# Beyond the Fossil Era

Transformative Pedagogy for Sustainability

*Ludwig Bengtsson Sonesson*

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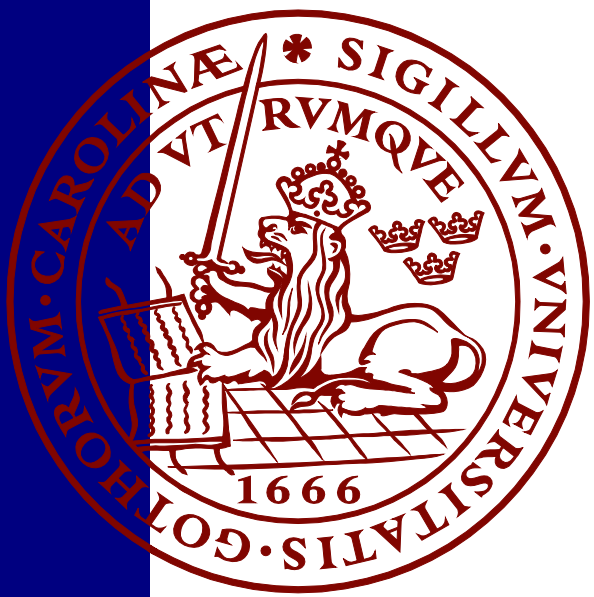


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Supervisor: Elina Andersson, LUCSUS, Lund University

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## Abstract

Society faces multiple and interconnected crises that require transformation. Education has long been theorized as key to transformation, yet an important driver of transformation, imagination, is marginalised within pedagogical approaches to sustainability. This thesis examines Beyond the Fossil Era (BFE), a pedagogy that invites learners to become co-creators of a speculative museum looking back at a sustainable transformation from year 2053. By bridging literature on pedagogy, futures and transformation and analysing BFE, this thesis explores the transformative potential of imagined futures as pedagogy. Through observation, surveys and interviews, it finds that BFE positively impacts pupils' perceived agency, affective relationship with the future and ecological, sociological and utopian imagination. By materialising the future in everyday objects, set in an imagined future, BFE defamiliarizes the present and opens the future for deliberation. Its transformative potential lies in its utopian and critical method, and can be strengthened by constructing infrastructures of the imagination.

**Keywords: futures, education, transformation, hope, utopia, imagination**

**Word count: 11956**

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## Abbreviations

BFE: Beyond the Fossil Era

EfS: Education for Sustainability

ESD: Education for Sustainable Development

IPCC: Intergovernmental Panel on Climate Change

TFE: Transformative Futures Education

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# 1 Introduction

Our modern societies faces multiple interconnected and complex crises, from climate breakdown and biodiversity loss (Steffen et al., 2018) to a neo-fascist renaissance, an inequality crisis (Cornell & Gupta, 2020) and a crisis of (in)attention spurred on by algorithmic surveillance capitalism (Hari, 2022; Zuboff, 2019). Given the scale and speed at which these need to be addressed, incremental change is inadequate—only transformative change will do. While transformation as an aim is applaudable, the key question that follows is: *how* can societies be transformed (O'Brien, 2018)?

This is a question with many possible answers. One avenue of research focuses on the necessity of imagination for transformation (e.g. Moore & Milkoreit, 2020). Its core argument is that social change happens when the popular imagination is activated, and not before (Linnér & Wibeck, 2020). Imagination, in this reading, is required both to understand how the system currently works and how it could be transformed. Worryingly, the literature shows that the politics of recent decades have produced an imaginative monoculture, a culture where 'there is no alternative' (to neo-liberal capitalism) and techno-managerial solutions are construed as the only viable path forward (Amsler, 2015; Amsler & Facer, 2017; Andersson, 2018). The imagined future has been 'colonised' by the structures, ideas and actors that caused many contemporary crises. Consequently, many argue that we are experiencing a 'crisis of imagination' (Ghosh, 2016). This is a failure on three fronts; a failure of ecological imagination (to understand the impacts and dynamics of ecological degradation), of sociological imagination (to see the structures that cause that degradation) and of utopian imagination (to imagine desirable futures that can mobilise action) (Bai et al., 2016; Moore & Milkoreit, 2020; Oomen et al., 2021). To accelerate deliberate transformations, these three imaginative capacities need to be nurtured, and the imaginative monoculture needs to be diversified.

Further, the scholarship on futures contends that, in addition to our failure to imagine desirable futures, most people are also 'futures illiterate'—they fail to see how assumptions about the future shape behaviour in the present (Miller, 2018). The hypothesis goes that, were we to imagine the future as emergent and open, rather than given and closed, we would be capable of making better decisions for the future, today. Others point to the shallowness of our imagination and argue that to transform society, we must also transform ourselves—our values and world-views—both as a collective and as individuals (O'Brien, 2018). This involves recognising that the individual is in fact part of a greater whole, and that the relationships between oneself and objects, people and the

environment enable and constrain transformative change (Ghosh, 2021; Ives et al., 2020). In that sense, we must re-imagine ourselves as well as our social configurations.

One particularly important site for these transformative struggles is education, as schools are arbitrators of what counts for legitimate knowledge and can thus cement the status quo or encourage young people to question it and imagine things otherwise (Apple, 2013). What the insights above call for is a transformative pedagogy—a form of teaching that re-kindles our collective imagination and forces us to reckon with our idea of the good society. This is in line with ideas of education not as a means to an end, shaping learners with a certain ideal in mind, but rather as an 'end in itself', a social practice which co-generates the very future it explores (Amsler & Facer, 2017). While these practices are needed in all parts of society, schools are the institutions available to most. In addition, today's young people, as inheritors of the past, have an especially troubled relationship with the future. According to a global study, 55 percent of young people believe 'humanity is doomed' (Hickman et al., 2021) while a Swedish study described that over half of the country's young people are worried about the future (Novus, 2021). While pessimistic notions of the future can be warranted, foreclosing the future as 'doomed' can cause apathy and anxiety (Ojala, 2015). It is thus essential that schools address the pupils' concerns and develop methods for learning about and with futures (Smith, 2021).

### 1.1 Beyond the Fossil Era

To answer this call for transformative futures pedagogy, methods are being developed that employ a combination of arts and science to imagine and explore futures together with pupils (e.g. Duggan et al., 2017; Hajer & Versteeg, 2019; Hicks, 2002). One such method currently deployed is *Beyond the Fossil Era* (BFE), which I developed together with the educational branch of the NGO *Swedish Society for Nature Conservation* (Naturskyddsföreningen) in 2020 as part of my employment within the research project *Climaginaries* at Lund University. The initiative uses a fictional museum exhibit looking back at our present fossil-fuel dependent age, set in 2053 in a world where emissions have reached net-zero, to explore how transformative change could occur (Raven & Stripple, 2021; Stripple et al., 2021). Through everyday objects displayed in the museum, participating pupils explore stories from the transition years (2015-2053). When placed in the museum and experienced from the future, everyday objects, such as the LEGO-set, become anachronistic symbols of a contentious 'petroculture' (Wilson et al., 2017).

The exercise has three main phases. First, pupils are immersed in the museum by watching a film of a museum guide touring part of the museums' collections, talking about how our relationship to heat

has changed and the absurdity of SUV-driving in cities. Second, the pupils explore the museum's objects, perhaps reading the story of how EU agricultural policy shifted from funding growth to funding restoration or how regenerated wetlands have caused certain flower species to thrive (see Appendix 7.3.1). Third, they get to identify objects for the museum and write stories which explain their significance. To help them contextualise and understand transformations, they also explore a historical timeline of the Fossil Era (see fig. 1) as well as an overview of eight transformative societal processes.


**Figure 1** Excerpt from a timeline of the Fossil Era from BFE. The full timeline includes 17 historical and fictional events, ranging from the discovery of the Haber-Bosch process in 1910 to the bursting of the financial carbon bubble in 2024 (Naturskyddsföreningen, 2022).

The stated aim of BFE is to nourish the imagination of its participants and to instil a sense of agency by expanding perceived possibility (Stripple et al., 2021). While laudable goals, the extent to which initiatives such as this one achieves their aims is under-explored in the literature (a notable exception is Hoffman et al., 2020).

## 1.2 Aims and Research Questions

Against this background, this thesis contributes to the field in two ways. Firstly, it bridges the literatures on education for sustainability and transformative learning with those focused on futures, transformation, and futures literacy to craft a novel understanding of the connection between futures education and societal transformation. Previous studies have established how futures education could be *personally* transformative (e.g. Pouru-Mikkola & Wilenius, 2021), drawing on concepts from the literature on transformative learning. However, schools are not isolated islands within a community—the institutions and their learners bring the outside world into the classroom and use what they have learnt as they leave (Apple, 2013). It is therefore pertinent to conceptualise the broader societal implications of transformative futures education.

Secondly, by analysing BFE, a method that is already in use in Swedish schools, I add important empirical insights to the emerging literature on sustainability education, which lacks studies of transdisciplinary and normatively oriented pedagogies (Monroe et al., 2019). However, drawing on

an understanding of knowledge as inherently situated (Haraway, 1988), my aim is not to establish a causal relationship between a certain pedagogy and societal transformation. Instead, this thesis should be understood as a first piece of a puzzle, which aims to conduct an initial investigation into the transformative potential of imagined futures as pedagogy.

Moreover, I align with the normative effort to improve on education for sustainability. I answer the call from educators such as Keri Facer (2019), who seeks techniques that "support our pupils to think with hope and with rigour about the sorts of futures that are being made today; and to enable them to care for, imagine and make liveable futures …" ( p. 2). This normative aim fits aligns with the heritage of educational action research where the researcher/practitioner "shapes the world *with* others in a more desirable direction" (Bradbury et al., 2019, p. 7) by combining practice with inquiry.

This is also in line with recent work within sustainability science that highlight the need for methods that "provide opportunities for crafting narratives to guide transformations toward sustainable development pathways" (Clark & Harley, 2020, p. 60). Further, I contribute insights on the potential and difficulty of co-production and transdisciplinary collaboration—two topics at the heart of contemporary sustainability science (Chambers et al., 2022; Jerneck et al., 2011; Wibeck et al., 2022).

Through this analysis, I attempt to answer the over-arching question:

- *How can transformative futures education contribute to societal transformation towards sustainability?* (RQ1).

Further, I ask specific questions relating to BFE and transformative futures education:

- *How and to what extent does transformative futures education help learners understand, imagine, use and act towards desirable futures?* (RQ2)
- *How is transformative futures education experienced by learners?* (RQ3).

For clarification, I use pedagogy and education interchangeably throughout the thesis to mean the same fundamental teaching process.

This thesis is structured as follows. In section 2, I outline my theoretical framework, exploring the relationship between transformations, education, futures, utopia and hope. In section 3, I explain my abductive, ethnographic methodology, data construction and analysis. In section 4, I analyse the data collected in schools and reflect on my findings' implications for transformation. The final section summarises and concludes the thesis.

# 2 Theory

## 2.1 Transformations towards sustainability

To avoid "transformation" becoming another 'empty signifier' (Laclau & Mouffe, 2001), it is important to delineate what I mean with the term in the context of this thesis. While there is no agreed upon definition of transformation, a useful starting point is Patterson et al.'s (2017) definition as "fundamental changes in structural, functional, relational, and cognitive aspects of socio-technical-ecological systems that lead to new patterns of interactions and outcomes" (p.2). Given its breadth, Linnér & Wibeck (2020) emphasise the need to specify the *scale*, *pace* and *process* of transformation for each research endeavour. They sketch a four-field typology of four ideal type transformations with different scales and paces; *quantum leap, convergent, emergent and gradual* (see fig. 2). In a complementary paper, Scoones et al. (2020) delineate between understandings of transformative processes that emphasise *structural* change (i.e. changing how production and consumption is organised), *systemic* change (i.e. intentional, targeted change within systems) and *enabling* change (i.e. encouraging and developing collective capacity and engagement towards desirable futures).

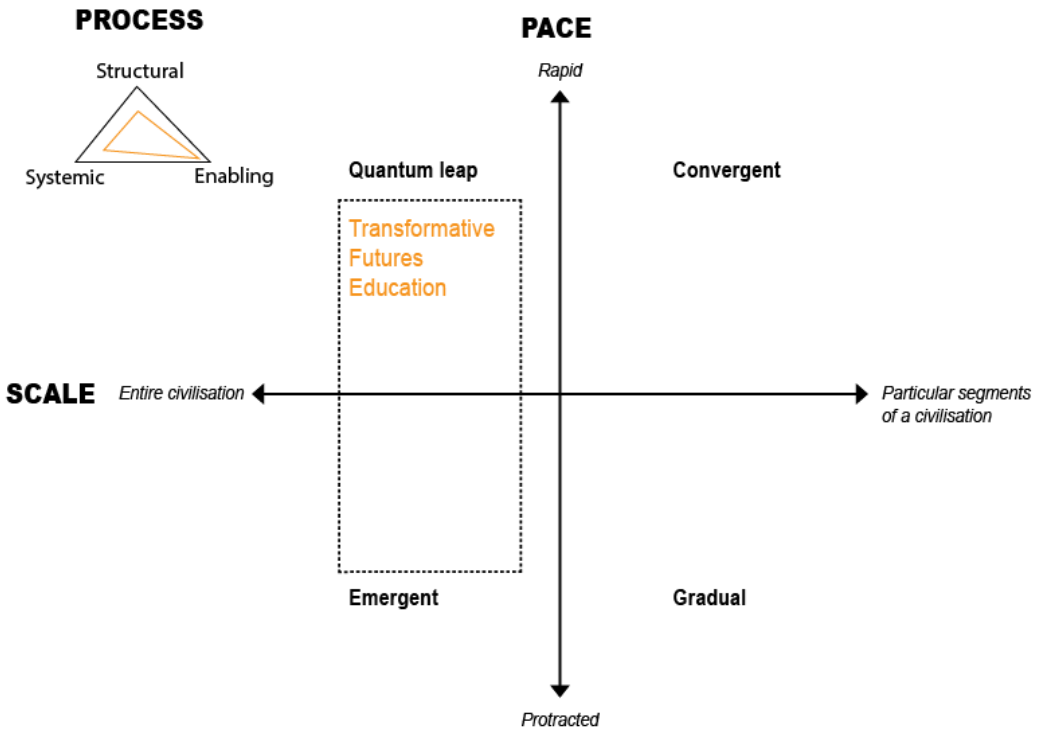


**Figure 2** Conceptual mapping of TFE's transformative potential. The top-left spider diagram (adapted from Scoones et al. (2020)) shows how TFE (in orange) emphasises enabling transformative processes while contributing to systemic change. The quadrant diagram, adapted from Linnér & Wibeck (2020) details how TFEs aim to contribute to civilization-wide transformation (scale) at a rapid pace, although recognising that education is a slow process, often leading to emergent transformation.

Education is in many respects a slow process, but with a society-wide scope (Linnér & Wibeck, 2020). One could argue that no transformation would be possible without education (Apple, 2013). However, transformative futures education puts the emphasis on *enabling* participation in transformation by deepening and broadening learners' perspectives on and knowledge of futures. In that sense, education's role in transformation is *emergent*, it equips participants with tools to understand, adapt to and change the rapidly evolving structures of society. Thus, it is also *systemic*—by changing one key component in the system, education, it aims to have cascading effects throughout the system.

However, the bio-physical realities of climate change and biodiversity loss forces us to reckon with *time*. In the same way that incremental change is inadequate, protracted transformations may leave little of the earth system intact. There is therefore a normative imperative to understand and enable what Linnér & Wibeck (2020) call *quantum leap* transformations—rapid and society-wide transformations towards sustainability. Ultimately, the goal of this thesis is to explore education's role in enabling such quantum leap transformations.

## 2.2 Education for Sustainability and Transformative Learning

The idea that education, in some form or another, is necessary for sustainability transformations is not new. Much of this work has been done under the banner of Education for Sustainability/Sustainable Development (EfS/ESD). These ideas have been adopted into curricula around the world (Taylor et al., 2019), including in Sweden (Skolverket, 2013) since the 1990s. At its most aspirational, EfS can be understood as "holistic and transformational education which addresses learning content and outcomes, pedagogy and the learning environment … It achieves its purpose by transforming society" (UNESCO, 2014, p. 12). However, as Tobias Schnitzler (2019) points out, much EfS has resulted in closed processes of "unidirectional transmission of information that focus on authoritative notions of what it means to be an ecological citizen"(p. 244). He calls this 'weak' EfS whereas 'strong' EfS entails open, participatory and transformative learning processes.

This second approach is in line with work on 'transformative learning' which attempts to "not only change … what we know or are able to do, but also … how we come to know and how we understand ourselves in relation to other humans and the natural world" (Schnitzler, 2019, p. 245). Sterling (2011) describes this in his three 'orders of learning'; the first, *conformative* learning, aims to 'do things better', the second, *reformative* learning, to 'do better things' and the third, *transformative*

learning, 'to see things differently'. Translated into EfS one might, for instance, imagine education focused on sustainable consumption to be conformative and education focused on lifestyle changes to be reformative. Transformative education is then supposed to encourage learners to fundamentally question their assumptions about the world to see it anew.

While this 'perspective change' is key to all understandings of transformative learning, the process as well as the target of transformation differs within the field. The original theory on transformative learning focused on individually transformative experiences while later iterations, inspired by the writings of Brazilian educator Paulo Freire, adopt an emancipatory mission and aim to transform society by "demythicizing reality" (E. W. Taylor, 2008, p. 8) and developing a critical consciousness in their pupils. This is similar to experimental futures (Candy, 2010) and speculative design (Auger, 2013), that seeks to achieve a form of 'epistemological rupture' (Moore & Milkoreit, 2020) by using the imagination to see through hegemonic representations of reality and move beyond a "politics of the obvious" (Stripple et al., 2021, p. 88).

There is also an extensive literature on futures education, a summary of which is beyond the scope of this thesis. However, particularly relevant is the work of Pouru-Mikkola & Wilenius (2021) on transformative futures education as they provide, to my knowledge, the first sketch of a holistic understanding of the topic. I draw on their conception that it is the "development of individual capacity to understand, imagine, use and act for futures" (p.8) that is the desired effect of transformative futures education while elevating their work to the societal scale, asking what the development of those capacities might mean for societal transformation.

## 2.3 Futures and Education

To understand the relationship between BFE and transformation, one must first understand the future's role; in education, for transformation and for decision-making. Starting on the micro-level in education and scaling up to the societal level, the following sections argue for a pluralistic, reflexive and performative understanding of futures.

Whether or not it is explicit, the future is always present in education. A core aim of educational institutions is to prepare pupils for the future by developing certain skills and capacities that policy makers and educators deem important. This involves forecasting and judging what is considered valuable knowledge—hence education is political. Amsler & Facer (2017) argue that education is designed to legitimise certain futures over others (e.g., capitalist or social-democratic futures) and

mould pupils into specific types of persons to avoid certain futures (e.g., racist or homophobic futures). Further, the neoliberal turn in education, characterised by standardisation, measurement and competition (Apple, 2013), has increasingly 'colonised' the future by designing pedagogies that prepare pupils for a future much like the current present (Amsler & Facer, 2017). Increasingly marketized school systems, such as Sweden's, employ what Paulo Freire called 'banking education' which seeks to "fill human receptacles (pupils) with abstract knowledge to be applied in fixed futures" (Amsler & Facer, 2017, p. 8). Pupils are thus dispossessed of the possibility to imagine the future otherwise within their education.

Moreover, futures education is not about bringing the future 'into the classroom', but making the future explicit and open for intervention and deliberation—in contrast to today when the future is often implicit and unquestioned (Häggström & Schmidt, 2021). This explicit futuring comes closer to what Freire (2005) called 'problem-posing' education, where "people develop their power to perceive critically the way they exist in the world … they come to see the world not as a static reality, but as a reality in process, in transformation" (p. 83).

The key point made by Freire, and by many futures scholars, is that the apparent inevitability of futures is socially constructed (e.g. Jasanoff, 2015). At any moment, an infinite variety of futures is possible. Yet, people base much of their decisions on implicit, and often narrow, ideas of the 'later-than-now' extrapolated from historic trends and processed through ideology (Mangnus et al., 2021). This is how the future comes to matter in the present, we 'use-the-future' to make decisions based on 'anticipatory assumptions', specific ideas of how the future will unfold (Facer & Sriprakash, 2021; Miller, 2018). Anticipation scholars hold that this is true for most decisions we make, whether they concern our individual or collective future. In reality, the future is unpredictable, prone to novelty and produces emergent phenomena. As relationships between nodes in a system change, it self-organises into novel configurations. That said, possible and probable futures are also constrained by material realities (Levitas, 1990). Climate change and species extinction are contingent on decisions made in the past and today, and non-renewable resources are finite, thus material conditions put limits on the future.

So, while the future is (largely) unknowable, it does political work in the present—in education and society at large. Actors evoke certain futures to argue for decisions and investments today, thus impacting the present (Beckert, 2016). Over time, some stories about the future become social facts. These are understood in the literature as 'socio-technical imaginaries', defined by Jasanoff (2015) as "collectively held, institutionally stabilized and publicly performed visions of desirable futures" (p. 2). These have power as they organise our present behaviour, promoting certain pathways while

dismissing others. It is important to note here that futures which claim to limit their forecasts to only technological or financial change are also deeply political (Longhurst & Chilvers, 2019). For example, negative emissions imaginaries have been diffused through much of EU climate policy, strengthened by scenario-building from the IPCC and other scientific bodies that disguise itself as 'simply numerical models' (Christiansen & Carton, 2021).

Understanding the future as open yet impactful for decisions today is what Riel Miller (2018) calls being 'futures literate'. He, together with the broader field of anticipation studies, argues that it is essential to develop the capacity to 'act on the future'—to think deliberately about what futures are used to justify behaviour in the present, and what behaviour other images of the future would justify. And like literacy in its original meaning, it is a capacity that must be learned, a process education must facilitate (Amsler & Facer, 2017). However, as Mangnus et al. (2021) point out, futures literacy is not a homogenous concept—what literacy means depends on one's epistemological and ontological relationship to the future, i.e., what can be known about the future and how we come to know it.

Mangnus et al. (2021) outline four broad ways to use the future. *Predictive* approaches hold that the future is at least partly knowable (e.g., through methods such as quantitative modelling) while *plausible* approaches draw on systems thinking to describe futures that could be planned for. *Experimental* approaches employ methods that actively expand the horizon of futures, aiming to craft futures that motivate action in the present. Finally, *critical* approaches put emphasis on the political nature of futures, deconstructing their claims of legitimacy to make room for alternative futures. There is not a 'correct' way to understand the future, these four approaches can complement each other. However, there is already extensive work being done in futures studies on predictive and plausible approaches to futuring—thus there is an argument for deepening the scholarly engagement with the latter two approaches, which is my ambition with this thesis.

## 2.4 Futuring as Dramaturgical Practice

The previous section elaborated on what we can know about the future and how we come to know it. But how does the future *do* 'work' (Appadurai, 1996) in the present? And how does it affect agency? Oomen et al. (2021) suggest that it is through the *act of futuring*—"the identification, creation and dissemination of images of the future shaping the possibility space for action, thus

enacting relationships between past, present and future" (p.2)—that the future becomes socially performative.

The future is thus an act, it is social, it is collective and it serves to guide action in the present. The future is not 'out there' or a figment of the mind, it is a "materially and discursively enacted part of the present" (Oomen et al. 2021, p. 6). This insight is important to understand futures education—if hegemonic imaginaries constrain the possibility space, how can we create experimental techniques of futuring that expand it?

Importantly, futuring is not just about what is being said, but about how, where, when and by whom it is being said—which Oomen et al. (2021) call the future's 'dramaturgical regime'. Further, the past also matters for how the future can be narrated in the present—discursive conventions might enable or restrict what stories can be told. For my analysis, this is a key insight, as these factors vary widely between different educational settings and navigating them could determine the effectiveness of the pedagogical intervention as it scales.

Through the sequential repetition of these dramaturgies, they can become authoritative and naturalised and form an imaginary (Jasanoff, 2015). However, these performative acts are always open to rebellion, there is always the "possibility of a different sort of repeating" (Butler, 1988, p. 520). It is this rebellious re-casting of the future that BFE attempts to facilitate.

To summarise, I understand the classroom as a stage where different futures are performed. BFE, as a rebellious act of drama, intervenes in the conventional repertoire of Swedish education. To understand whether it becomes persuasive or not, I will analyse how it is staged, what stories it tells, and how they relate to dominant imaginaries.

## 2.5 Building Utopian Worlds

> Utopian consciousness wants to look far into the distance, but ultimately only in order to penetrate the darkness so near it of the just lived moment (Bloch, 1995, p. 12)

The stepping stone between our present day petroculture and a future Beyond the Fossil Era is imagination (Linnér & Wibeck, 2020; Stoetzler & Yuval-Davis, 2002). This involves both imagining the structures that organise life today and how these might be different in the future (Moore & Milkoreit, 2020). I understand transformative imagination to consist of three modes: ecological,

sociological and utopian (see Ch. 1). The aim of transformative futures education can then be understood, at least in part, as the development of these specific types of imagination.

While BFE attempts to nurture all three, the analytical focus of this thesis is on the utopian imagination, given that it is the most marginalised of the three in the current educational regime (Amsler & Facer, 2017). It is therefore important to clarify what I mean with 'utopian'.

Utopia is often caricatured as a naïve fantasy or a societal blueprint destined for totalitarian rule (Levitas, 2013). History teaches us that caution is warranted when crafting utopias, but key here is to understand that the utopias that helped spawn totalitarian rule were imagined as closed systems and designed from the top (Baumann, 2018). Contemporary understandings of utopia see it rather as a *method* or a *praxis* than a roadmap to a specific future (Fournier, 2002), and emphasize pluralism and reflexivity in utopian thinking (Levitas, 2013).

The philosopher Ernst Bloch distinguishes *abstract utopias* from *concrete utopias* (Levitas, 1990). If kept in the abstract, utopias amount to 'wishful thinking', but once brought into the realm of possibility via the imagination they can lead to 'will-full acting'. The connection between the two is education, the cultivation of what Bloch calls 'educated hope' or the 'education of desire': to "teach desire to desire, to desire better, to desire more, and above all to desire in a different way" (Levitas, 2013, p. 4). So rather than imagining the *perfect* society that by definition will never exist, utopian practice is about imagining a *better* society by articulating one's desire for it to be otherwise.

Here, the connection to futures education becomes apparent, because in imagining the future otherwise "the estrangement disrupts the taken-for-granted nature of the present" (Levitas, 2013, p.4), providing space for the education of desire. Drawing on Levitas (2013), I also see the need to not just imagine the structural elements of the good society (e.g., norms, laws, economies) but also the people and places that might inhabit such a society. To achieve this, it is not the creation of utopian stories, singular, that is needed, but the construction of utopian 'imaginary worlds' (Wolf, 2012)—immersive story worlds in which pupils can explore alternative futures. Here I draw on Candy's (2010) insight that critique needs to be enacted, through a variety of medium, not simply interpreted, for it to be transformational.

The key takeaway for this thesis is that there is a burgeoning literature that advocates for the deliberate use of utopian methods, not to create *the* vision of a good society—but to do the *work* of imagination required to move us towards a better future.

## 2.6 Hope(s)

So far, I have focused on the cognitive dimensions of future education. However, BFE has more often been described in affective terms: as a hopeful pedagogy (Interview #3). Emotions have also been described as a key aspect of futures education (Pouru-Mikkola & Wilenius, 2021). But what does a 'hopeful pedagogy' mean? The literature on hope is vast and varied. In his review of hope, Darren Webb (2007) outlines five 'modes of hoping': patient hope, critical hope, estimative hope, resolute hope and utopian hope. He distinguishes between open-ended modes, such as the patient hope of religions, and goal-oriented hope such as the resolute hope of an individual attempting to achieve something, no matter the odds.

Given that the aim of this thesis is to conceptualise societally transformative futures education, the patient mode of hope risks falling into the 'fallacy of hope', whereby naïve optimism passivizes the public—what Ojala (2015) calls hope by denial and Berlant (2011) calls 'cruel optimism'. As for estimative and resolute hope, they can of course play an important role for transformations—much significant social change was led by individuals who worked towards a specific purpose against the odds. However, these modes of hoping have a tendency to address individuals' goals and developments, giving primacy to the individual over the collective.

Rather, it is 'critical' and 'utopian' hope that prove most relevant for transformations and education. Critical hope is "born out of a lack that leads to a longing" (Ojala, 2017, p. 79), thus it is in the critical appraisal of society that the possibility that things could be otherwise emerges, and here the sociological imagination is essential. Relatedly, utopian modes of hope are felt and made collectively, imagining desirable futures in the 'Not-Yet' that can mobilise action (Ojala, 2017).

In her review of how hope and anticipation can be included in education for sustainability, Maria Ojala (2017) suggest that a critical utopian hope ought to be fostered by educators, moving between the emancipatory possibility of utopia and the material realities of the world that can constrain action. For such hope to lead to action, it has to be learned and practiced. Thus, far from being just an emotion, or a naïve ignorance as some might suggest, hope is a practice that has to be practiced.

## 2.7 Towards a theoretical framework

By combining these literatures, I arrive at an initial understanding of how BFE (and transformative futures education) could contribute to transformation. In section 4, this understanding will be compared to the data collected in the field.

Firstly, the normative aim of BFE is to provide a socially transformative pedagogy which contributes to deliberate transformations by enabling three ecological, sociological and utopian imagination.

Secondly, by crafting of an imagined future story world, BFE attempts to intervene in the dominant imaginaries which currently organise our societies. It attempts to teach an experimental and critical futures literacy, through which visions of desirable futures can emerge.

Third, in imagining the future otherwise, BFE aims to foster a critical and utopian hope in its participants. Here, utopia is understood as a method, not a definite end goal.

Finally, I understand acts of futuring to be dramaturgical in nature. Thus, whether or not BFE 'succeeds' depends on how it is staged, the stories it tells and how it navigates dramaturgical conventions.

# 3 Methodology

## 3.1 Data Composition

In this thesis, I use an inquiry-driven, abductive methodology. I do educational action research, where practice is combined with inquiry to improve pedagogy (Mertler, 2019; Norton, 2009). My research was born out of a 'breakdown' in understanding (Brinkmann, 2014): people in one of the world's wealthiest countries struggle to imagine society otherwise and act on that imagination, despite extensive access to both material and political tools to do so. What ensued was a long period of 'sense-making', an iterative process involving many different projects that ultimately led to the development of BFE. As is common in abductive research, I then tested the result of that sense-making "in the field", continually developing my understanding of transformative futures education (Brinkmann, 2014). This thesis is the latest step in that sense-making.

Abduction was chosen over deduction or induction since "knowing is … intimately connected to doing" (Brinkmann, 2014, p. 722). Further, my involvement in the very object of study made an inductive approach, letting the data speak for itself, a troubling venture. A deductive approach—letting theory guide the construction of data—was an option, and ultimately this inquiry will be theory-driven. However, wearing too narrow theoretical spectacles might occlude important aspects of the educational experience, thus shielding my inquiry from uncomfortable or surprising lines of inquiry.

I used ethnographic methods to understand how BFE affected the learners, teachers and classroom dynamic. Rather than employing a classical ethnographic method which involves spending extended periods of time in a particular place, I understood ethnography as "an art of the possible" (Hannerz, 2003, p. 212) which meant that I conducted participatory observation in schools to the extent which covid-regulations, work-obligations and teaching schedules allowed.

The character of the observation varied over time. At the start of the BFE project, I held several teacher trainings to spread the initiative to schools. During this period, I also led sessions with pupils which contributed to the iterative development of the exercise. From a methodological perspective, these occasions run closer to auto-ethnography (see Rambo & Ellis, 2020) where an author's own experiences of a situation or phenomena provides a starting point for inquiry. While data from those sessions will not appear in this thesis, they were valuable in guiding my inquiry and contributing to my pre-understanding of the issue at hand. For an overview of the timeline of this research, see Figure 3 below.

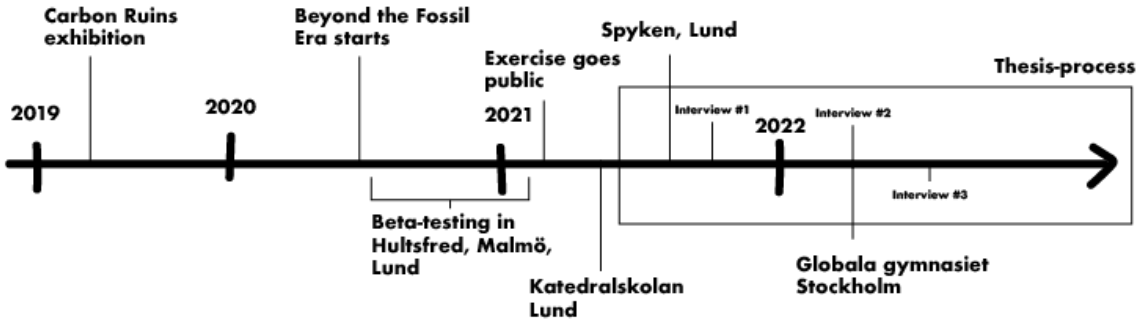


**Figure 3** Timeline of BFE's development and research process. It grew out of the Carbon Ruins-project, which we launched in 2019. In 2020, we secured funding from the government agency FORMAS to create BFE. It has since then continually been iterated on, translated into English and expanded. This thesis will inform further development of the exercise.

As it became clear that I would conduct research on BFE, a phase of more structured inquiry began (see Table 1 below for an overview of my data). In November 2021, I held a session together with two teachers and 22 participating pupils at an upper secondary school in Lund. The participants participated in their roles as 'sustainability ambassadors' for their class, thus they varied in age and educational background but had a strong commitment to the topic at hand. The pupils' group-discussions were observed, field-notes were taken and pupils also filled in a survey at the end of the lesson.

In February 2022, I spent a whole day at an upper secondary school in Stockholm. Two teachers had expressed interest in piloting a version of the material written in simple Swedish aimed at learners with limited Swedish skills. Four classes at the school took part in BFE. Two classes were enrolled in the second year of a science program and two enrolled in an introductory program where they would be taught Swedish as well as subjects required to start upper secondary school. The session with the science pupils was done in the school's great hall (both classes were combined into one session) while the other lessons were done in smaller groups in individual classrooms. Due to the large size of the group, a colleague from the university was enlisted to observe half of the classes. We collected data through participant observation (DeWalt & DeWalt, 2011), small-talk with pupils and teachers at the school, semi-structured interviews with the two participating teachers and through a survey that the pupils took at the end of the lesson (see Appendix 7.2 for survey design). Doing a survey in Swedish proved difficult for the participants with limited Swedish skills, even though the questions were simplified in cooperation with their teacher. This meant that some of the answers were not legible and had to be excluded from the analysis.

At the end of BFE, pupils contribute an object to the museum. Their objects were collected and analysed by using data and concept-driven coding, identifying recurring themes and structuring the data according to the theoretical framework. The analysis of these stories, and the classroom conversations that preceded them, are key pieces of evidence as they can be seen as a proxy for the pupils' imaginations.

**Table 1** Overview of data sources, quantity and method of collection.

| **Data Category** | **Number** | **Method** | **Comments** |
|---|---|---|---|
| Objects and stories created by participating pupils (referenced as O[City] [1,2…]). | 48 objects across 5 sessions (Lund-Spyken, Lund-Katedralskolan, Stockholm-Globala (Science+SPRI 1+SPRI 2). | Data and concept-driven coding to aid analysis. | Due to time-constraints, some of the stories were more polished than others, which makes comparing them quantitatively difficult. Thus, they were only qualitatively analysed. |
| Survey responses (referenced as SL (Lund), SSC (Sthlm, science pupils) SSpri (Sthlm, intro Swedish) + [1, 2..]). | 80 pupils across five high upper secondary classes (59 pupils from Globala Gymnasiet in Stockholm and 21 at Spyken in Lund) | Short five question survey done on Google Forms/Menti post-exercise. See survey questions in Appendix 7.2. | Five pupils did not want their responses to be stored, so those have been removed. Some chose not to respond to certain questions in the survey. The time left over for the survey varied between sessions. Before participating in the survey, they were informed of their right to, at any point, revoke their participation in my research. |
| Participant observation (referenced as Fieldnotes [Lund, Stockholm]). | Participatory observation in Hultsfred and Lund in 2020 contributed to pre-understanding, while sessions in Lund and Stockholm in 2021/22 included structured analytical observation which provided data for this thesis. | Field notes were written during the sessions and structured immediately following the sessions. | For all sessions, except for the ones in Stockholm, I led the exercise and thus had less time to observe the pupils' reactions and interactions. |
| Semi-structured interviews (referenced as Interview [1,2,3]). | Interview #1: Teacher at Katedralsskolan<br>Interview #2: Two teachers at Globala Gymnasiet<br>Interview #3: Teacher employed at Naturskyddsföreningen. | The questions changed as my analysis evolved, some examples can be found in Appendix 7.1. | Used mainly to inform inquiry and guide my analysis. All teachers had used BFE with pupils. |

Semi-structured interviews with teachers were also conducted during the research (see Appendix 7.1 for interview guide). Such interviews do not attempt to uncover objective 'truths', but instead they "offer a route to partial insights into what people do and think" (R. Longhurst, 2009, p. 583). The teachers were identified as key informants as they have prior experience of their pupils' behaviour, the institution they operate within and what a 'normal' teaching environment entails for them—thus their descriptions give me something to compare observations against to interpret their meaning.

## 3.2 Ontology and Epistemology

The epistemological departure of this thesis is firmly rooted within constructivism, as it focuses on how representations of the future shape action today. However, I align with a critically realist paradigm in understanding that certain representations are more accurate than others, and that there is *one* ontological reality which actors attempt to represent—thus avoiding the epistemic fallacy of conflicting the constructedness of knowledge about reality with reality itself (Bhaskar, 2008; Longo et al., 2021). Relating back to a previous argument about imagination and futures, the aim of BFE is not to foster imagination *per se*, but rather specific forms of imagination that allows participants to both understand the material effects of environmental change (ecological imagination) and the social structures that cause them (sociological imagination) while imagining new social configurations that improve human-nature relationships (utopian imagination). In that sense, this research project also aligns well with the goals of sustainability science: normative, solutions-focused and transdisciplinary research (Jerneck et al., 2011).

## 3.3 Limitations and Positionality

Reflecting on one's positionality is always important, but even more so when doing work 'in the field'. This involves asking "[w]ho am I in relation to my participants and my setting?" (Herr & Anderson, 2014, p. 45). Ever a complex question, I inhabit multiple positionalities in this research. I am an "outsider-within" (Hill Collins, 2000) in the sense that I have over the past years worked together with teachers on BFE, yet I am not a teacher by training, lacking all the experiences and identity that comes with that particular profession. Importantly, when I engage with pupils and teachers, they see me as 'the researcher'—a position of power. When engaging with pupils, my identity as a white Swedish male also constitutes a position of power and potentially affects what participating pupils might say in front of me. Further, I am also one of the creators of BFE—something all teachers had told their pupils

beforehand—and when I engage with participants in interviews or observations, my presence most likely affects their behaviour as there might be an unconscious bias towards positive responses. Of course, this also goes for my own observations—key here is the normative aim of educational action research, to improve pedagogy (Herr & Anderson, 2014), and to improve something, one must first identify its faults.

I attempted to remedy these limitations in the research design. For the majority of the data collection in schools, I enlisted a colleague that had not previously worked on BFE to observe sessions with me, thus giving me a second perspective. I also used a range of methods to generate data and some, like the survey, did not require interaction with me, was anonymous and occurred at the end of the lesson after which the pupils knew they would not have to interact with me further.

Beyond issues of positionality, there were further limitations to my research. Firstly, Covid-19 restrictions at first made physical participation impossible and ethically dubious. Further, the pandemic has strained many teachers which affected their willingness to host me and to fit BFE into the schedule. Relatedly, as a teacher I met during the course of this thesis pointed out, “nothing happens in schools that isn’t planned four months in advance”. While I had a head-start given my previous involvement with the project, finding teachers that had enough flexibility to accommodate me was difficult. These issues led to quite a small sample size with little geographic diversity. Additionally, the schools that did participate were all high-performing schools in affluent districts. Further research should expand the scope to a more diverse set of schools. Another limiting factor was time. Ideally, I would follow pupils over a longer time to put my observations into context. This would also have enabled analysis of the effects transformative future education might or might not have on life-decisions, big and small.

# 4 Analysis

Drawing on my theoretical framework and informed by my experience in the field, I set out to understand BFE's transformative potential by analysing it as one would review a play, where the classroom is the stage and the teachers and pupils are the actors. The analysis is structured as a dialogue, where my theoretical understanding of how the method ideally *should work* faces the empirical reality of how it *has worked*, in line with my abductive method of analysis.

## 4.1 Setting the Scene: The Future as a Narrative Mode

The core premise and educational appeal of BFE is its placement in the future. It is, to use the language of transformative learning, the central 'disorienting dilemma' of the pedagogy that forces the pupils to question their understanding of the world (Häggström & Smith, 2021). Moreover, the future tense has several implications for pedagogy.

Firstly, the future opens up and 'levels the playing field'. Reflecting on the exercise, a teacher (Interviewee #3) remarked that the temporal shift emboldened teachers that might otherwise avoid teaching contentious subjects such as climate change. They felt that by moving away from polarised debates over contemporary policy, their role as arbitrator of right and wrong was lessened, "[the future] is a neutral place, none of us have been there", as they put it. Instead, they said the focus was on pupils' imagined transformations which improved classroom discussion and "release[d] the[ir] creative floodgates".

Secondly, the future allows pupils to experience their world otherwise, and return with new perspectives. Recalling an early pilot-test of the exercise in a school outside Malmö, an interviewee described how some pupils, whose favourite past-time were racing cars, initially rejected the imagined future of BFE (Interview #3). Yet, they engaged with the exercise, imagining a transition away from petrol to electric in racing cars and reported that they had learned a lot—but that they hadn't enjoyed themselves. While disheartening, this indicates that even pupils who reject the content of the imagined future return from it equipped with a new understanding of the present. They see the petroculture by experiencing its absence. Here it is worth recalling Candy (2010), who understands the impact of experimental futures to be that participants return to the present with a "heightened sensitivity to the mutability of the world, and with that, a sense of one's own capacity, however modest, to nudge things in one direction or another" (p. 164). Several pupils made remarks in this vein. Prompted by a question on whether their view of the future had changed due to the

exercise, one student in Lund said: “my image of the future hasn’t really changed, it has been created. I now see many different chains of events, and will think about which one I prefer” (SL20). Another remarked that they now consider more diverse pathways to change, and that they “think more concretely about how the future could become” (SL11). A third reflected on the importance of visiting the future: “you often hear that changes need to happen, but it is rare to get to see the effects of them” (SSC11). These statements speak to the transformative capacities that Pouru-Mikkola and Wilenius (2021) call ‘long-term orientation’ and ‘temporal-change dynamics’, the ability think in different temporalities (long/short) while understanding how different events are contingent on each-other. However, as the following sections will show, the extent to which learners and teachers lived up to these capacities was contingent on *how* the exercise was used.

It is clear that futuring has implications for pupils’ perceived agency. While the current scale of the project is modest, increasing the transformative capacity of individual pupils and encouraging them to ‘see things differently’ (Sterling, 2011) can have large-scale effects, in line with an ‘enabling’ understanding of transformation (Scoones et al., 2020). As the initiative scales, so does its transformative potential—to date, the project has held direct trainings with nearly a thousand teachers, with confirmed use in a range of geographies and subjects.

### 4.2 Building the Set: The Affordances of the Speculative Museum

The degree to which pupils became immersed in the BFE world differed between the schools I surveyed (Fieldnotes, Stockholm). This partly stems from the inherent uniqueness of each school, but as Oomen et al. (2021) suggest: *how* the future is narrated determines the way in which participants engage with it, as does the staging of its narration. Below I outline what the key aspects of BFE as a narrative device are and how factors in the classroom can impact the degree to which pupils are drawn into the imaginary world.

The design of BFE relies on the ‘discursive genre’ (Oomen, 2021) of the museum. The genre comes with certain affordances, logics and expectations. A visit to a museum usually involves viewing objects with associated text explaining their importance to the topic of the exhibition. Further, museums have traditionally been seen as an objective mirror to the world (although that is and should be contested) (Bjerregaard, 2020). This affordance of the medium, as a perceived legitimate historic account, is something BFE plays with—the museum frame gives meaning to its contents. The frame is enacted through a deliberate staging of events, relying on pupils’ knowledge of how

museums are 'supposed to work' (Oomen et al. 2021). The pupils 'visit' the museum by watching a video of a museum guide walking around an exhibit showing a few of the objects that appear in BFE. They are then shown images of objects laid out on pedestals or encased in wooden frames as the teacher explains why they are included in the exhibition (see fig. 4 below). The pupils are then given access to the entirety of the museum's collections and encouraged to present a few of the objects to their classmates.

**Figure 4** Overview of some of the objects on display in BFE. Some of the objects' stories are included in Appendix 7.3.1. Illustration: Ludwig Bengtsson Sonesson.

Merely presenting a ready-made future like this would just further the legacy of teleological education where the truth is singular. Here the project once again draws on museums, who are attempting to democratise how they ascribe meaning to items in their collections. Learning from Latour's 2005 exhibition "how to make things public", museums are evoking the dual etymology of the word 'thing'—meaning both an object, and deliberation (Ahnlund Berg, 2020; Latour, 2005). They are hosting 'things' centred around things, inviting visitors to make sense of the objects collectively: developing a *pedagogy of things.*

However, there is a tension between democratising futures and designing immersive and intentional experiences with a specific message (Light, 2021). The fiction needs to 'believe in itself' and provide enough details of the imagined world to be immersive (Wolf, 2012) while democracy entails a degree of humility and openness to new ideas. In line with the 'pedagogy of things', BFE tried to negotiate this tension by limiting the imagination to stories of a carbon neutral world while inviting the pupils

to suggest objects themselves, thus allowing them to rebel against the museum's narrative if they wanted to. The object-focused learning seems to have been appreciated by the pupils, as one of them put it: "concrete objects made the bigger perspective easier to grasp" (SSC13). Closing down to open up is a way to reduce "unknowability and openness of the future to more manageable proportions" (Oomen et al. 2021, p. 12), which in turn can help participants imagine. However, there was a tendency for pupils to favour everyday objects with 'shock-factor' (Interview #1) such as the hamburger or the LEGO-set over those that deal with ecosystems, such as the beetle that was driven to extinction by BECCS-plantations or the flower whose habitat was saved through wetland restoration (read the stories in Appendix 7.3.1). This tendency is problematic since knowledge about ecosystems is vital for the ecological imagination and, as one teacher noted, pupils are increasingly "species blind" (Interview #3).

The museum's object-based approach is heavily influenced by design fiction methodology, described by Bleeker as "making *things* that tell stories" (2009). The aim is to create 'prototypes' that exist within fictional 'story worlds' (Duggan et al., 2017). BFE does this in a slightly different way, since most of the objects are part of everyday 'petroculture', it is their context, as archaic museum objects, that tell the story. By removing them from their 'natural' context, they are 'defamiliarized' and opened for deliberation—similarly to how Peltzer and Versteeg (2019) describe an art piece that isolated the smell of exhaust fumes and exhibited it in a gallery. An example of such defamiliarization from BFE is the nylon stocking:

> The nylon stocking was first presented at the New York World Fair in 1939 and was worn for almost a century. During the 2020s, we were desperate to decrease emissions, and fossil fabrics such as nylon became very controversial. Wearing fossil products suddenly felt wrong and campaigns such as "I'm rather naked than covered in oil" made it very difficult to wear such stockings in public. (Naturskyddsföreningen, 2022)

A teacher reported that their pupils found this object particularly intriguing, asking "huh, nylon stockings? Why can't you wear those?" (Interview #1). It was not an object they had seen as part of a petroculture until it was included in the museum.

Whether the experience of the object is immersive, and thus transformative, seems to depend on how well the teacher manages to create what Auger calls a 'perceptual bridge' (2013) between the present and the future. In Carbon Ruins, the exhibition that BFE is based on, me and my colleagues had the advantage of a physical space that looked and felt like a museum and the immersion created by a fictional museum guide (Stripple et al. 2021). Due to scalability, the museum is now digitalised

and the speculative theatre outsourced to the teachers and pupils. This is necessary to lower the barrier of entry, but does change the context within which imagination occurs.

The effects of this becme clear when I compared the session performed by me at a school in Lund and the sessions I observed in Stockholm. In Lund, I opened the lesson by performing a short 'time-travel exercise' to transport them into the museum. I then showed the pupils an image of all the objects contained in the museum and let them choose which ones they wanted to know more about. There was plenty of laughter and the pupils were eager to pick the next object. In Stockholm, the teachers had less time and hosted a larger group of pupils in a big mess hall. Thus, they relied on the video provided by the exercise for the immersion and let the pupils re-cap stories from the museum to each other. They then moved on quickly to the object creation. The result was that for the duration of the class, the Lund pupils were more creative, their objects had greater depth and they were eager to perform their objects "in character" as the museum guide at the end of the lesson (Fieldnotes, Lund). In Stockholm, on the other hand, many pupils had not really grasped the concept of the exercise when it was time for them to engage with it, causing some confusion and a break in immersion. This was also evident at the end of the class when the pupils had to present their stories, due to time constraints many had not had time to write a coherent story which meant that the performative part of the exercise was lost for many.

Speaking back to theory, Oomen et al.'s (2020) insistence on the power of staging is clearly important. Places and practices infer expectations on their users. When the pupils sit in their own classroom, with their own classmates, being taught by their own teacher, it becomes more difficult to immerse themselves in another world. There is a lesson to be learnt here—if futures education is to fulfil its potential, the sites where pedagogy happens need to be thoughtfully crafted. Herein lies a challenge both of time and resources, two scant resources in today's schools. This means that, for education to be transformative, it is not just about what is being taught but how, where and when.

### 4.3 Writing the Script: Imagined Themes, Characters, Plots

While one could, in theory, imagine anything, the context and medium within which imagination occurs shapes its outcome (Davoudi & Machen, 2021). In the introduction, I outlined how three types of imagination—ecological, social and utopian—are essential for transformation. In this section, I explore whether BFE provides the context for such imagination by examining the stories crafted by participating pupils.

As part of the exercise, pupils were asked to identify an unsustainable practice and a symbolic object for that practice. They were also allowed to choose objects that symbolised new practices that became common during the transition. However, the instructions lent themselves to the former and thus most of the stories revolve around practices that have been left behind in 2053.

From a pool of 48 objects, I identified seven broad categories (see fig. 3). Most common were objects made of or relating to plastics. These ranged from common plastic objects—food packaging, single-use utensils/straws, bags—to less talked about, but more relevant objects for the teenage experience such as nail polish, polyester clothing, bathing rings and toothpaste packaging.

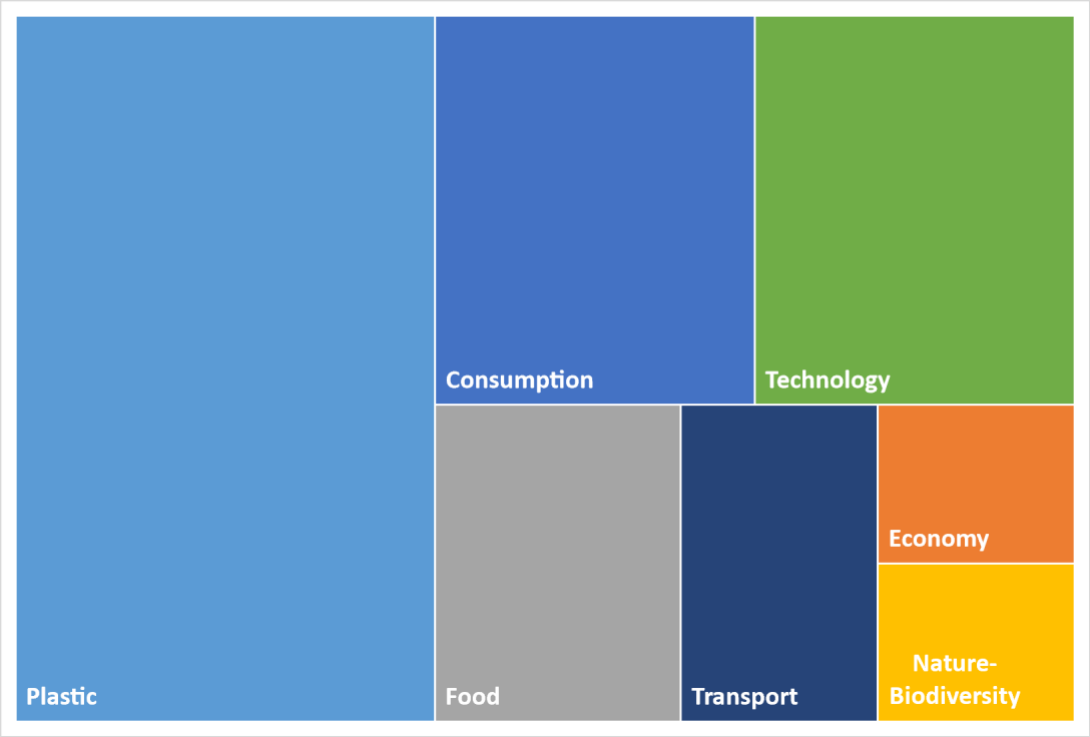


**Figure 5** Categorisation of the theme of pupils' objects. From an initial run-through, a list of categories was made and then the 48 objects were assigned to the one which best fit their overall theme.

There were also many stories of technological appliances (phones, batteries, e-toothbrushes, dryers) and general consumption (fast fashion, cigarettes, paper, silicone implants). Given the importance of decarbonising transport and food, there were quite few stories dealing with these sectors. There is not enough room to re-tell all the pupils' stories here (see 7.3.2 for more examples), but the story below provides a good example of a typical story that would emerge from BFE:

> Plastic straws are an example of what used to be known as "single-use plastics". They created straws, cutlery and mugs that were only used once! They were then thrown into the ocean and nature. The straws are especially bad as they end up in the throats of marine animals. Turtles are the most famous example. As awareness grew of the problem, a

> movement called VSCO-girls emerged. There were extremely opposed to single-used plastics and only used so-called hydro flasks. Initially, they used social media to spread awareness but felt like it wasn't enough. They joined forces and rebelled. All over the world, VSCO-girls gathered outside plastic factories to protest, which garned a lot of media attention leading to boycotts of single use plastics. Companies went bankrupt, laws were enacted and people switched to paper straws. The production of single use plastics is no longer allowed. (OL1) [my translation]

In selecting their objects, pupils used differing strategies. One group deployed a strategic mapping exercise based on the question "what is made of oil?" while others simply chose something that they knew had a negative climate impact (Fieldnotes, Stockholm). Here, the openness of the exercise, ironically, seems to have lent itself to quite a narrow and haphazard selection of sectors.

In an ideal world, the pupils would all identify novel and relevant objects. However, the main purpose of the exercise is to *practice* imagination. The evidence above shows that the complexity of the imagined narratives is dependent on previous knowledge. For instance, the pupils who were just preparing to start upper secondary school in Sweden, and thus had a lower overall level of previous education, struggled with their ecological imagination. Nevertheless, this lack proved to be a learning opportunity, as the teacher had to explain synthetic fossil fabrics and the environmental impacts of nuclear arms to their pupils (Fieldnotes, Stockholm).

This points to another potential risk with the 'open' design of the exercise, that pupils might imagine things that are factually inaccurate but outside the scope of the teachers' knowledge—perhaps cementing an understanding of the world that is unhelpful. For instance, one group imagined that all plastic bathing rings would be replaced with ones made out of cork. While an innovative idea, they claimed it would "have no negative effects on the environment" (OG7, see Appendix 7.3.2 for the full story) which by definition is untrue as almost all of the world's cork is produced in western Mediterranean plantations, and a vast surge in production would undoubtedly come at some sort of environmental cost. In the same vein, pupils might imagine futures that are problematic in terms of justice or human rights and feel emboldened by presenting them to an audience that might not object. These are especially relevant contextual factors, as teachers are increasingly pressed for time and have to handle many pupils.

However, in my data, the pupils' stories maintained a high level of factual accuracy. So, while the openness might broaden the range of possible mistakes, as an interviewee told me, this is no

different from other lessons where the teacher gets questions that they can't answer—the questions become an opportunity for collective learning (Interview #2).

Speaking back to the theory section, my data confirms that utopian imagination without ecological and sociological imagination is not enough. It's clear that education for sustainability needs to be integrated holistically in all subjects for futures education to fulfil its full transformative potential. That being said, futures pedagogy offers many learning opportunities that can further pupils' knowledge both of social structures and ecosystem dynamics. In that sense, immersive futures pedagogy can allow pupils to understand sustainability challenges more holistically.

As outlined in the theory section, how we understand the future is influenced by society's dominant imaginaries. These 'dramaturgical conventions' need to be navigated when doing futures work (Oomen et al. 2021). There have been several attempts at crystallising what these conventions are. For example, Marquardt and Nasirtousi (2021) outline four broad imaginaries that populate the discussion on climate futures in Sweden: *techno-optimism, ecological modernisation, disruptive innovations and system change.* By analysing the stories crafted within BFE, I can see whether novelty emerged and to which degree the stories differ from how climate futures are normally narrated. While not perfectly analogous, this does indicate whether BFE's learning outcomes are transformative.

Many of the pupils' stories have a similar narrative structure: awareness of a problem rises, groups mobilise to advocate for change, legislators or companies are forced to change, behaviour or technology change ensues (see the story about straws above). Compared to the imaginaries of Swedish politicians, who mainly imagine change through technological substitution (Marquardt & Nasiritousi, 2021), participating pupils rather imagine radical, citizen-driven system change where the primary driver of change is legislation with technology as a result.

However, it is somewhat worrisome that so many of the stories are so alike. One teacher mentioned that they had a hard time convincing their pupils that there are other pathways to change than activism (Fieldnotes, Stockholm). This imaginative conformity was something we noticed early on when developing BFE, which resulted in an add-on to the exercise entitled "How does change occur?" where we outlined eight forces for societal transformation: knowledge, activism, organisation, stories, new markets, policy, innovation, norms, behaviour and attitudes. In the add-on, there are two historic accounts of societal change to draw lessons from: how homosexuality was de-classified as a disease in Sweden and how chlorine-bleached paper was outlawed.

Interestingly, the most diverse stories came out of a session which had an outsized focus on change, including extensive use of the add-on (Fieldnotes, Lund). Here, pupils imagined a degrowth-movement which escalated into a full-on civil war and anti-plastic-plant-movements led by the British monarch and Kanye West (see Appendix 7.3.2). They also imagined decreased lawnmower-use as male stress levels decrease due to a reduction in working hours (see below).

> The lawnmower was a darling for many Swedes. Not only did it rid the garden of annoying insects, but it also functioned as a male stress reliever for many dads. No thistle, no pointy grass and most of all high social status! The dark side of the lawnmower overshadowed the good. We saw a drastic drop in pollinators as their food supply was severed. Biodiversity dropped quickly. Our agriculture suffered. Food shortages followed! Farmers, climate activists and bee-keepers rise up, demanding change. They occupy marginal spaces in cities and towns, demanding that they be kept uncut. People are inspired! Uncut lawns are anointed garden of the year by the "Garden"-magazine. But what did people do with their discarded mowers? Well, the famous artist Jan Karlsson Grönkvist collected them and created a masterpiece for Stockholm's Central Park as a memory of the wrongs of our civilisation. Thanks to these brave people, our gardens are now paradise. As lawns were kept to themselves, the butterflies and bees returned. Flowers grew stronger and more beautiful than ever. (OL2).

In conclusion, in choosing an appropriate museum object, pupils practice their ecological imagination, and in writing stories of transition, they practice their sociological imagination. The complexity of their stories varies, pointing to the necessity of a stronger emphasis on social change and ecosystem dynamics within education in general, and BFE in particular. It is difficult to draw conclusions from a few sessions, but story-telling as a method seems to encourage a more holistic understanding of climate futures as it forces students to specify places, events and characters that might be involved.

### 4.4 Reading the Reviews: Divergent Emotions

While the premise of BFE is hopeful by design—we do achieve the current Swedish climate targets—its stories are not restricted to the positive emotional register. Be it the mining operation that went wrong near lake Vättern or the monument built to mourn the losses accrued due to climate inaction (see Appendix 7.3.1), the museum also highlights the grim realities of the future.

However, that grief is also accompanied by joy. BFE borrows from the repertoire of the museum by highlighting the oddities of past practices, such as frequent flyer cards and SUVs, in an ironic tone designed to make the viewer laugh. It is a form of 'détournement', the situationist practice of taking a phenomena out of its original setting to highlight its absurdity (Wark, 2009), as exemplified below by the Frequent Flyer Card included in the museum:

> This is a so-called frequent flyer card, which was intended to encourage the use of air travel! The more you flew, the more perks you received: perhaps reduced prices on your next flight, skipping the queue when boarding or sitting in a special private lounge eating unlimited steak. For many of the people with a card like this, being a frequent flyer meant that you were a big deal—an important, high-status member of society… (Naturskyddsföreningen, 2022)

While the museum uses humour and irony to immerse the pupils and make them question aspects of their everyday lives, the ultimate aim of BFE is to evoke a form of critical hope (see Ch. 2.5). The critique shines through both in objects that highlight past practices, such as the frequent flyer card, and those that detail how a transition could fail to deliver on biodiversity and justice goals, such as the 'clear-cut artwork' in Stockholm. Highlighting failures as well as successes also makes the world more believable and immersive.

BFE's hypothesis is that the setting of a desirable future ought to make the pupils more hopeful about the future. Speech consists both of message and reception (Storey, 2018)—so what did the pupils feel during the exercise?

My data shows that 57% of the emotions reported by pupils were 'positive' (hope, motivation, joy) while 43% were 'negative' (frustration, anger, fatigue, worry, grief, shock, hopelessness). Quite often, they felt both at the same time, anger or frustration at the pace of change but hope drawn from the possibility of things being otherwise. As one pupis put it, "it is heading downhill but we can solve it" (SL18). Another said it "looks quite dark now, but I won't give up. Even if it is not as perfect as in the imagined future it can still become better than it is now" (SSC31). A third recounted how, during a climate negotiation role-play they had done, they had felt pessimistic about the future while this exercise had made them see possible avenues for change (SSC18). In contrast, several pupils focused on the perceived implausibility of the future presented to them and how that made them feel hopeless or frustrated (SSC16, 31, 39). Another group of pupils felt grief and anger, primarily due to historic inaction and as a reaction to learning about new sources of carbon emissions during the exercise (SSC11, 13, 18).

While the sample size is too small to draw any extensive conclusions on the emotional effects of the exercise, the data does confirm Ojala's (2015) understanding of education for sustainability as an emotional practice and points to the need for schools to have the capacity to handle difficult emotions as they arise. This was also shown in a recent study by the polling company Novus (2021), which showed that 56% of Swedish children (12-18) were worried about the future due to climate and environmental change, while 46% were hopeful about our prospects of solving these issues. Further, the pupils do report the kind of hope Ojala (2017) argues for, they are critical towards the hegemony while remaining hopeful that they can contribute to the future being otherwise.

### 4.5 Debates set in Motion: Building an Educational Infrastructure of the Imagination

So far, my focus has been on BFE's effects inside the classroom, but what are its broader implications for societal transformation? Do the pupils' experiences in the future lead to action today? A full answer to that question would require further research and a longitudinal study outside the scope of this thesis. However, several pupils did report that doing the exercise made them re-consider their agency. One "re-evaluated in what ways I can contribute to change" (SL11), while another had gained insight into the barriers that exist to change but contended that "as long as you want it, it is possible" (SL10). A third reflected on how, before, they had "felt like [they] had very little power" (SL19), but now saw opportunities where they could have an impact. Of course, not everyone felt the same. One student argued that most of the material is "wishes and quite impossible to realise" (SSC36) while another reported that they: "felt nothing. It's just a school exercise" (SSC6). There was also one student who criticised the entire endeavour, asking "how are we supposed to imagine solutions that university professors cannot?" (Fieldnotes, Stockholm).

Speaking to their point, the aim of BFE is not to produce 'solutions' that can be implemented at scale—pawning that off on young people would mean abdicating the historical responsibility we have as adults. Instead, the intended dynamic of BFE comes closer to what Dillon & Craig (2021) call 'storylistening'. They contend that an important part of 'public reasoning', how we collectively make decisions, is gathering 'narrative evidence', stories that inform our understanding of the world, be it science-fiction books or climate modelling scenarios. Thinking in this vein, both the stories created by the project team and by the pupils help learners understand transformations from multiple perspectives, identities and locations thus broadening the range of mental models through which they understand the world (Dillon & Craig, 2021). In a sense, the classroom becomes a 'rehearsal

space' (Tyszczuk & Smith, 2018) where pupils anticipate futures, prepare for, and work towards, social transformations.

Further, I understand BFE not just as an individual pedagogical intervention, but as part of a larger movement to both deconstruct and construct 'infrastructures of the imagination' (Baumann, 2018). By infrastructure, I here mean complex socio-material processes that enable or disable particular kinds of action (Graham & McFarlane, 2015). Today, both our material and immaterial imaginative infrastructures are largely petrocultural. This immersion in petroculture restricts our imagination. I argue that transformative futures education can help build a new infrastructure of the imagination in two distinct ways. Firstly, the fictional story worlds created by these initiatives can provide new imaginative infrastructures within which participants can create stories that explore how a post-fossil life might be lead. Secondly, the practices and spaces that are created to facilitate futuring are themselves a form of social infrastructure—communities that can facilitate long-term discussions and mobilisation around specific futures. This is in line with Baumann (2018), who argues that infrastructuring the imagination involves three processes; the creation of alternatives, the building of spaces where the alternatives can be experienced, the forming of communities that can facilitate democratic deliberation on these futures. Educational institutions have the capacity to host all three of these processes, but it will require committing more time and resources to ensure longevity.

Infrastructuring is by no means a task only for educational institutions, much like the petrocultural infrastructure of road networks they can only fulfil their function properly if distributed and accessed by large portions of the population. Thinking along the lines of Amartya Sen's capabilities approach, one aspect of being free is having the capability to imagine things otherwise (Nussbaum, 2003)—the fulfilment of which requires extensive educational infrastructures of the imagination. Thus, there are both intrinsic and instrumental reasons for further work on transformative futures education.

In this thesis, I have contributed a 'thick description' (Geertz, 1973) of an implementation of futures education. By doing so, I have shown that processes of transformation are messy, piecemeal and non-linear. Transformative pedagogies are not a straight path to social change, but could act in concert with other movements to create the conditions for the imagination required for transformation. This tempers some of the enthusiasm of utopian theory and futures education by acknowledging that for them to be successful, the staging and context of interventions are vitally important. This gives further credence to the idea that these interventions need to become infrastructural and long-term.

To sum up, in studying BFE, I recognise that education is a fundamentally political act. I recognise that the future unspoken is hegemonic, and that new infrastructures of the imagination will be required for transformation.

### 4.6 The After-party: Failures and Omissions

As with any initiative, BFE's design can and should be questioned. In this final section, I reflect on some of BFE's flaws and avenues for improvement.

Firstly, there are important on-going discussions on who gets to narrate the future and thus set the terms within which imagination occurs (e.g. Vervoort & Gupta, 2018). As Donna Haraway puts it: "it matters what stories make worlds, what worlds make stories" (2016, p. 12). The 'story world' (Wolf, 2012) of BFE shapes and directs imagination through its language, contents and perspectives. I believe the 'worlding'-approach to futures used in BFE is a democratic and inclusive approach since it sees pupils as narrators in their own right, not just recipients of narrative. However, similarly to how the story world of Tolkien's Middle Earth both enables and restricts imagination, BFE's utopian, object-based, museal world encourages a specific type of story.

If we are to build a transformative infrastructure of the imagination, it needs to consist of a plurality of worlds, stories and concepts. Here, it is especially important to highlight those practices that story the more-than human and give pupils access to worlds previously silenced by colonial structures (Ghosh, 2021).

Second, there is a tension between BFE's ambition to make futures graspable and relevant while still maintaining their radical critique. Consider the over-arching narrative of the exercise, that the Swedish emission goals have been reached by 2045. While I did include a meta-critique of the overall narrative in the form of an art-piece that highlights the losses accrued by inadequate climate targets (see Appendix 7.3.1), the narrative does signal that much have remained the same in the political realm, that transformation occurred in ways understandable and relatable to our current selves. If the story world was different, the imagination would be steered in another direction. If the museum detailed the rise of animist understandings of the world, and the ways kinship with nature re-shaped our relationships to the more-than-human, the pupils might have imagined more radical social configurations.

However, to build an educational infrastructure of the imagination, one has to navigate the dramaturgical conventions that surround any given institution or topic (Oomen et al., 2021). The Swedish school-system is currently governed through a national curriculum, and teachers rarely have

the time or resources to engage with anything that falls outside of the learning goals set for their subject (Interview #1; Interview #3). The arts have also been increasingly marginalised. Taken together, the possibility of integrating transformative futures education rests on it fitting well enough into the current institutional frame while still maintaining its transformative components. Hence, there is a balancing act between creating the *ideal* futures education and one that is implementable in schools today.

Further work on transformative futures education should push those boundaries further and explore ways in which a plurality of ontologies and epistemologies could be integrated. Further research into TFE should also examine their long-term effects on pupils and their actions, how different immersive mediums change the efficacy of the pedagogy and explore historical accounts of education's role in transformation to see if there are lessons to be learnt.

# 5 Conclusions

To conclude, I have shown that BFE has a positive effect on pupils' perceived agency and that it is conducive to a critically hopeful relationship to the future. By creating a speculative future museum and inviting pupils to curate its exhibitions, BFE defamiliarizes the present and contributes to the construction of an infrastructure of the imagination—the scaffolding required for pupils to imagine the future and themselves otherwise. By exploring the future through story, the pupils practice their ecological, sociological and utopian imaginations—all of which are required for futures education to be transformative.

The transformative potential of BFE, and transformative futures education in general, lies in the deconstruction of taken-for-granted imaginaries and the construction of emancipatory alternatives. This aligns with the burgeoning scholarly work on utopian praxis as a pre-condition for just transformations. However, I have shown that there are concrete material and institutional barriers to consider when implementing these pedagogies. Their efficacy is dependent on resources and time—factors that are lacking in many schools today. Further, there is a tension between the exercise's democratic aspirations and pedagogical result as opening up the future too much without skilled supervision risks legitimising unscientific narratives. An important aspect of futuring, immersion, is also at risk as these methods move into schools' rigid institutional frames which can lead to variations in the staging and performance of the imagined future. Taken together, transformative futures pedagogies can have a key role in societal transformations: as the binoculars that allow us to see beyond the hegemonic today and as the first statement in a conversation about which tomorrow we desire.

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# 7 Appendices

## 7.1 Interview Guide

The interviews were conducted in Swedish. Below is a translated version of the interview guide I used. As the interviews occurred before, at the beginning and in the middle of my thesis process, the questions I ask developed along with my inquiry. However, the version below shows the most central questions I posed to the teachers.

*1. In your own words, please describe what parts of BFE you have used. Please indicate within which subject it was used, how much time you had and the context that the exercise occurred within.*

*2. Which sections were helpful? Which worked best for the pupils?*

*3. The museum contains many objects and many stories. Which did you cover? How were they chosen? Which struck a chord with the pupils?*

*4. Speaking as teachers, how did the exercise function?*

*5. What separates this exercise from other teaching on sustainability that you or your colleagues have used?*

*6. Which emotions did the exercise evoke in the pupils?*

*7. Did the exercise give new perspectives on today's society? Did critical perspectives on our contemporary lives surface?*

*8. How did the temporal aspect of the exercise land with the pupils? Could they immerse themselves in the future?*

*9. Do you have any feedback on the exercise or its design? Any topic that needs to be covered?*

## 7.2 Survey Design

Below you will find examples of questions used in the survey. Depending on the context, the phrasing of the questions varied. For instance, for the classes with less Swedish skills, the questions were simplified.

1. What is your relationship to the future after doing the exercise? Did it change due to the exercise?

2. What did you learn from the exercise? What do you take home with you that you did not know before?

3. To combat climate change, society needs to be transformed. How do you imagine these transformations occurring?

4. Did the exercise make you reconsider your role in the climate transition?

    4.1 If yes, what did you reconsider?

5. Which emotions did you experience during the exercise? Please explain what caused that emotion.

## 7.3 Objects and Stories from BFE

### *7.3.1 Objects created by the project team*

**Milk strike (2025). Protest against agricultural policy in Brussels.**

Biodiversity declined rapidly during the fossil era. Industrial agriculture, with its large monocultures and extensive use of pesticides, was a major driver. To reverse this alarming trend, a new agricultural policy was enacted in the EU in 2025: the Transitional Agriculture Policy, in short TAP.

Before TAP, the majority of the EU budget was spent on direct payments to farmers based on how much land they cultivated and the size of their yields. TAP replaced these payments with a subsidy system compensating farmers based on the social goods produced by their farms. If, for instance, they kept traditional pasture lands open, provided habitats for pollinators or preserved cultural heritage sites, they were eligible for compensation.

TAP also compensated farmers transitioning to less harmful farming techniques, such as organic farming, perennial crops, agroforestry or conservation agriculture.

Since the subsidies now favoured low-emitting and high biodiversity farms, large-scale meat operations and vast monocultures of wheat, soy and beets became less profitable. This led to the positive trend we are now seeing in agricultural biodiversity and why we can have the large blue in our collection. This also significantly lowered emissions from agriculture, not only as these practices stored more carbon in the soil but also as they led to a shift in people's diet away from meat and dairy to plants.

For many farmers, however, especially the ones keeping animals, TAP was viewed as an existential threat. Huge protests erupted, and tractors filled the main streets of many European cities. The most infamous protests took place in Brussels in 2025. For weeks on end, farmers and other political groups who jumped on the bandwagon gathered outside the European Parliament. These protests were initially non-violent, but confrontations became more common as time passed — and by the time the protesters left, several people had died.

**Marsh gentian (2019). Typical in restored wetlands.**

The marsh gentian is an example of a species having benefited from initiatives to restore nature's carbon sinks. Since emissions did not actually begin to decrease until the 2030s, we had to capture carbon from the atmosphere.

An important initiative in that strategy has been to reintroduce grazing in wetlands and moist meadows that used to be overgrow — and it is on this kind of land that the pretty marsh gentian flourishes.

### Plastic toy (2053). Fossil Lego oil rig.

This object is made from perhaps the most iconic material of the fossil age: plastic. This Lego set is on loan to us from the local toy library, since we were keen to display Lego from the time during which it was still made from oil. As more and more parents got engaged in the climate issue, they looked around their homes for things that were causing it — and right there were their own children, playing with the very materials endangering their futures.

As a result, Lego became controversial. Parents and activists protested outside the Lego offices and almost drove the company to bankruptcy. The images of children, dressed in white gowns and with their hands covered in thick black sludge transfixed the whole population of Denmark — and many people beyond. In the end, the Danish government had to step in to support Lego in the company's transition to bio-based plastics. Today, the company is stronger than ever — especially since they started renting out their products.

### Hamburger (2038). Fast food dish from the fossil era.

The burger is a symbol of the fossil era food system. We wanted fast, cheap food that tasted the same wherever we went. There were even "drive-in" restaurants where the visitors would not exit their vehicles for the entire meal.

The reason that fast food was even conceivable was the rise of industrial agriculture and access to cheap meat. The scale and intensity of fossil agriculture had a major effect on the climate and animal health. Large fast-food restaurants did everything they could to save the fast-food burger. They invented halloumi burgers, bean burgers and eventually lab-grown burgers.

This kept the burger alive for a few more years, but eventually they had to face the fact — the wants and needs of society had changed. In 2038, Sweden's last fast-food burger was served at a roadside grill in Lidköping — and is now preserved forever in our museum.

As you are well aware, however, the concept of protein-between-two-slices-of-bread did not disappear — burgers are still around, they are just slower.

### Hermit beetle (2047). Critically endangered forest-dwelling beetle.

The hermit beetle was one of the victims of forestry practices during the fossil era, as its lifestyle depends on old deciduous trees with plenty of deadwood. The hermit beetle has become a symbol for all those fighting to protect living beings: if the beetle suffers, you can be sure that other species suffer too!

The hermit beetle's habitat decreased and became more fragmented throughout the fossil era, which made migrating to healthy habitats very difficult.

In the end, most habitats were so small that the chances of long-term survival for the beetle were nearly zero — and sadly, the outlook is still grim. Investments in negative emission technologies and a renewed focus on fast-growing trees for carbon sequestration have further marginalised the old trees that the beetles once called home.

### Membership card (2012). Loyalty programme for air travel.

This is a so-called *frequent flyer card*, which was intended to encourage the use of air travel! The more you flew, the more perks you received: perhaps reduced prices on your next flight, skipping the queue when boarding or sitting in a special private lounge eating unlimited steak. For many of the people with a card like this, being a frequent flyer meant that you were a big deal—an important, high-status member of society.

This specific card belonged to a climate scientist working at Lund University. Originally from the US, she regularly crossed the Atlantic by plane to visit her family. However, by combining these sorts of trips with travelling to academic conferences and doing fieldwork in remote locations, she—and many researchers like her—flew up to six times more than the average Swede!

Given what she knew from her research, she was unable to ignore the implications. She decided to radically reduce her flying and became a pioneering champion of the "Flying Less" movement among scientists. She obviously met her family less as a result—but a few years after her decision, she and her partner sailed across the ocean to return to the US.

### SUV (2036). Large high-emitting vehicle.

Private car usage increased dramatically in the late fossil era. Starting in 1970, fuel usage decreased per kilometre due to regulations and technological developments. That is, until 2010 when new cars used more fuel per kilometre than before.

The primary reason for this was the rise of the SUV, which entered car stores in the US during the 1980s. At the time, US authorities had just legislated that all new cars needed to be more fuel-efficient, safer and emit less pollution. However, to lessen the burden on those who needed big trucks and jeeps to do their jobs and leave their homes, these types of vehicles were exempt from the rules. Subsequently, the car industry designed a jeep for city-dwellers and marketed it heavily to families.

During the coming decades, the SUV became more and more popular, and in 2017 it was the most sold new vehicle. However, as petrol prices soared and climate protests intensified (there was a time when SUV owners would enter their cars at night so as not to be identified as one of them), SUVs became less popular. In 2036, they were officially banned—because no matter how hard manufacturers tried, they could not escape the fact that larger cars require more energy to operate.

### Eudialyte (2046). EV mineral from Norra Kärr.

This is a sample of eudialyte, a rare earth element. It is collected at Norra Kärr, a former mine north of Gränna near lake Vättern. Eudialyte contains high amounts of neodymium, a material used in electric motors and generators, which was in high demand due to the increased production of electric vehicles and wind power plants.

Norra Kärr was one of few sources of rare earth elements in the EU. Since the start of operations, the mine has been met with fierce protests. Engaged locals and organisations collected signatures and organised protests to shut down the mine due to its proximity to lake Vättern, the main source of drinking water for more than 250,000 people. However, pressure from European industry actors to decrease their dependency on imported "critical minerals" combined with a boom in electric vehicles resulted in the authorities giving the mine permission to operate, despite the protests.

For some time, Norra Kärr was Sweden's largest open-pit mine. But the mine was short-lived, and it closed seven years ago, as a massive downpour in 2044 (in today's standards a 50-year rain) led to severe leakage, a breached dam and toxic chemicals leaking into the lake. Many Swedes can recall exactly what they were doing when the dam burst.

Cleaning up the area is still an ongoing project, and recycling technology for metals and minerals is improving. Today, mining waste can be processed to extract rare earth elements and new types of magnets are entering the market.

### The Weave of Sorrow (2045). Art work of loss.

The purpose of this museum is not just to celebrate that we reached net zero emissions. It is also a way for us to remember the more painful aspects of the Fossil Era, so that we don't make the same mistakes.

Not taking action is also a choice. Politicians, business leaders and citizens knew in the 1900s knew that the Fossil Era had to end, and that every lost year would lead to suffering in the future.

The memorial *Weave of Sorrow* was built in front of the museum in 2045, the same year Sweden reached its climate goals. It was the first object added to our collections.

We still don't know how extensive the damages caused by climate change are since we are still experience its effects. We do know that many died and even more suffered. We know it impacted the most vulnerable and

least responsible quickest and hardest. It was in their memory that the *Weave of Sorrow* was constructed. Over the years, many groups have brought with them a piece of fabric representing something they have lost and weaved it into the artwork.

The exiled citizens of the Salomon Islands weave a canoe, set against a blue background the colour of the sky to symbolize their cultural connection to the ocean.

The *Norwegian Association for Oil Veterans* weaved a piece of cloth from their old working uniforms to symbolise their loss of identity as the oil industry collapsed. They also took the opportunity to formally apologise for their actions during the Fossil Era.

Sami organisations weaved a piece of reindeer pelt to symbolize the many reindeer and reindeer herders who suffered as climate change and industry expansion made it difficult for the reindeers to find food.

Many more pieces of fabric will be added over time, and each ceremony is an important opportunity for participants to remember, grieve and reconcile.

The role of a museum is not to beautify history, but to tell it and learn from it. We know that Sweden's climate targets, net zero emissions by 2045, were not ambitious enough. We know that many suffered unnecessarily. But we also know that, despite this, the world did not end, as many believed it would at the start of the transition years.

### Clear-cut (2026). Iconic artwork.

In this image, you can see an art installation that got a lot of attention in the 2020s. It was the Samí artist Sanna Viertotak that chose to turn part of Djurgården in Stockholm into a clear-cut forest through projections and large canvases in order to pressure the state-owned company Sveaskog and its political leadership.

How best to manage Sweden's forests was a longstanding debate. The most common method at the time was clear-cutting. The forestry industry planted vast areas with few tree species and then chopped them down, piece by piece.

Environmentalists and Samí organisations protested, often with their own bodies as weapons, and argued that the clear-cuts were harmful to biodiversity, the climate and the Samí way of life. The forestry industry, on the contrary, argued that the clear-cuts were always re-planted and thus absorbed more carbon dioxide while the harvested wood could replace fossil fuels or be used for construction.

Critical researcher performed detailed measurements that showed how a large portion of the sequestered carbon was actually stored underground, and that much of this was released during clear-cutting. They also showed how large machinery, preparing the soil for planting and large even-aged monocultures made it difficult for many species to continue living in the forest.

Many years of debate and campaigns by researchers, activists, journalists and progressive foresters were required before sustainable forest practices became commonplace. But then, on a cold winter day in 2026, in a board room in central Stockholm, a decision was made that is now considered a turning point. After much lobbying and arguing, the state-owned company Sveaskog made the historic decision to stop the practice of clear-cutting, transitioning to continuous use forestry. The Swedish church and other larges forest owners chose to do the same the ensuing years.

However, it takes time to transition forestry. The trees have to grow many decades before they are felled. Today, nearly thirty years later, we have come a long way. Forests with high natural and cultural importance are sanctuaries and most forests are harvested without clear-cuts.

### *7.3.2 A selection of pupils' objects*

The stories were originally written in Swedish but have been translated by me for legibility. While difficult, I have tried to keep most of the oddities and phrasing of the original text where possible.

**Plastic bathing rings**

Bathing ring made of plastic, and plastic is bad for the environment since it breaks down slowly. In the 2020s, many people threw it in the ocean or in the bath and then the animals that eat plastic waste are suffocated or get internal damage and this led to [decreasing] biodiversity in the ocean. In 2021, organisations working on nature observed this and explained to the local people, then many people had understood and changed their behaviour. Organisations, together with the government, barred families with swimming rings to enter public baths.

In year 2033, everyone uses cork bathing rings since it is natural and can float on water. It has no negative effects on nature.

**The phenomenon of eternal growth**

Sweden consequently renamed itself Antifossiliana and became a free state. Quickly, chaos ensued, leaders of industry hired mercenaries and a horde of capitalist knights to quench the massive riots. To counter this, the movement, now called the climate knights, sought help from other countries' armies and the UN. In the end, the civil war ended in an agreement and the post-growth state was formed. The rest of the world, still stuck in their old ways, would soon follow in its tracks.

Today's society is based more on a sharing economy, where you lend things to one another and production is only focused on essentials, such as climate-friendly food and clothes according to need. People no longer take satisfaction in material things, but instead our wellbeing is based on culture, music and social interaction. Companies are cooperatives and we work without a centralized

leadership, it is led by the workers. Production of goods relies on a philosophy of quality over quantity and can be described as a circular economy. Recycling and reuse of goods is more common than the production of new goods.

The concept of infinite growth is now forgotten.

### Kanye West's Real Plants

They might look like real plants, but they lack all the positive qualities they have. Plastic plants had been a staple in many homes, a way to give a homey expression without having to care for them. But their production was unsustainable as they were made out of fossil plastic. Plastic waste constitutes between 60-80 percent of marine litter and is "one of the world's most persistent pollutants affecting our oceans and waterways", according to the UN.

In addition, the plastic plants do not contribute to the conversion of carbon dioxide to oxygen, which is one of our real plats most important functions.

During the spring of 2023, the famous artist Kanye West cooperated with the company Plantagen on a campaign to increase the use of real plants over plastic plants. It was covered prominently by the press and led to decreased production of plastic plants by 90% the first three months. A year on, by the spring of 2024, the last ever plastic plant was produced.

### Queen Elisabeth and the edible plant revolution

Imagine that flowers and plants stand there, just as decoration, and that people bought their herbs and edible flowers from the store! After Queen Elizabeth came out as a proponent of self-sufficiency in food in 2023, a movement started. Daniel Radcliffe joined in, and so did the Potterheads. It grew quickly after that. The benefits of this is that plants are not just decoration, but edible. If you dry the flowers, they can be used as tea.

By doing this, one decreases export and import and thus the emissions from transportation. The purchase of foreign plats decreased by 50% after seven years. Today, the most popular plant in homes is basil. Instead of foreign flowers, we grow domestic flowers at home.