Foreclosing Infrastructure: On Permit Time and the Permission to Transit From Fossil to Renewable Fuels

Marie Widengård
University of Gothenburg

Corresponding author
Marie Widengård
School of Global Studies, University of Gothenburg
Konstepidemins väg 2
41314 Gothenburg
✉ marie.widengard@globalstudies.gu.se

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Abstract
Building on research on the time and temporality of infrastructure and climate, this article focuses on permit time, or the environmental permit as a temporal form of control. Based on an analysis of three environmental permit procedures in Sweden related to the fuel transition, the article argues that the permit can be seen as a process and device for managing and synchronising different times and temporal standpoints. Permits often lead to conflict and protests among various other stakeholders, involving temporal controversies, negotiations and compromises on infrastructure and climate futures. Permit processes therefore offer a fruitful means of studying the making of timescapes, as permits have often been issued on a continuous basis, but climate timelines and carbon rhythms may be changing this situation. Uncertain futures and the "carbon timeprint" of infrastructure may explain why Swedish courts are turning towards time-limited permits.

Keywords
infrastructure; time; temporality; permits; fuels; climate transition.

1. Introduction

How long should carbon emissions be permitted? This question comes under scrutiny when industries apply for environmental permits to establish new climate-friendly infrastructure: for example, when fuel companies aim to shift their production towards low-carbon fuels, renewables, or biofuels. In many countries, environmental permits are traditionally granted without a time-limit; however, such "eternal" permits are increasingly challenged, given the imperative to gradually diminish carbon emissions (Nordic Council of Ministers 2023). While the fuel transition is considered pivotal in addressing climate change, it is important to acknowledge that also low-carbon fuels contribute to the emissions driving climate change. Consequently, permits for new fuel structures often spark controversy, leading to lengthy negotiations and compromises regarding the duration and extent of permitted emissions, that is, how far into the future a permit and its permitted emissions may reach. Environmental permit processes thus perform crucial temporal work in this sense, yet this

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aspect has largely been overlooked in literature focusing on infrastructure and climate times (e.g., Edwards 2003; Appel et al. 2018; Hetherington 2019).

This article contributes to research on infrastructure and climate by highlighting the permit as a temporal form of control. Based on a time-based analysis of three environmental permit processes in Sweden, I argue that the permit can be seen as a process and device for managing and synchronising different times and temporal standpoints. In this view, permit time is part of the infrastructured "timescape" of climate change. By "timescape", I refer to Barbara Adam's multi-dimensional view of time, and the understanding that different temporal elements, such as timeframe, timing, tempo and duration, may be out of synch but can be synchronised to fit certain interests (Adam 1998). The timescape perspective allows us to analyse infrastructure through the time horizons of permits and how the permit shapes not only the lifespan of infrastructure but also annual carbon emissions and the accumulation of carbon over time. Permit processes offer a fruitful means of studying the entanglements between the different temporalities of infrastructure, fuel production, and climate transition, and their mutual relations according to different actors.

The analysis centres around three recent permit applications by Preem, Sweden's largest fuel producer and one of Sweden's largest carbon emitters. Preem is striving to become the world's first climate-neutral petroleum and biofuel company. However, when the company applied for the environmental permits to implement its fuel transition plans, lengthy permit procedures and negotiations followed, and its old permits to produce fossil fuels were also called into question. Among the questions were whether old permits should be allowed to continue, and whether new permits should be issued with or without a time limit. Hence, permit processes offer an important analytical inroad to how different kinds of time and temporal standpoints clash, are negotiated and managed. In Europe, courts have been given the administrative powers to rule over major permit processes, a situation which gives courts a distinct control over the negotiations, and over infrastructures and their environmental impacts (Nordic Council of Ministers 2023). Swedish permit procedures imply that the company submits its application to the environmental court, whereafter relevant authorities and the public may submit comments which the applicant can respond to. Thereafter, a hearing is held (Swedish Courts 2023). Thus, the process leading up to the hearing is quite deliberate and may result in compromise. Disputes, however, do not merely occur in courts where permits are ruled upon, but also in the media and on the streets since permits often lead to protests, demonstrations, blockades and legal appeals by concerned citizens, climate movements and non-governmental organisations. These sites of climate controversy have been studied as a question of just transition (Lövbrand and Brodén Gyberg 2023). The low-carbon fuel promises have largely been understood as "techniques of futuring" (Oomen et al. 2021) as they give meaning and shape to a fossil-free future, one that may merely extend the fossil-intensive present (Brodén Gyberg and Lövbrand 2022). Building on this, I argue that the permit processes themselves are interesting sites for time and temporality scholars. As the analysis will demonstrate, diverse temporal standpoints clashed, and the courts were not always consistent in their verdicts but issued a mix of timeless and time-limited permits. Climate times also caught up with the corporate plan to expand fossil fuel production.

Hence, the permit offers an interesting inroad to examine temporal work from the more hidden and inverted view of infrastructure, such as from the legal angle (Bowker and Star 1999).

The timescape perspective has proved helpful for showing how different notions of time clash and are synchronised in the creation of climate-smart worlds (e.g., Kitchin 2019; Bensaude-Vincent 2021). More commonly, though, the low-carbon transition is approached by scholars as a temporal process, focusing on its duration, pace, and sense of urgency, as well as how its effects evolve over time (Delina and Sovacool 2018; Martiskainen et al. 2021; Sareen et al. 2021; Sovacool 2016; Sovacool et al. 2019). What is often overlooked is a more explicit examination of the temporal politics involved. Science and technology studies prompt us to inquire into how timelines, speeds, and other temporal notions are constructed and influenced by power dynamics, knowledge systems, interests, and technological progress (Marquardt and Delina 2021). This article therefore explores the various perspectives on permit durations, the underlying knowledge and interests shaping temporal viewpoints, the significance of conflicting timescales, and how courts intervene and mediate the temporal differences that emerge when new fuel structures are proposed. Indeed, it is crucial to examine the temporal intersections among infrastructure, climate and transition, and to consider who holds the authority in shaping these dynamics.

The following theoretical overview of the entanglements of infrastructure, climate and permit times includes an overview of permit times in Sweden to exemplify and background the analysis. Thereafter the Swedish context, methods and the three permit cases are described. The three cases are then analysed, followed by a concluding discussion that draws together the temporal role of permit processes.

2. Conceptualising Infrastructure, Climate and Permit Times

The temporal relations between infrastructure and the environment have long preoccupied scholars. Infrastructure is a slippery term, but it involves structures that connect and speed up. Timothy Mitchell (2020) has highlighted, though, that large infrastructure, such as energy plants, filling stations and roads, does not merely accelerate matters. Rather, their sheer scale, durability and political backing give them the power to delay and lag. A reason for this is that infrastructures typically demand large investments which rely on long-term payback to recover their high costs. While infrastructures have been built on the promise of speed, modernity, progress and development, they contribute to "engineered" landscapes and institutions and environmental impacts that last over time (Edwards 2003; Appel et al. 2018). In the economic sense, infrastructure is built in anticipation of a long-term future. They rely on "the long now" (Ribes and Finholt 2009), and political and legal guarantees are instrumental for securing this durability (Mitchell 2020).

2.1 Permit Times

Building on this, I argue that the environmental permit is an important device that may help stretch and protect the long-term lifespan of infrastructure. Like infrastructure, environmental permits tend to be oriented to the long term, and they often sustain the "long now" since permits are decided based on the present situation and are authorised by a given legal infrastructure and protected by current laws and regulations. When permits are unbounded in

time, it means that they take on a perpetual temporality, a continual and uninterrupted timeframe that may extend beyond the legal arrangements and political agreements that granted the permit in the first place. These so-called perpetual, eternal, endless or timeless permits are our long timekeepers because they reach far into the past and extend far into the future.

A review over Nordic environmental permitting processes shows that environmental permits are generally open-ended, except in Iceland where permits are issued for a specific period and must be reviewed at least every 16 years (Nordic Council of Ministers 2023, 41). In Sweden, there are many eternal permits that, together or alone, have major environmental and climate impacts: approximately 850 of Sweden's 6,000 permit-requiring operations were granted in accordance with the 1969 Environmental Protection Act and have not been retried according to the newer Environmental Act of 1999 (Miljöprövningsutredningen 2022). About 40 permits are older than 40 years, and the oldest permits date back to 1971. Time limits are used, for example, when environmental impacts are not yet known, or there is a need to evaluate new products or processes before giving an indefinite permit. Permit temporalities depend on many factors. Even in legal systems that are regarded as relatively close, there are differences that work "under the surface" (Nordic Council of Ministers 2023, 6). Permit time also differs between sectors. In Sweden, fuel permits tend to be indefinite in time, while quarries and wind and fish farm permits are time-limited (*ibid.*, 54-55).

Environmental permit time is a much-debated issue, though, specifically in relation to the political urge to fast-track permit processes to achieve a faster climate transition. Permit processes take time in themselves, involving environmental impact assessments and permit procedures, with their lengthy consultations, remits, public hearings and requests for supplementary investigation and information, and decision-making and appeal processes that may further prolong the processes. In practice, a "permit" is often multilayered and containing a combination of decisions made throughout the years as a company's activities may be regulated by different, amended, and add-on permits (*ibid.*, 39-41). These multi-layered permit timescapes have not attracted much attention among temporality scholars, but we can learn from migration research that the question of temporary and continuous permits and their processing time is central for how people perceive time and how it is controlled (cf. Maury 2022).

2.2 Synchronisation

One challenge now is to synchronize permit times to urgent climate times. A lagging aspect in Sweden is that permits are currently assessed against the Environmental Act, which has not been updated to consider the climate framework and climate law introduced in 2017. These stipulate that climate must permeate all politics and lead to the achievement of Sweden's climate goals. However, the environmental law that regulates the environmental permit does not yet reflect this ambition. In this way, permits contribute to the *when* of infrastructure (Star and Ruhleder 1996) as they refer backwards to the past. Permits may, therefore, serve as temporal barriers to change. Industries can delay renewing permits to avoid stricter rules and regulations. This is problematic because it allows operations to continue unchanged even when a re-examination would lead to significantly different requirements (Miljöprövningsutredningen 2022). A public worry therefore is that eternal permits may help conserve old technology

(Nordic Council of Ministers 2023, 70). In contrast, in Norway, the permit holder is required by law to work continuously to reduce emissions and adopt new technology, and changes that aim to reduce carbon emissions rarely require a new permit process (*ibid.*, 58-60).

2.3 Studying the Permit Timescape

What power, then, could the state-issued environmental permit have over the carbon emissions of fuel infrastructure? How can permit authorities possibly intervene in the temporality and permissibility of infrastructures and their carbon emissions, and what is the role, and opinions, of concerned citizens, climate movements and environmental organisations? When analysing these questions, it is also important to consider that time is a multi-faceted notion and that temporal standpoints can differ. As Adam (2008) has argued, questions surrounding timescapes are not merely about "when", "how fast" or "for how long" but are also about standpoint and perspective. It matters, for example, whether one assesses an infrastructure's impact on climate change from the standpoint of the present laws and regulations, or from the future. Institutions generally design the future for the benefit of the present and act as if the future is theirs to shape; that is, they approach the future from the standpoint of the present future. An alternative approach would be to orient actions from the future present. This would mean to consider that we are "acting and trespassing in the rightful domain of others", a perspective which belong to the realm of morals and ethics (Adam 2008, 7). The latter standpoint suggests that we must take responsibility for the future that comes with infrastructure. Adam's timeprint helps draw attention to this latent, potential effect of infrastructure and how far its impacts extend not just across space but also across time. Adam and Groves (2007) define the timeprint as the temporal equivalent to the "ecological footprint", a concept which asks us to consider the potential overreach of certain activities into the space of others. The "carbon footprint" similarly sums up the carbon emissions associated with producing and using a product. I believe it is useful to draw on these concepts to capture the "carbon timeprint" of permits. By "carbon timeprint" I mean the carbon emissions permitted by a permit over a specific duration. I will use this metric in the subsequent analysis.

3. Permission to Transit From Fossil to Renewable Fuels in Sweden

The remainder of this article focuses on Preem's fuel transition and the permit processes that have both held up and upheld infrastructural change in Sweden. Preem is Sweden's largest oil refinery company with two refineries on the west coast of Sweden, in Lysekil and Gothenburg. According to Preem's website, these together have a refining capacity of more than 18 million cubic meters of crude oil per year, which represents 80 percent of Sweden's refinery capacity. The company is also Sweden's largest producer of renewable transport fuels, and its current ambition is an annual production capacity of five million cubic meters of renewable transport fuels by 2035. Preem regards itself as a central actor in fossil-free transition and has been a close ally in Sweden's race to become the first fossil-free welfare state, by 2045 (Brodén Gyberg and Lövbrand 2022). Recently, the company brought forward its own climate target

and accelerated its measures to achieve climate-neutral operations with net-zero emissions throughout the value chain by 2035. The future has been a fundamental part of its image from its inception: the name derives from the English word pre-eminent, and its symbol, the happy bear, was meant to embody the company's soft, friendly profile (Wilson 2008). Its green plans have been matters of dispute, though.

3.1 Permit Cases and Material

We turn now to Preem's permit processes surrounding three projects: the so-called ROCC project, which was a residue oil conversion complex aimed at the production of low-sulphur fossil fuel, and the Syntas and HVO projects which aimed at processing HVO (hydrotreated vegetable oil) and animal fats to produce renewable diesel and aviation fuel. Figure 1 illustrates these three projects and the case proceedings that were a central part of the analysis. I refer to these materials in the text by using their case code. For the ROCC project in Lysekil, I analysed the application case M4708-16 and the appeal case M11730-18, as well as the materials published by environmental and social movements and the media, specifically articles in Sweden's most prominent morning paper, *Dagens Nyheter* (DN). For the Syntas project in Lysekil, I analysed the application case M5514-20 and the appeal case M8900-22, and for the HVO project in Gothenburg, I analysed the application case M2673-19 and the appeal case M11764-21. The court proceedings offered substantial material, including the company application and the opinions of authorities, individuals, and organisations, as well as the ruling. For this article, I focused on the summarised court proceedings as well as the original opinions by the four major environmental movements: 1) Swedish Society for Nature Conservation (SSNC), 2) Protect the Forest, 3) Friends of the Earth and 4) Greenpeace Sweden. The material was in Swedish, and translations, which have been checked for accuracy, were generated using online services. In analysing these materials, I focused on the different opinions of the stakeholders about the temporality of the new fuel infrastructure, and what temporal controversies and differences emerged, as well as how the court mediated and passed judgement on temporal issues, specifically what pertains to the duration of the permit. Ultimately, I wanted to understand how the environmental permit shaped and was shaped by infrastructural and climate times, and how permit processes can be seen to synchronise different kinds and understandings of time.

3.2 When Permit Processes Occupy Time: Foreclosing the ROCC Project

In 2016, Preem submitted an environmental application to the Land and Environmental Court for the ROCC project at their refinery in Lysekil. The permit involved the rebuilding and expansion of the refinery, from processing 11.4 to 13.9 million tonnes of oil per year. The reconstruction was mainly meant to enable the conversion of sulphur-rich residue oil into sulphur-free and metal-free fuels for marine transport. The International Maritime Organization had sharpened the rules regarding sulphur in shipping fuels, and Preem believed the market for oils with high amounts of sulphur would come to an end. The new structure involved a slurry hydrocracker whereby the oil molecules would be split into smaller molecules with the help of hydrogen. However, hydrogen processing is an energy-intensive process, and

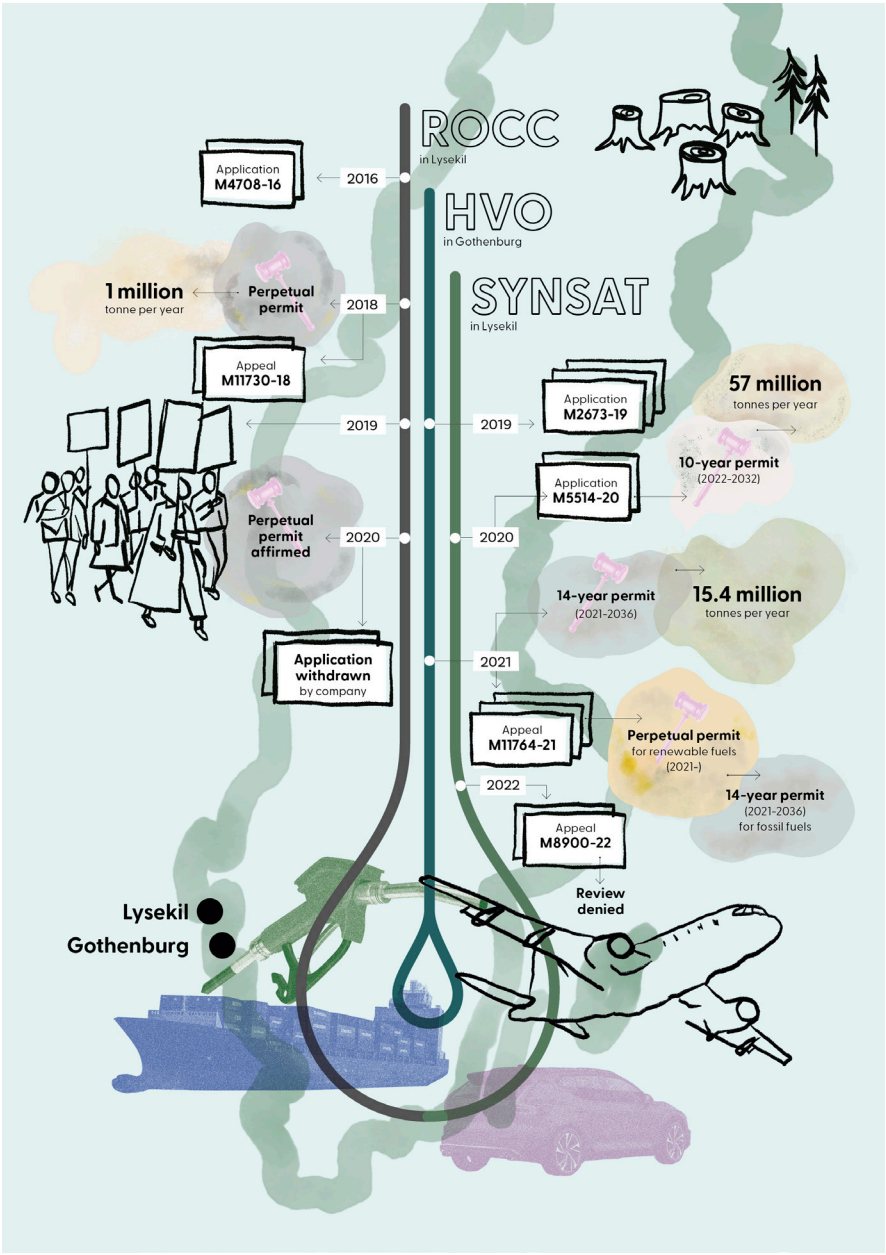

Figure 1.

Three permit processes were analysed, involving permit applications, public contestations, court proceedings and appeals. The clouds in the sky represent the "carbon timeprints" that accumulate from the permit decisions. Illustration: Victoria Skoglund.

the restructuring would lead to a doubling of the plant's emissions from 1.7 to 3.4 million tonnes of carbon per year. The proposal was very controversial on the grounds that it would turn the refinery into the largest emitter in Sweden, in sharp contrast to the demands by environmental organisations to phase out fossil fuels (Lövbrand and Brodén Gyberg 2023). The justification was that the new technology would reduce emissions in the transport system with nearly the same amount released through the hydrogen process, and that there were no other alternatives for green shipping fuels in sight (M4708-16, 48). The reconstruction was framed as a necessary and desired development considering the market's and society's increasing demands for more environmentally adapted products, which meant that refineries "must successively change or be dismantled" (*ibid.*, 67). The reconstruction was expected to cost SEK15 billion, and it would begin in 2022 at the earliest (*ibid.*, 33-34).

In 2018, the Land and Environmental Court granted the permit. This was the starting point for a massive mobilisation against Preem's plans to expand fossil-fuel production. The umbrella Network "Stop Preemraff" (Nätverket Stoppa Preemraff) was initiated by a small group of activists but quickly grew to include a wide set of individuals and organisations fighting for a common cause – a sustainable and just future (see Lövbrand and Brodén Gyberg 2023). For the Network, the project was deemed a climate disaster and shameful for a country such as Sweden, which held itself out as an international climate leader. Several environmental organisations and around hundred individuals appealed the decision, and the higher court agreed to review the case (M11730-18). After pressure from the environmental organisations SSNC, the Swedish Environmental Protection Agency (SEPA) and the Green Party, as well as two thousand emails from individuals, the government also made a first-time decision to assess the permissibility of the application based on climate concerns. That is, some permits may be preceded by a governmental decision on permissibility before it can be granted. In such cases, the court hands over its opinion to the government to guide the decision on permissibility, which in turn should only be a preliminary decision and "not a guarantee for a permit at the end of the day" (Nordic Council of Ministers 2023, 30).

From March 10-13, 2020, the court hearing and on-site inspection took place in Lysekil. The event gathered a large crowd: the judges and experts from the Land and Environmental Court, representatives from the company Preem along with its consultants, the Provincial government, SEPA, the appellants, media, researchers, environmental and social movements, and concerned citizens. On June 15, 2020, the appeal court gave its opinion to the government. It did not change the lower court's judgement but agreed that a permit should be granted. Like the lower court, the appeal court had no issue with granting a perpetual permit which would allow the operation to continue indefinitely into the future. According to the appeal court, the climate issue had no bearing on the decision. The court declared that the new climate law and goals had not led to any changes in the environmental legislation, which sets the ground rules for the permit assessment. Rather, the climate law only contains guidelines for the government's climate-policy work. The climate law, therefore, was deemed to have no legal effect on the permit review of individual activities, specifically not for businesses that are part of the emissions trading system for greenhouse gases within the EU. The court reasoned that for the Swedish climate goals to be met by 2045, the ambitions set out in the EU's emissions trading system must instead be raised (Swedish Courts June 15, 2020).

While the court's opinion should guide the government's decision, the governing Social Democrats and Green Party were free to make their own assessment and weigh in on wider social interests than the court had done. The Green Party expected that the government could use the new stop rule that had been introduced to halt activities that threaten the fulfilment of Sweden's climate goals (DN September 5, 2020). However, to journalists following the case, it was not clear whether the government could decide freely or must abide by the same laws as the court. This lack of clarity suggested that any decision could be appealed to the Supreme Administrative Court and to the European Court of Justice. Journalists, thus, foresaw that the final decision would lag (DN September 20, 2020). During this delay, Preem promised to reduce the emissions from the reconstructed fuel plant, from 3.4 to 2.7 million tonnes per year. The company avoided making these promises legally binding, however, e.g., by agreeing to a carbon-reduction schedule in the permit, on the grounds that the company had no control over legislation or the supply or costs of renewable resources; as the company representative stated to the press: "entering a legal process with commitments we have no control over is difficult" (*ibid.*). The newspaper, in turn, made sure its readers understood the magnitude of Preem's loose promises by projecting that the amount would still make the refinery in Lysekil Sweden's single largest source of emissions (*ibid.*).

Environmental and social organisations and concerned individuals intensified their protests. An "Occupy" movement was formed which organised actions across the country "to stop Sweden from committing one of the biggest climate mistakes of our time" (Stoppa PreemRaff 2020). While manoeuvring the COVID-19 restrictions, a range of dispersed activities took place in August–September 2020: postcards and emails were sent to those in power, debate articles were written, demonstrations were held, and streets and refineries were blocked by crowds of people (Stoppa PreemRaff 2022). Greenpeace's "Rainbow Warrior" ship blocked an oil tank out at sea while activists occupied Preem's head office, poured an oil-like substance and hung banners from the rooftop. The banners emphasised the priorities at hand: "Paris or Preem", "Change the system, not the climate", "Climate Justice for all", "Our future, not your business". Like other temporal "Occupy" movements, the Swedish-wide network reclaimed time as collective, shared and hopeful (cf. Brigstocke 2016).

Public resistance likely played a central role in foreclosing the application case. "We did it!", cheered the movement, as the company withdrew its application on September 28. This was seen as a milestone for the movement that had mobilised "to stop Sweden from committing one of our times' biggest climate mistakes. Together we blocked 1 million tonnes of carbon dioxide per year!" (Stoppa PreemRaff 2020). However, the company denied that the push-back from civil society had anything to do with the closure. Rather, Preem announced that the discontinuation was "a commercial decision based on a balance of the project's profitability and technical feasibility" (Preem 2020). The COVID-19 crisis and its effects on the world economy had contributed to the project being no longer commercially viable, while new political decisions, such as a more ambitious reduction obligation, had increased the demand for renewable fuels and improved the investment climate for those kinds of investments instead. The Network, though, doubted the financial reason would have worked on its own: "had the application not been appealed in the first place, they would probably have already started construction" (Stoppa PreemRaff 2022).

These are all temporal speculations, but they show that the timeframe is much more than chronological. The four-year delay turned out to be decisive. The signs that time was running out for fossil fuels had become clearer. The company said the external circumstances could not have been predicted in 2016, but four years on, they had made the ROCC application obsolete (Preem 2020). Media speculated on the politics of the delay, whether the Green Party in power had handled the application "by exhausting the oil company with an incredibly long legal process" (DN September 20, 2020). Indeed, four years earlier, the Paris Agreement had been the loose governing tool, but since then, Sweden had introduced a climate policy framework and climate law which stipulated that climate must permeate all politics that are pursued and must lead to the achievement of Sweden's climate goals (DN September 29, 2020). The dragged-out process moved the decision to a new temporal context where the company decided to leap straight to renewable fuels. According to Preem (2020), the decision to close the ROCC project beforehand had freed up resources to accelerate the renewable transition, and a new application was quickly submitted to enable large-scale production of renewable fuels.

In the media, this corporate decision was framed as a historical one and a sign that climate change had brought about "an era where emissions count and can determine investments" (DN September 29, 2020). According to one editorial, the decision was "not a one-off, but a trend break" towards neoliberal climate action wherein being climate-smart pays off in the long run:

> It is much healthier and more effective to have a policy that creates incentives for companies and individuals to steer their own actions towards a climate-smart existence, than for governments to step in and poke at individual company issues. Partly because in this way you avoid arbitrary abuse of power, but above all because it creates a long-term perspective and stability that makes the calculation predictable for companies that want to invest in innovative and fossil-free solutions (DN October 15, 2020).

In the next sections, we will see that renewable projects also have some issues with time.

3.3 When Permits Become Limited in Time: The Ten-Year Synsat Permit

On December 23, 2020, Preem submitted a new permit application for a Synsat project in Lysekil (M5514-20) aimed at refocusing the plant towards renewable fuels and biofuels. The hydrocracker that had been designed to convert heavy fossil-based oil was to be repurposed to process biomaterials, such as rapeseed oil, pine oil and recycled frying oil. The restructured plant aimed at processing HVO, which is short for hydrotreated vegetable oil, but can contain animal fats as well. HVO had become a popular fuel in Sweden. Unlike biofuels, it has diesel-like properties and can be mixed with fossil diesel at any rate. It began peaking in 2016 when it was sold as renewable diesel in mixed or pure form. Preem also planned to adapt it to aviation fuel. The reconstruction would allow a renewable share of up to 40 percent, which corresponded to up to one million cubic meters of renewables. In the application, Preem pointed out that it was an environmental improvement measure and an important step in the urgent transition to achieve Sweden's climate goal by 2045. It would lower transport emissions by 1.2 to 1.7 million tonnes of carbon per year. The climate benefit was premised on

the accounting rule that renewables are climate neutral. Preem hoped an amendment permit would suffice for this beneficial project, and that it could simply be added onto the original permit from 2004. After all, the original production would not increase but would stay within the maximum annual throughput of 11.4 million tonnes. Over time, fossil fuels would gradually decrease to make room for renewable fuels.

However, stakeholders began raising the idea of making the permit time-limited. There were doubts that the move to renewables would contribute to a climate transition, specifically since fossil-fuel production would continue at high levels and the application was vague on the volumes and biomaterials that would be used. Due to these uncertainties, SEPA and the Provincial government believed there was a need to time-limit the permit to the end of 2030. SEPA believed that if the Synsat permit was set to run out in 2030, it might trigger a reassessment of the entire operation. By 2030, the original permit would be more than 25 years old. The Provincial government agreed and anticipated that when the expiration time came, there would be more opportunities to consider carbon in permit reviews and more clarity on whether it was possible to regulate carbon emissions. The expectation was that carbon regulations might also cover industries that are part of the carbon-trading system in consideration of EU law (M5514-20, 70). Thus far, the Swedish courts had found no legal backing for considering carbon emissions beyond the fuel plant, despite Sweden's climate law that was introduced in 2017. By suspending the process, a time limit might work like a lifejacket until climate-sensitive rules came on board (cf. Appel 2018).

Environmental movements were not as accommodating. They opposed the expansion and argued that the basic permit needed to be reconsidered "now", not later in time. SSNC claimed that permission for extensive carbon emissions was not compatible with the Swedish and EU climate goals, especially since the EU rules stipulated that all sectors should play a role in achieving climate neutrality by the year 2050, regardless of whether or not they were covered by the emissions-trading system (M5514-20, 80). The Network found further support for this thinking in the preparatory work for the Environmental Act which stipulated that "Permits that have been issued according to older law for unlimited time must be able to be time-limited, if it is necessary for Sweden to fulfil their international commitments" (cited in M5514-20, 103).

The environmental movement Protect the Forest contributed to this reasoning by calculating the annual carbon timeprint. It was not only that Preemraff Lysekil releases 1.7 million tonnes of carbon at the refinery, but that 11.4 million tonnes of crude oil would generate emissions in the magnitude of 7 million tonnes of carbon dioxide in the extraction stage and around 50 million tonnes of carbon dioxide in the consumer stage. This amounted to a total of 57 million tonnes per year, which was larger than Sweden's territorial fossil emissions (Protect the Forest in M5514-20, Annex 34). Greenpeace also pointed out that the atmosphere does not differentiate between a "black" or a "green" carbon dioxide molecule, but that all emissions within the next ten years will cause climate damage. The basis for counting biofuels as climate neutral is that the now-living plants that are burned up will eventually grow back and bind the carbon into the biomass. Yet, the environmental organisation drew attention to the critical time aspect, noting that the timeframe that this calculation relies upon "is far too distant" in relation to when reductions are needed (M5514-20, 86-87).

> It takes 60-120 years before the trees that have grown back have taken up the same amount of carbon released when they were felled. Science is at the same time clear; we must already now radically reduce emissions. If the trees had instead been allowed to stand, the emissions would have been prevented. The trees had also continued to bind large amounts of carbon during the same time. (Greenpeace in M5514-20, 87)

Greenpeace argued that producing biofuels was a counterproductive use of time since biofuels merely provide fossil companies with a green alibi: "It is a socio-economic misprioritisation, lost time for critical climate work, disaster from a climate and environmental point of view" (*ibid.*, 88). Environmental movements were quite coordinated in their view that renewable fuels had no place in a climate-smart future.

The company seemed certain that the legal tradition of issuing perpetual permits would hold, especially for renewables, which were part of the future; and it was adamant that facilities that "are rebuilt or built to produce renewable fuels should reasonably not be time-limited because they will have a designated socially important function for a long time to come". A time limit would make the urgent transition more difficult (*ibid.*, 117). The company made clear that a lack of "guaranteed legal survival" would make it difficult for the project to proceed:

> The requested changes are based on billions of investments that will be subject to depreciation and may have a repayment period that runs up to – and past – the proposed time limit. Carrying out the changes and then running the business with a given end date for the change permit is, to say the least, difficult in terms of being able to obtain the capital that the changes and maintaining the operation require. If the permit is in danger of ending at a certain time, uncertainty and risk increase to a significant extent, which in turn means that the possibility of obtaining financing decreases and the cost of financing the project increases. (*ibid.*, 115-116)

Preem confirms here the long infrastructural time that they argued was needed to recover the investment (cf. Mitchell 2020). A perpetual permit was so important to Preem that the company offered to submit the entire operation to a permit review by the end of 2025, provided that the Synsat permit was not time-limited (M5514-20, 117). In the eyes of the court and authorities, however, the crux of this promise was that it would not be legally binding. The court did not see this as a viable bargain, and SEPA read it as an invitation to regulate the transition more strictly.

On June 20, 2022, the Lower court granted a time-limited permit for the Synsat project, valid until the end of 2032. The court gave permission for a yearly throughput of 11.4 million tonnes and 250,000 tonnes of fossil or biogas, and the ruling specified that a maximum of 1 million cubic metres could be renewables. A time-limited permit means that a new review must take place for the business to continue; otherwise, the project must be abandoned and revert to the operations that were covered by the original permit. The court admitted that a time limit can be costly and time-consuming for the company, but it suspected that the permit would be outrun by fast technological developments. Another motive was the "doubts" and "inconveniences" concerning the renewable raw materials that would be used (*ibid.*, 125-127). These were mild terms that glossed over the many counterclaims that had been raised by the environmental movements. The company had deferred many of the decisions to the real-time sit-

uation, to "the present present" (Kitchin 2019), which made the future very uncertain. Preem meant that the share of renewable raw materials would vary over time depending on availability, price/margin, changed sustainability criteria and changes in regulations, and thought it was important not to tie the permit to certain explicitly stated raw materials or carbon reduction. Again, a more binding transition plan was considered impossible (M5514-20, 19-23, 118). The court judged that a ten-year temporary permit was fair under these circumstances.

Three environmental organisations appealed, but the Appeal court saw no reason to review the case. In the appeal, however, Greenpeace offered the carbon timeprint of the permit to emphasise the effect of the permit over time. A throughput of one million tonnes of raw material per year meant "it is a decision that concerns ten million tonnes of raw material, which is far beyond the amount most permit processes deal with, even those without a time limit" (M8900-22, Annex 3).

Greenpeace further highlighted that Preem's facilities in Lysekil and Gothenburg alone would account for more than 100 percent of Sweden's emission budget in 2045. This would conflict with competition law as there would be no emission space left for other industries. In this view, the court had foreclosed Sweden's climate future in substantial ways. Greenpeace noted that the court gladly considered matters that worked in favour of Preem's application, but to be perceived as fair, it must also consider processes that disadvantage it, such as the EU's phasing-out of combustion engines and the stricter requirements for the protection of standing forests and biodiversity (M8900-22, Annex 3). Friends of the Earth pointed out another temporal disorder which was that the government had preceded the Synsat permit procedure by granting a green credit guarantee for the project the day before the court hearing. This was perceived as the wrong order of doing things. Critics suspected that the government had influenced the court's decision and thereby violated the independence of legislative power and justice (M8900-22, Annex 1). This out-of-order decision-making troubled citizens' trust for the legal and political apparatus, but it was not cause enough for the Appeal court to review the case. The Appeal court had already stated its views on infrastructure for renewable fuels in the application case of the HVO project, to which we turn next.

3.4 Permits As Opened and Closed: The HVO Project

The HVO project in Gothenburg was initiated in 2019 when Preem sought permission to process 7.6 million tonnes of raw materials. Preem already had a permit for processing 6 million tonnes of raw fossil materials and wished to acquire a permit for an additional 1.6 million tonnes of renewables. The company admitted that the reconstructed plant would demand more energy and emissions, but the increase was justified by the overall reduction of fossil emissions at the end of the pipe, which was "more than 30 times larger than the increase of fossil carbon from the refinery" (M2673-19, 51).

On September 10, 2021, the court issued a temporary 14-year permit, valid until end of 2036. The court believed that Preem was moving in the right direction but noted that the company's high fossil-free ambitions were not equally manifested in the applied-for levels. The promise of a green transition clashed with the sustained fossil-fuel volumes, and the court judged that the pace of the transition demanded a tighter time-control, hence the time limit. Again, the 2036 endpoint was a compromise. SEPA argued that the permit should be valid until the end

of 2041. The Provincial government proposed the end of 2035 so that it aligned with the provincial goals. The Environmental and Climate Committee of Gothenburg City also wanted a time-limited permit but trusted the court to arrive at an appropriate duration (*ibid.*, 73).

The environmental organisations had tried to convince the court that retrying the entire operation was not only possible but also desirable. The Network that was determined to stop Preem's expansion leaned on climate experts who argued that climate issues can indeed be considered in environmental assessments. In jurisprudence, though, there was a prevailing belief that carbon emissions should not be regulated in individual permits. The reason was that emissions are of a more global nature than the local environmental issues that are normally considered in permit assessments. However, the Network tried to nudge the court to rethink climate as an environmental issue:

> Legal practice has long been to draw a dividing line between environment and climate, a line that in reality does not exist. Natural science says the exact opposite, that environment and climate are closely intertwined and cannot be considered independently of each other. Jurisprudence should reflect the reality we live in and acknowledge that Preem Gothenburg's emissions contribute significantly to both the climate crisis and the crisis in our environment (Network Stoppa PreemRaff in M2673-19, Annex 82).

From the Network's perspective, it was completely unreasonable to grant permission to continue to emit such large amounts for many years to come "when what we should be doing is demanding phase-out" (M2673-19, Annex 82). When the Network calculated the timeprint of the 14-year-long permit, it figured it would increase the production of fuels by 25 percent which would increase emissions by the same percentage. The annual emissions of carbon dioxide would amount to 15.4 million tonnes per year and accumulate to a much larger figure over the years.

> In total, during the 14 years that the permit applies, the emissions will be approximately 215 million tonnes of carbon dioxide. About two-thirds of Preemraff Gothenburg's production is exported and one-third is sold in Sweden. Emissions in Sweden from Preemraff Gothenburg's products will be 71 million tonnes of carbon dioxide, which corresponds to roughly a quarter of Sweden's remaining emissions budget (Stoppa PreemRaff 2022).

The "timeprint" (cf. Adam 2008) weighs heavy when the climate is concerned. According to environmental law, such activities should not be carried out since they risk that many people "will have their living conditions significantly worsened or the environment will deteriorate significantly". This would also violate the Convention on the Rights of the Child, since the depletion of biodiversity destabilizes the Earth's system and triggers food and water crises that threaten children's right to life: "the children of the future will be hit even harder". The Network emphasised that not only human lives were at stake. Sweden already has 1,200 species that are acutely or highly threatened, of which half belong to the forest, which would be threatened by biofuel production. The legitimacy of the fossil-free welfare state was also called into question. To the Network, Sweden, as a welfare state, has an obligation to take the lead in the transition (M2673-19, Annex 82).

The 14-year-long HVO permit was appealed by actors across the board (M11764-21). Despite the short appeal period of just three weeks, a total of 110 appeals were submitted by organizations and individuals, and many requested injunctions to prevent the company from starting to build before the case was heard. The company also appealed. Preem agreed to the time limit pertaining to fossil-fuel production but contested the time limit for renewable fuels and for the fossil carbon needed for renewable production. At this point in time, Preem had pushed its climate goals ahead to 2035, which might explain why the company so easily agreed to time-limit its production of fossil fuels. The Appeal court agreed to review the case and ruled in favour of the company's claims.

On June 1, 2022, the Appeal court revealed its verdict (M11764-21). The court removed the 2036-time limit for the renewable stream and the time limit was also lifted for the fossil fuels used in renewable production. The court found no compelling reason to limit these flows in time. Clear reasons were needed to break the tradition of granting timeless permits, and the court did not foresee any viable alternatives to using fossil oil and gas in the production of renewables. However, a limit on the yearly throughput of crude oil by 2036 was deemed desirable, and since the parties had agreed, this was easily decided. This was an important milestone. The company had applied for a permit to expand renewables and ended up with a time limit for the fossil fuel operation. Hence, new permit processes may undo what was permitted before and set new rhythms, timelines and deadlines. But the permit procedures alone cannot achieve this. Instead, many factors shaped the timetables that were agreed upon by the company, authorities and the court. The environmental organisations, however, never signed off on the idea that renewables were part of the long-term future. Greenpeace Nordic punctuated this notion in a recent publication: "The sky is full" (2023) develops the idea that it does not matter whether fuels are fossil or biogenic but all carbon emissions prolong the climate crisis. Figure 2 reflects this notion that carbon timeprints accumulate in the air.

4. Concluding discussion

In this article, I have argued that we can gain a deeper understanding of the infrastructured timescape of climate change by considering permit times. The analysis of three environmental permit processes in Sweden shows that the time of the permit is a central timekeeper in the climate transition. Permit proceedings expose the temporal differences and tensions that exists when new low-carbon fuel infrastructures are proposed against the backdrop of old fossil-fuel permits. The multiple opinions on the time horizons of new fuel structures suggest that temporal issues are difficult to agree upon. Nonetheless, new times are "made" through these processes.

First, when permit processes occupy time, and when processes are lengthy and delayed, the passage of time can play a powerful role. The ROCC project, which aimed to expand fossil fuel production, was eventually withdrawn by the company itself. The sense of climate urgency and changing market conditions seemingly rendered plans to expand fossil fuel production obsolete. This is telling in light of the political ambition to fast-track permit procedures in order to accelerate the climate transition. A crux of speedy procedures is that they leave less time for democrat-

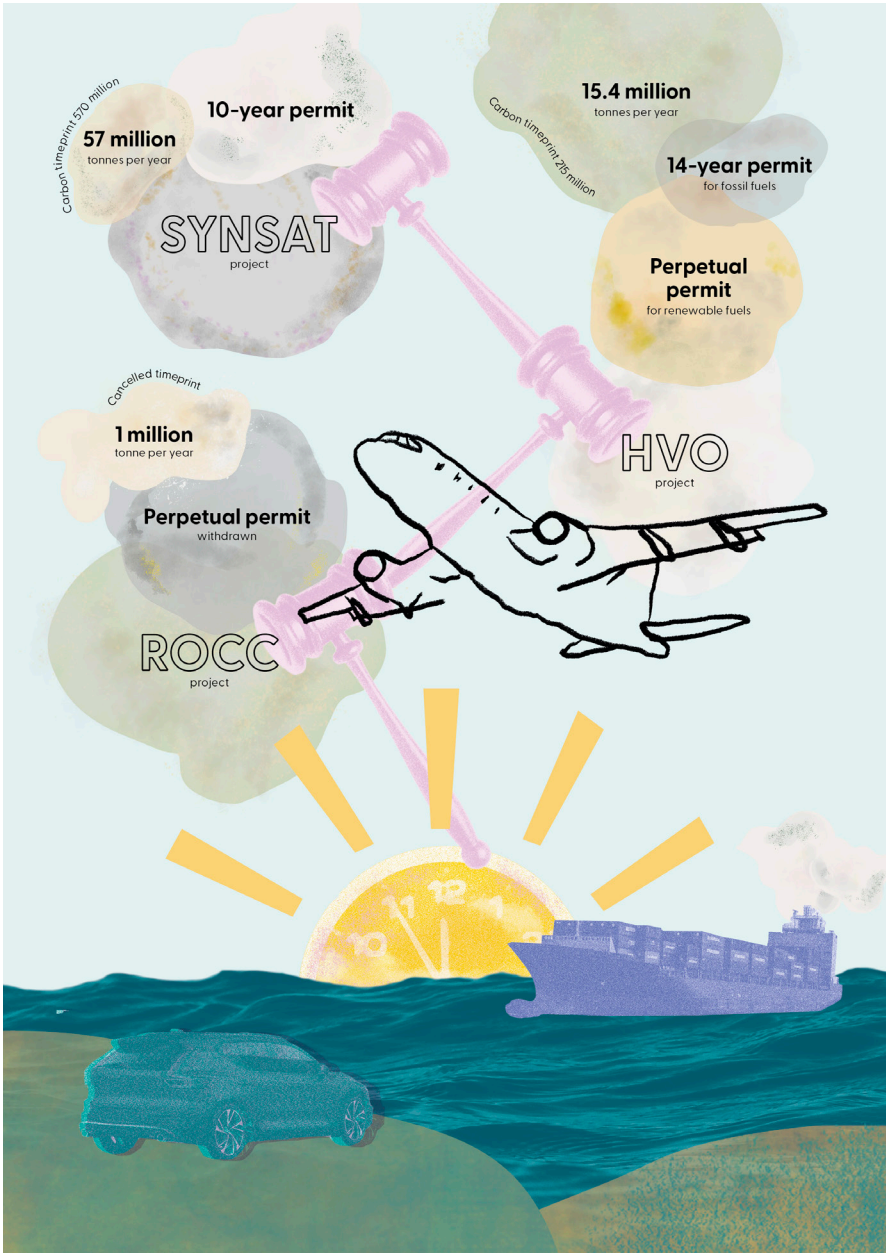

Figure 2.
Today's permits shape tomorrow's climate through their carbon timeprints. Carbon emissions accumulate over the length of the permit, or indefinitely if permits are unlimited in time. Illustration: Victoria Skoglund

ic processes to settle the many temporal controversies that emerge when new infrastructures are proposed. The Nordic permit review also notes that is necessary to weigh the political urge for swifter permit processes against the need for transparency and public participation in the permit system (Nordic Council of Ministers 2023, 41). Courts and the legal sphere must also be challenged to account for carbon emissions in permit reviews, and to recognize that today's permits cannot merely be judged from the standpoint of the present but also from the future. Permit decisions are matters of temporal justice, but many issues raised by concerned citizens and organisations were left aside, such as the broader and long-term impacts of the new infrastructure.

Second, when permits are becoming limited in time, it may suggest that the era of eternal permits is running out. Time-limits were proposed not merely as a way to manage uncertain technologies and environmental impacts, but the negotiations also resulted in time-limits for conventional fossil fuel production. New practices thus emerged to constrain the temporal reach of infrastructure and their carbon emissions. Perhaps controlling the length of time was one way to manage the climate transition when using carbon as legal justification was deemed a no-go. By introducing time limits, the carbon timeprint also became easier to imagine and estimate. Time limits, therefore, do something to how one can perceive and contest the infrastructured timescape of climate change. Perhaps eternal permits are even becoming a thing of the past. It may be that we are approaching a moment when courts decide that eternal permits are untimely, and that it is necessary to go beyond linearity and predictability towards a conception of time as open to unpredictability, recognizing our poor knowledge of potential outcomes (Adam and Groves 2007; Adam 2008; McNeilly 2018). While the fuel company mobilised uncertainty to avoid a strict climate transition plan, uncertainty may also be used by permit authorities to constrain the reach of uncertain infrastructure. Time-limited permits have previously been used for uncertain projects, but in these uncertain climate times, they may move from being the exception to the standard. Still, time limits are not welcomed across the board, but they have become part of permit practice and discourse; for example, a recent permit overview recommended that Swedish permits should be reviewed every tenth year and that no permit should be more than 40 years old (Miljöprövningsutredningen 2022).

Third, when permits can be both open-ended and time-limited, the choice gives an indication of how specific fuel futures are perceived. Seemingly, the difficulties of foresightedness seeped into the courts' deliberations on requiring time limits for the horizon of fuels, but not in straightforward ways. While the lower court granted temporary permits for co-processing fossil and renewable fuels, the higher court revoked this decision and firmly made renewables part of the long-term future. Hence, the permitted temporality that has emerged through these cases is both continuous and temporary, as well as controversial. By "foreclosing infrastructure" I mean to signpost the possibility that infrastructure may be closed ahead of time, and that once issued permits can be time-limited or revoked. But "foreclosing" also works as a reminder that infrastructure may reach far into the future and accumulate climate damage that forecloses the future of next generations (cf. Appel et al. 2018). It is an important reminder that infrastructure works on time in numerous ways that are not well understood (Mitchell 2020). While we might want to think about infrastructure as structures that speed things up, such as the flow of energy or the climate transition, infrastructure does not merely make things run faster. Infrastructure can work as an apparatus of delay (Mitchell 2020), even as an appartus that fore-

closes futures. For those counting on renewables being climate neutral, these permits will help accelerate the climate transition, but for those who count the carbon timeprint, the permits will merely delay the climate transition and potentially foreclose human and nonhuman lives in the process. This moral understanding of time differs significantly from the temporal standpoint taken by the courts, where available technologies, contemporary regulation and local environments delimited what was considered. Even so, climate temporalities seeped into the deliberations and continuously influenced what was permitted: those who applied, intervened, appealed and judged used climate rationales to both oppose and support the permits. The ways multiple temporalities must be juggled supports Adam's (2008) notion that "the more types of time involved, the more difficult becomes the task of synchronisation and timing".

In this way, the permit adds a layer to the temporal notions of infrastructure. If imagination is about the possible, aspiration about the desirable and anticipation about the likely (Appadurai 2013; Aalders 2020), then permission is about the permitted. Like other modalities, permission is not about what will happen but about what can happen – the possible. This offers an additional way to think about infrastructure as matter out of time by focusing on that which is legally allowed, but not what is obliged. This legal acceptance, and questions of permission and permissibility, warrant more attention. The deliberative processes associated with permits will also continue to be interesting entry points for understanding and changing the perception and control of time. Old, perpetual permits are difficult to uproot using legal means, but perhaps permit processes can be one avenue where actors come together to reconsider the continuation of the past in the face of climate change. Permit processes do not merely work by looking forward; they fold time by revisiting past decisions and potentially overturn their hold on the future. New infrastructure and its permit processes may, in this way, trigger new temporal relationships, as they can work back in time and erase old permits and make new times happen.

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M11764-21	Svea Hovrätt 2022 (protocol by Higher Environmental court).