to them, this represents a "social-ecological transformation" (Heuwieser 2017, 21) of mobility patterns. The network creates a different kind of hybrid, in which CPH's stable concern around *market* and *industrial* orders is challenged with a new concern, around how the whole transportation system can in the long run be thought of as fitting into their *green* order.

This is a different approach than what has been shown at CPH. In the case of the offsetting project, the climate was translated into a Verified Emission Reduction, tradable in the *market* order. The possibility to act upon climate change was thus viewed only through the prism of CO2 reduction, thus it became possible to say one has 'succeeded' once the carbon neutral goal is fulfilled through offsetting. The possibilities to act are distributed differently in the case of the activists. For an activist, the *green* order is not compatible with the vision of growth and increasing flights: "you cannot be an eco-traveler if you fly" (Member BJ A 2020). Thus, all attempts to reconcile the *green* order with the *market* and *industrial* order, are seen as per-se unacceptable. The relevance of flying is called into question, as the member makes visible how emissions are already entangled in the practices of such flying.

While the airport thinks about connection through flights around the globe, consequences of climate change were not elaborated on a similar scale in the material. Within the offsetting scheme, the concern around the environment was delegated to others, the environmental responsibility which was acted out aligned with the defined boundaries of CPH as a market actor, in line with those emissions which were said to be under control. The concern around the climate, in the case of offsetting, showed, how the airport relies on the assumption that ecological stability can be fixed through seemingly 'right' input-output factors. CO2 reductions were brought into the calculative frame of the *industrial* order, and the issue of climate change became a matter of emission reduction; thus, performing a view in which climate change became something manageable and possibly solved through a climate strategy.

While CPH enacts a hybrid regarding *market*, *industrial*, *civic* and *green* registers, the critical question is, *how* the climate is entangled in, and negotiated in the airport's practice. The CPH network engaged with the climate as a rather detached issue, based on negotiable parameters, as could be exemplified by the adaptation of boundaries of the GHG protocol to the *industrial* order and most vividly in the example during the Corona crisis, where the fragility of the *green* order was shown. Instead, Stay Grounded surpasses this idea by engaging with a whole new form of mobility (Stay Grounded 2020b). The activists thus challenge the stable concern around the need for flight connection and expansion, a view of the future which was performed as stable by CPH. The airport network mobilized a vision in which the condition of growth, in relation to job situation of Danes, responsibility to the state and the economy, and the flourishing as supposed citizens of the world, were seen as unnegotiable. CPH thus also enacted growth as part of a moral story. In contrast, these hybrid relationships and responsibilities seem not to be of value from the viewpoint of activists. As the *green* order seems to be the most significant, their values are in tension, since even a moral story of improving the life condition of Danes is not compatible with their view of ecology. Yet, the activist's vision of terrestrial transportation could likewise be seen as a compromise for others, in order to adapt to an ecological system. At the same time, it should be noted that Stay Grounded is a mainly European network, in which cross-country travel is also more easily viable than on other continents, posing a challenge to a vision of limits to air travel on a broader scale.

The above might point to a fundamental challenge mentioned earlier by Banoun et al. (2016) regarding the compatibility of orders of worth; whether or not the *green* order is at all compatible with other orders, could be regarded as problematic, as considerations of livelihoods of future generations and a worldwide ecosystem might surpass time and space horizons of the other orders. For the airport, this potential conflict does not become apparent; on the other hand, the activists point to a challenge. Both, airport and activists, have long-term futures, yet, parameters are very different. Growing passenger numbers would stabilize CPH's future strategies of expansion and the climate strategy fits into and legitimizes such growth. On the other hand, future scenarios of the activists are oriented primarily towards preventing the impact of climate change, growing passenger numbers create a threat to this goal.

The above analysis and discussion could show how a field of tension arises between the different networks, allowing perspectives from outside CPH's network in at the same time makes clearer on which basic fundaments CPH relies, viewed through the material gained in this study. The following conclusion and outlook summarize the main insights of this study and points into a direction for the future.

7. Conclusion and Outlook

The goal of this study was to investigate how carbon offsetting is practiced at Copenhagen airport, and how this relates to concerns of environmental activists. An initial assumption was thereby that CPH finds itself in a field of tension due to increasing environmental contestation during 2018/2019. Around this time, a concern around the climate was incorporated in the business practice in form of a climate strategy, including a carbon offsetting project.

In an ethnographic case study approach drawing on various qualitative sources, the thesis empirically demonstrated how CPH is nested in and mobilizes the vision a growth, influencing how issues around the climate are taken into account and translated into the specific offsetting project. Drawing on various socio-technical approaches inspired by ANT, particularly its extension to economic markets, the paper showed how carbon offsetting is practiced in an interplay of actors and devices. A focus on concerns allowed to bring to light how offsetting is embedded in a variety of issues around the question of

how to best enact such. The study made visible the network in which carbon offsetting takes place by detailed description of the Airport Carbon Accreditation scheme and the Gold Standard's relation to the Sustainable Development Goals, as they shape and specify the outcome of the project. In so doing, the paper demonstrated how carbon offsetting relies on very practical translation and framing activities, which bring the project into being in a particular way. The climate was brought into a calculable frame through various translations and appeared as a narrowly defined section of the climate system which can be addressed in market terms. As such, climate issues emerged as controllable and manageable, a set of actors and devices made it practically feasible for CPH to bridge industrial, market, green and civic valuation registers all together. Thus, the climate appears as a calculable and tradable good, climate action is delegated towards other actors.

Several negotiations of what is deemed valuable in the respective project appeared to matter for CPH, during which questions around sustainable development were negotiated. Drawing on specific standardizing mechanisms, it became possible for CPH to seemingly perform a win-win project, thus preempting potential accusations regarding credibility of the project. In addition, the analysis indicated that carbon offsetting is deemed an interim pathway until other emission-saving measures are found; yet, these seem to be subordinate to the stable parameters of growth.

By creating different attachments, activists presented an alternative way to enact concerns around the climate, challenging taken-for granted assumptions of the airport network. What is considered worthy in terms of ecology appeared as differently equipped, making questions around what counts in regard to the climate a central question. In addition, responsibility to act upon climate change was allocated towards those who are flying the most, contrasting CPH's view of outsourcing climate change mitigation. Under the awareness of an impending climate crisis, the activists created a view of a different transportation system, implicating that carbon offsetting is not a viable solution to face climate change. As such, carbon offsetting seems to be born from and intertwined in ongoing concerns and compromises about the proper way of how to act upon climate change in the very moment.

While offsetting is often argued along black-and-white lines, the paper could show the importance of investigating subtle issues of definition and scope. Beyond recognizing offsetting as 'Greenwashing', I suggest approaching it as based on fragile moment-to-

moment practices, continuously needing to grapple with issues such as selection and commensuration of emissions, determination of operational boundaries, and standardizing guidelines. Such framing activities need to be scrutinized in order to gain a form of 'carbon-literacy' and to be able to evaluate the effects of approaches in a nuanced way.

I propose an analysis of carbon offsetting in context rather than in abstract terms, as it is nested in a wider net of concerns of involved actors and devices. A coming-together of issues around economic growth, industrial stability, climate change mitigation and sustainable development need to be discussed together to understand how offsetting is acted out in situ. The particular way how these questions come into being, are interlinked and negotiated with each other, will matter for the kind of hybrid which will be performed. Industrial approaches towards sustainability are in need to be analyzed with much scrutiny, by paying close attention to how diverse climate and development-related issues are practically made feasible. Such issues seem to be enacted more multiple, requiring careful description as they are constantly rearticulated and specified within their network. Attempts to bring the climate into the calculable frame seem to constantly spill over into unaccounted for concerns. It thus emerges highly relevant to reflect upon the multiplicity of what is considered worthy as 'green' or 'sustainable', since these terms appear as politically diverse. An approach sensitive to the multiple ways such questions can be transformed and reshaped in practice, yields potential to stimulate discussion about how to act upon climate change mitigation in novel ways.

The techno-anthropological perspective of this thesis can contribute to understanding the 'not-really-separate' nature of technological, social, environmental and economic matters in relation to offsetting. Refraining from purifying the phenomenon enables interdisciplinary collaboration and open-mindedness for not too hastily closing the debate. In a network perspective, change doesn't seem to be straightforward, and places of authority appear manifold, as actors always are entangled in a network of diverse responsibilities and morals. The strength of a techno-anthropological study such as this, lies in the virtue of describing, of following the connections made and unmade. Careful description is vital as with it comes the potential to uncover what is lost on the way. The analysis in this paper could give an example of links taken for granted, and of those which are more loosely defined. Rendering these explicit, means, allowing to reconsider and reconstruct worthwhile ties, while opening up for an undoing of less nourishing

attachments. This allows for possibilities to change the future in a direction open to be determined.

Perhaps it is time to take a step back and reflect upon seemingly indispensable connections. Hopefully, the paper can contribute to heightened sensitivity to the different 'flavors' of green, and the various relationships the climate is entangled in, made to fit, or left out of other practices. This could help for being able to more carefully design criteria for the future when it comes to where and how to use offsetting in relationship with broader socio-technical transformations such as likely to happen in the transport sector, for instance. What order to navigate by, and reflection upon how each order is distinctly equipped, presents an essential and fertile starting point to visualize and measure in which way green transitions could unfold.

8. Reflections and Limitations

This last part discusses limitations of this research project and reflects about the choices made in practice. A focus on a concrete recent timeframe brought forward a rich description of the status quo which seems decisive for understanding how various movements in the field around carbon offsetting play out at the very moment. While the goal of this thesis was to find out what CPH is currently undertaking in the climate strategy, a broader focus on how this interrelates to past environmental measures in a Danish context could certainly have added depth to the analysis. While several historic news pages were investigated, a closer look onto significant shifts of environmental measures could elucidate how environmental practice has emerged throughout the years, which factors determined potential shift of action, and how these link to the climate strategy. Equally, more detailed description of future technological change in the aviation industry would have added depth to how carbon offsetting relates to these measures.

A challenge was perceived in approaching the activist network with a pragmatist approach towards their valuation of carbon offsetting, as members at times mobilize a strong normative position. This tension was both fruitful and difficult. On the one hand, it was deemed possible to investigate through the material how value judgements are constructed, for instance by tracing how actors reference other statistics. At the same time, an asymmetry was perceived in such an approach. This challenge is also mirrored by some

scholars within Valuation Studies, questioning how normative claims and more feminist approaches could fit into the field, as Valuation Studies are heavily based on quantification and calculation (Helgesson and Muniesa 2014). Here, the research project could provide a starting point for further discussion of how different contexts might require a broader set of tools or strategies to grapple with potentially asymmetrical realities.

As this case study offered much to ponder and plenty of links to follow, certainly not every aspect has been possible to be investigated in full complexity. A broader analysis is required to better understand the role of airline businesses, shareholders, environmental legislation regarding aviation and the historic importance of climate science authorities such as the IPCC, amongst others.

The research would also have benefited from a broader user-perspective of airports. While the activists give a rather radical perspective on flying, asking airport passengers would have contributed to understanding what effect the label carbon-neutrality has on them, whether it raises questions or promotes comfort, for instance.

The analysis of CPH was mainly based on publicly available documents which limited the analysis until a certain point. It would have added value to the case study if more heterogenous access points to the field would have been available, yet, were not possible in the highly regulated access towards the business. Further, additional insights of interview partners from other departments at CPH, could have added further perspectives on questions around calculation of capacities when it comes to determining boundaries, priorities, and power relationships to other actors in the aviation industry. This could have for instance added insights into the relationship between expansion and environmental parameters. Informants working behind the scenes involved with the carbon offsetting project, could have added more nuances on aspects of relational work and negotiation processes. Some links between actors are more hardly traceable for the researcher, thus also posing potential shortcomings to this study. The interview with the environmental advisor seemed to fill some gaps, while other links remain hidden. In addition, tuning into two different networks increased flexibility and sensitivity to certain issues, which was deemed as a benefit for understanding a phenomenon as complex as this from different angles.

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