Exploring the Future in a What-if Mode

A Philosophical and Critical Investigation into the Use of Scenarios in Climate Science

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Abstract:

The figure of scenarios is frequently used in present-day climate science and plays a prominent role in the architecture of the IPCC Reports. In this work, I undertake a philosophical and critical investigation into the ontological, epistemological and temporal modalities of the figure of scenario. I do so by engaging with the term's supra-scientific origins, with the history of its semantic alterations as well as with its present-day applications across a variety of discourses — both scientific and non-scientific. I propose to analyse scenarios as examples of imagining and as such I embed my critique in what I label 'critical imaginary studies', coalescing around the critique of capitalist realism formulated by philosopher and cultural critic Mark Fisher. I develop his concept of hauntology into a hermeneutic method to analyse one of scenarios central — thought frequently overlooked — characteristic, namely the agency of the virtual that inheres in it. I complement my philosophical reading of scenarios — which I perform consulting selected fragments of the latest Synthesis Report (IPCC: 2023) — with a historico-critical counterpart of my investigation, problematising its political dimension resulting from the particular present-day context of environmental and climate collapse. Ultimately, I argue for an alternative understanding of scenarios and futurity in climate science, one mindful of their inherent performativity.

Key words: scenario, future, the IPCC, Synthesis Report, Mark Fisher, hauntology

'As for the future, your task is not to foresee it, but to enable it.'

Antoine de Saint-Exupéry, *Citadelle* (1948)

also used as the motto of The IPCC 2018 *Special 1.5°C Report* (IPCC 2018)

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Prolegomena

…an amazement I have not been able to lessen since…

Roland Barthes

The origin of some works can be traced to a very particular instance. Take, for example, *Camera Lucida*, an essay on photography by semiologist Roland Barthes, which he opens with the following lines:

> One day, quite some time ago, I happened on a photograph of Napoleon's youngest brother, Jerome, taken in 1852. And I realised then, with an amazement I have not been able to lessen since: "I am looking at eyes that looked at the emperor" (Barthes 2000: 3).

The case of this investigation is similar. Its inception, too, can be pinpointed with precision: it began during a seminar titled 'Humanities Reads the IPCC', organised by the *Center for Applied Ecological Thinking* in Copenhagen, in the fall of 2022, with the following lines from Chapter 1 of the 6th Assessment Report prepared by the Working Group II, which we were reading for that particular session:

> Scenarios are defined in IPCC reports as plausible descriptions of how the future may develop, based on a coherent and internally consistent set of assumptions about key driving forces (e.g., rate of technological change, prices) and relationships (Annex II: Glossary). Scenarios are neither predictions nor forecasts but rather 'foresights', which imply envisioning challenging futures (Vervoort and Gupta, 2018). Scenarios are used to provide a view of the potential consequences and implications of developments and actions in a 'what-if' mode of exploring the future (IPCC WGII 2022: 135-143).

My initial amazement, I have to admit, was hardly of a rational or a scientific sort. Rather, it was an intuitive, aesthetic one. In the report

lines, there seemed to ring a slightly dissonant note, something potentially off the register, perhaps, a different language game played than the one I was expecting from the text of scientific discourse. *Why does* — I was trying to articulate the disturbance — *scientific discourse feel the need to recourse to a device that seems supra-scientific?* I was not ready to yet understand precisely what was disturbing me, struggling to put it into words. What was clear was the locus of the incongruence — it was the figure of the *scenario*.

During that seminar, there were many things that I did not know about scenarios. I was familiar neither with the term's etymology nor with the semantic shifts it has undergone, nor with the roots of this shift in the military interests of the Cold War America of the 1960s... I knew neither of its links to a field known as futurology, nor its various entanglements in corporate thinking and interests, personified by Royal Dutch Shell and their decades-long work on developing scenarios. I was not aware of its unclear status noted by the critical scholarship, nor of the controversies and challenges inherent in even trying to define the term. Little did I know that this amazement was the beginning of a process that would bring me to engage in rethinking certain ontological, epistemological and temporal assumptions of present-day climate science and the way it conceptualises the future.

All this I found out only subsequently. It is these — and other — findings that build the thesis that you have in front of your eyes, dear reader, serving as a material for a philosophical and critical reflection on the use of scenarios in present-day climate science that this work would like to offer as its contribution to debates in critical ecology and environmental humanities. While the way I formulate my thoughts in the following chapters is perhaps somewhat atypical for a human ecology thesis, I nevertheless understand this investigation as falling within the scope of

that field in that it operates at the intersection of the themes that constitute it: culture, power and sustainability. To the degree that this works tasks itself with clarifying the concepts employed by science, it is a *philosophical* investigation. To the degree that it is also interested in exposing hegemonic aspects of the scenario thinking, it simultaneously doubles as a work of *critical* theory — hence, I decided to call it 'A Philosophical and Critical Investigation into the Use of Scenario in Climate Science'. In what follows, I will attempt to keep these two strands close but separate, though never at the price of obscuring the way they are intertwined.

Much like for Barthes, then, the following pages are an investigation into an amazement, one so captivating as to make it impossible to neglect. Where we differ is that, unlike for him, a structuralist of an older persuasion, for me, so for someone identifying broadly with the historical materialist tradition refracted by the cultural critique in a post-structuralist vein, there are hardly any ahistorical, self-generating, kairotic events. Rather, through any occurrence of that sort speaks a whole myriad of conditions and forces, historically and materially determining and relationally impacting each other. Today, some use the term 'Anthropocene' as a shorthand for this historico-material situation (e.g. McPhearson et al. 2013), which I prefer to refrain from doing, given the troubling, oppressive luggage the term carries (Yussof 2018; Malm and Hornborg 2014).

Instead, I propose a slightly different approach to accounting for this rhizomatic background of the present-day forces that put the interest and reading of scenarios in context. This context comes from my engagement with the problematics formulated by a philosopher-turned-cultural critic Mark Fisher, pivoting around the question of the place and role of imagination in the formation of this present-day sensitivity, as well as its

relation to politics of what he calls *capitalist realism*: 'the widespread sense that not only is capitalism the only viable political and economic system, but also that it is now impossible even to *imagine* a coherent alternative to it' (Fisher 2009: 2). Under the provisional name of 'critical imaginary studies', I gather voices that I believe articulate concerns similar to Fisher's and I venture to read climate science in dialogue with them. The kairos, then, can only be understood as a part of a cosmos, however (inevitably) limited and idiosyncratic any given conceptualisation of this cosmos may be.

Much to my own surprise, this work ends up engaging in dialogue with one more voice, one I have not originally planned to build on. It so happened that, while composing these pages, I was re-reading a work of scholar of inhuman geography Kathryn Yusoff, *A Billion Black Anthropocenes or None* (2018), with an intention of building on it for another project. Before long, I realised that Yusoff's piercing sharpness and unflinching critique of one of the Western sciences — geology — moves with a force that I was unable to ignore, if only because I began to recognise significant parallels between our respective approaches and analytical strategies. In her critique of (the search for the origins of) Anthropocene I came to recognise a sort of negative of my own work on climate science scenarios — her's probing the past (Yusoff 2018: 101), mine probing the future — both sharing an interest in the temporal operative relationality of those respective temporalities with the present. And so, slowly but surely, while formulating my own account of the use of scenario thinking in climate science, somewhat inadvertently, Yusoff's thought began permeating my own, providing invaluable insights, formulations and vocabulary for my own sensitivities and intuitions.

To bring these perhaps lengthy but necessary prolegomena to a conclusion: the following pages are best read as a report from a process

of searching — meant in the etymological sense of *going about, wandering, traversing*. A report from a process of retranslation of a certain amazement into a form of philosophical inquiry located at the intersection of the fields of critical human ecology and environmental humanities. Trying to get to the bottom of a peculiar aesthetic amazement, born out of my reading of a fragment of the AR6 IPCC Report, revealed multiple and intersecting planes: ontological, epistemological, temporal, ideological, power-related… And all these entangled forces and vectors coalesce into this seemingly simple and unassuming figure — *scenario*.

1. Outline of the investigation

…critique and expansion of grammars…

Kathryn Yusoff

The following work investigates the use of the figure of scenarios — 'plausible descriptions of how the future may develop' (IPCC WGIII 2022: 135) — in present-day climate science. I say 'figure' here but, at this preliminary stage of the investigation, it is in fact best understood as a placeholder awaiting a more precise formulation — after all, the very ontological status of scenarios is one of the principal subjects of this investigation, in as far as it is a philosophical one. Corresponding to this ontological uncertainty is the epistemological one: as I observed elsewhere (Korbański 2023: unpublished), scenario thinking is applied across various seemingly incongruous disciplines and conceptualised to serve a variety of disparate functions. Depending on who we consult, they are said to describe, develop, provide, predict, foresee, envision, explore or enable the future, and much more (Korbański 2023: unpublished). This motley collection of the proposed functions of scenarios is so vast and diverse that investigating them calls for, first and foremost, adopting a structure and subject delimitation.

One important step to do so is to anchor this work in a concrete case. To do so, I choose the most recent Summary for Policymakers of the AR6 Synthesis Report (henceforth: SYR) (IPCC 2023) as the primary source from which I will draw examples for the analysis part of my investigation. SYR is a document summarising 'the state of knowledge of climate change, its widespread impacts and risks, and climate change mitigation and adaptation' (SYR: 3). As its introduction explains, it 'integrates the main findings of the Sixth Assessment Report (AR6) based on contributions from the three Working Groups, and the three Special Reports' (SYR: 3).

I opt to choose this artefact for a variety of methodological reasons. Interested in analysing the use of scenarios in climate science, I wanted to choose an example paradigmatic of this science, paradigmatic in the sense articulated by philosopher Giorgio Agamben, for whom it is 'an example which defines the intelligibility of the set to which it belongs and at the same time which it constitutes' (Agamben 2002: 3). As far as climate science goes, no other document fits this role better than SYR, in as far as it is an emanation *par excellence* of present-day climate science.

Furthermore, I consult it because SYR communicates the findings of all three working groups into which the IPCC is divided: Working Group I (WGI) working on the physical climate science basis, Working Group II (WGII) assessing impacts, adaptation and vulnerability, and Working Group III (WGIII) concerned with the mitigation. In addition, as of the time of writing (spring 2023), it is the most recent and up-today document produced by the IPCC. Finally, I choose the Summary for Policymakers over the Report in its entirety because it is the most widely read part of the Report and, last but not least, due to the feasibility considerations — its relatively short length of 36 pages lends itself to analysis that can be performed within the length constraints of this work. Here, I would also like to explain what this thesis is not: as I intend it, it should not be read as a focused, sustained document analysis of SYR — it engages with the text in a far too limited fashion to claim this role. Rather, it uses SYR as a paradigmatic example, as an illustration and means to develop my philosophical — and critical — arguments, which are the primary objects of my interest in this work. As such, the analysis of SYR I propose is of a preliminary kind, to be developed in subsequent work.

In the prolegomena, I have explained the original amazement that ignited this investigation. The process of transcribing it into a master

thesis work began with the methodological step of translating the many intuitions and prospective question marks prompted by the foundational *thauma* into the following three questions of investigation: *What are scenarios? How do they work? Why are they used?* The questions are deliberately formulated in a simplistic fashion, allowing for investigative flexibility and freedom from making concessions towards any particular theoretical standpoint — though not because this work operates without any theoretical framework. To the contrary, it very consciously draws from post-structuralist critical theory and Marxian ecology, and it will be this background, rather than the way the questions are formulated, that will infuse this work with the theoretical directionality and the resulting ontological, epistemological and methodological commitments.

Sketching that background, which will fill in the contours of the proposed questions of investigation with distinct theoretical colours, is the role of Chapter 4. Before I do so, in Chapter 2, I draft a brief critical account of the history of scenarios, speaking to the fact that they appear and grow in prominence at a particular historical moment and are not a-historical entities. Chapter 3 presents a review of the existing literature — both critical and mainstream (I sometimes will, interchangeably, use the term hegemonic in the sense articulated by Ernesto Laclau and Chantal Mouffe (2001: x)) — on the theme of scenarios. Chapter 5 builds on this preliminary work to then introduce the notion of scenario as it is defined across a variety of dispersed discursive fields — as well as problematising the fact of this very dispersion.

As noted above, the choice of SYR as an object of my study, serves the purpose of limiting the scope of the primary analysis and, as such, shapes the scope and sense of the three questions of investigation: when I ask *What are scenarios? How do they work? Why are they used?* I do so primarily in the context of climate science, even if my investigation ends

up engaging with other discursive fields, choosing to follow the textual and thematic threads of evidence rather than a conceptual *ad hoc* assumption to remain within the confines of what counts as scientific only. In fact, it is precisely the attempt to direct its Janus-like gaze at both sides of this science/supra-science frontier, which distinguishes this work from a good deal of existing literature on the topic (see Chapter 3). As we shall note, only too often, it tends to limit itself to the analysis of sources that fall under the aegis of the term 'scientific' — which strikes me as a serious limitation. The second factor influencing the meaning of the questions asked are theoretical commitments resulting from my critical stance — in other words, the kind of answers I will provide will be different from, say, ones someone of a more positivist-empiricist inclination may give.

The third and final methodological element influencing my analytical and critical strategy — and the final factor affecting the sense of the questions I ask and the kinds of answers I will provide — is the method I propose to develop for this investigation, namely, the hauntological analysis, presented in Chapter 6. Rooted in the theoretical field I draw from — through the thought of Mark Fisher — it not only reflects the concerns articulated from within this field (i.e. the problem of imagination) but it additionally has the advantage that it originates from the outside of what Fisher calls 'business ontology' or, to speak with climate and environmental economy writer Adrienne Buller, in the ontology and epistemology operative in 'green capitalism', with its market-centric consensus (Buller 2022: 25). Hauntological analysis, addressing the notion of 'the agency of the virtual', privileges the concerns about the dualities of the actual and virtual as well as the intratemporal relationality between present and future over the concerns of a more instrumental, techno-rational nature. As such, it strives to be, to borrow a formulation from Yusoff, a critique and expansion of grammars (2018:18) through which to articulate the mechanisms inherent in the use

of scenarios, an expansion that refuses to speak from the hegemonic, neoliberal positions of capitalism, green or not.

Once the foundations for the analysis are thus secured and the method is formulated, in Chapter 7. I proceed to present my hauntological reading of the use of the figure of scenario in the SYR. The final Chapter 8 is a place where I revisit the most important findings of all the constituent parts of this work and bring them all together, answering the three questions guiding this investigation.

2. A brief critical history

…imagined situation…

Online Etymology Dictionary

Let us begin this brief historical overview with an entry from an etymological dictionary. Scenario, it says, means the following:

> 1868, "sketch of the plot of a dramatic work," from Italian scenario, from Late Latin scenarius "of stage scenes," from Latin scena "scene" (see scene); earlier in nativized form scenary (1690s). The meaning "imagined situation" is recorded by 1960, in reference to hypothetical nuclear wars' (Harper 2022).

There are two reasons I begin with this entry. First, it is a testimony to the supra-scientific origin of the notion and illustrates how relatively recent is the semantic shift which turned a *sketch of a dramatic plot* into *imagined situations*: it is this latter meaning that we know from climate science. Secondly, and more importantly, it clearly points to a particular historical moment and context in the search for the historical roots of the figure of scenario — the Cold War America of the 1960s.

Ostensibly, this may perhaps seem slightly paradoxical, if one were — as I did, in the initial stages of my investigation — to note that climate science shares roots with meteorology, so with a science much older than six decades separating us from the 1960s. Forecasting the weather, trying to predict its future states, is, after all, one of the principal tasks of that science. In addition, The World Meteorological Organisation is one of the IPCC's parent organisations. One has to observe, however, that the relation between meteorology and climatology is a nuanced and complicated one, as explained in an excellent monograph on computer models and climate

data: *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming*, by climatologist Paul N. Edwards (2010). According to his account, the two sciences have, in fact, less in common than one might assume, from their respective objectives and the procedures they employ to the different kinds of data they collect and use — Edwards does speak of an institutional split between the two sciences (2010: 288, 98).

According to him, the importance of the 1960s in the context of this parallel history should be explained rather in relation to the developments in computer modelling: 'Since 1960, computer models have been the fundamental tool of both weather forecasting and climate science' (Edwards 2010: 13). In other words, the appearance of scenario thinking and scenarios as 'imagined situations' in climate science is not linked to climatology's roots in meteorology and weather forecasting. In fact, we shall see how it is somewhat of a mantra of the scenario theorists and practitioners to dispel the idea that they are 'forecasts'. Instead, Edwards links the advent of scenario thinking to a wave of computerisation, technological advancements and futurological thinking, connected by the roots they share in the military programs of the RAND Corporation and Hudson Institutes (Edwards 2010: 220). This pattern mimics the development of modern meteorology itself: it too developed, largely, as a science useful from a military point of view (Edwards 2010: 28). It is telling that according to *The Forecasting Dictionary*, the early precursor of the use of scenarios as a device to imagine the future comes precisely from the military field, dating back to 1871 (Armstrong 2012: 44).

Investigating this precise military-ideologico-theoretical assemblage is *Imaginary Futures: From Thinking Machines to the Global Village* (2007), a work of critical media scholar Richard Barbrook, applying the ideology critique to the politics of futurology and future studies that these Cold War institutions brought about and promoted. His reading of that

moment is political through and through, echoing the central argument of his work:

> If the geopolitical threat posed by the Marxist prophecy of communism was to be overcome, the leaders of the USA had to commit the resources and skills needed to construct a plausible alternative vision of the shape of things to come. After the Democrats came to power, the Cold War Left was finally able to raise the money for this priority project. In 1964, the American Academy of Arts and Sciences was given a large grant to set up a multi-disciplinary team of intellectuals dedicated to inventing the anti-communist vision of the non-communist future: The Commission on the Year 2000 (Barbrook 2007: 145).

We will encounter The Commission on the Year 2000 and its *spiritus movens*, sociologist Daniel Bell, in the later parts of this work. Here, I quote at length from Barbrook because the account of the origins of the scenario thinking presented by the mainstream narratives presents a very limited version of that story. Richard H. Moss et al. — the representatives *par excellence* of that mainstream strand of climate scenario scholarship — limit themselves to noting that 'antecedents of contemporary global scenarios were developed in 'futures studies' that explored the long-term sustainability of natural resources' (2010: 749). For their part, scholars in the critical tradition keep reiterating what the hegemonic accounts prefer to gloss over, and one does not have to subscribe to the strong political reading proposed by Barbrook (though there are arguably good grounds to do so) to appreciate the basic facts: 'Scenarios emerged in the military sphere; their use can be traced from the war games of the 19th century and their 20th century development during the Cold War period, especially by the RAND Corporation in the US' (Garb 2008: 4).

Surprisingly, scenario scholars Joost Vervoort and Aarti Gupta, whose paper is cited by IPCC to legitimise its own employment of scenarios, rather than signalling and problematising these origins, instead quote from another of the key figures behind the Hudson Institute, Hermann Kahn (Vervoort and Gupta 2018: 106). In an ironic twist of events, the thought of the Cold War ideologues finds its second-hand way into the latest Assessment Report, which is quite surprising, given how Vervoort and Gupta seem to be otherwise attuned to the potential political and ideological dimension of the use of foresight and scenarios, observing how 'seen from a critical social science perspective, foresight is likely to constitute thus a site of politics and governance in and of itself' (Vervoort and Gupta 2018: 106).

At any rate, in the case of scenarios, history and politics seem to be hard to think apart — these connections deserve signalling and flagging, not only because they are, for the most part, routinely overlooked by the mainstream science, but because they must be read in the context of certain concerns regarding the use of scenarios, signalled by the critical scholars. To prefigure this discussion (see Chapter 3) with but one example here, investigating the use of scenarios by Royal Dutch Shell scholar Jenny Anderson makes a suggestion to understand scenarios as

> tools of influence for an era in which the influence over specific territories could not be backed up with armed force in the same way as before and in which the symbolic influence over images of the future thus became important (Andersson 2020: 737).

From there, scenario thinking went on to follow an interesting trajectory before it found its way into the IPCC and the climate science of today. As further explained by Garb, the methods of scenario thinking 'were next taken up in the corporate realm, with the much-described strategic scenarios of the Royal Dutch Shell oil company, and the various

offshoots conducted elsewhere by the team involved in those efforts' (Garb 2008: 4). From there the road to the IPCC Reports is uncannily short: 'Gerald Davis, formerly of Shell, facilitated the 2000 scenario analysis of the Intergovernmental Panel on Climate Change' (Garb 2008: 4). Not only head of Shell's scenario planning team, his CV includes also the role of 'a Managing Director of the World Economic Forum from 2003 to 2007 responsible for the Davos annual meetings' (World Energy 2023) — I use him as a personification of the corporate-business-science nexus within which the scenario thinking is nested.

It bears pointing out, furthermore, that the Royal Dutch Shell is another actor of a non-scientific lineage which appears over and over again on the radar of the scenario-thinking investigation. In the company's own words:

> Shell has been developing possible visions of the future since the early 1970s, helping generations of Shell leaders, academics, governments and businesses to explore ways forward and make better decisions. Shell Scenarios ask "what if?" questions, encouraging leaders to consider events that may only be remote possibilities and stretch their thinking (Shell 2023).

If reading this account one may experience a feeling of *déjà vu* it is because asking the what-if questions is verbatim what the IPCC does, as we have seen in the opening paragraphs of this work, employing a "what-if' mode of exploring the future' (IPCC WGII Section 1.5.1: 143). Furthermore, Andersson — whom I quoted at the end of the previous paragraph — in her excellent investigation into Shell's use of scenarios, dating back as far as 1967, explained what this 'help' to 'make better decisions' were. According to her analysis, 'Shell strategically used the scenarios to respond to arguments, emanating both from OPEC and from the Club of Rome, of oil as a limited resource. Shell used the scenarios to

create images of a future oil market dominated by innovation, creativity, and sustainable solutions' (2020: 729).

Overall, the picture of the historic origins of scenario thinking reveals surprisingly little science and an alarming large dose of strategic military and corporate interests, which, as we have seen, continue to permeate into climate science, including the very IPCC Reports. This confirms the original intuition informing this work about the supra-scientific character of the figure of scenarios, at the same time confusing it and pointing in novel and unforeseen directions: not towards the cultural registers, but rather towards the military-industrial complex. Having read this brief critical historical account of the origin of scenarios as imagined situations, let us now take a look at the literature addressing the use of scenarios in climate science in their present form.

3. Literature review

…among the most controversial elements of the IPCC process…

Paul N. Edwards

We have already come across some of the key work on the theme of scenarios in the preceding paragraphs. As we have seen, an important monograph framing the use of scenarios within the *longue durée* of the history of both meteorology and climate science is *A Vast Machine* (Edwards 2010), investigating the application of computer modelling and computer data within these disciplines. While scenarios are not a privileged topic of his analysis, Edwards observes in the conclusions how, because of their looser and more speculative character, 'the process of generating scenarios is among the most controversial elements of the IPCC process.' What he has in mind is how they blend — and attempt to quantify — a variety of diverse elements: 'Social, behavioral, economic, and policy sciences all feature in this mix' (Edwards 2010: 421). While, as we will see shortly, this does not apply in equal degree to all the types of climate scenarios, of which there are several, it is undeniably true of integrated assessment models (IAM), which constitute the basis for the cornerstone of the present-day climate scenario use, the Shared Socioeconomic Pathways (SSP).

Edwards's analysis begins with the modern science of the nineteenth century and proceeds to about 2010 when his work was published; its reading can be complemented by another historical account of climate modelling by climatologists Kendal McGuffie and Ann Henderson-Sellers (2001), covering a similar timespan. The literature review presented here picks up around the time Edwards leaves off and climate scenario thinking comes to maturity. It is also from roughly that time that an early forerunner of more socially and critically oriented studies of scenarios

comes, i.e. the study of STS and political ecology scholar Yaakov Garb et al. (2008) and, an even earlier work on the role of scenario thinking within the sustainability studies, by Rob J. Swart et al. (2004).

Among the key papers on the use of scenarios in climate science, one should list a collected work of nineteen authors, Moss et al. (2010), one to which we will frequently return since it is representative of the mainstream climate science take on scenario use. It is situated in the same strain of work as Elmar Kriegler et al. (2012), Brian E. O'Neill (2014) or Detlef van Vuuren et al. (2014), coming from climate modelling community, devoted to theorising and proposing an outline for a new generation of climate scenarios, introducing the figure of the Shared Socioeconomic Pathways — together, constituting what could be perhaps called a moment of scenario thinking coming of age. If in what follows I focus mostly on Moss et al., it is not only because they are in the avant-garde of that moment of scenario studies, but also because they provide a useful typology of scenarios. Namely, they classify scenarios into the following kinds: emissions, climate, environmental, vulnerability and earlier scenario work. In addition, they distinguish between three types of their possible generation, namely through integrated assessment models (IAMs), climate models as well as impact, adaptation and vulnerability methods and tools (2010: 748-450).

I am well aware that the differences expressed through this matrix are theoretically and pragmatically important. In my following analysis, however, for the most part, I bracket them out in a gesture akin to Husserlian *epoché*, prioritising the aim to address the underlying ontological, epistemological and temporal assumptions that scenarios share as a whole. It goes without saying that it is necessarily a limitation of my work, one which should be addressed in a follow-up study that could focus on the more granular aspects of the topic. In a more perfect world,

I would have devoted much closer attention to, e.g., the specifics of IAMs, given — as critical sustainability scholars Natalia Rubiano and Wim Carton observe — their dominant role in the production of present-day climate scenarios (2022: 1) or how the 'IAM scenarios usually focus on the most cost-effective mitigation actions to reach long-term climate goals, which means they mainly use economics as the basis for decision making' (2022: 3). However, this omission is one of the many inevitable choices to be taken while engaging in an investigation of this sort.

While seminal, Moss et al. is not the work the IPCC AR6 refers to introducing scenarios, instead quoting a more recent paper by Vervoort and Gupta (2018), signalling how in the wake of the Paris Agreement various 'mechanisms and processes by which to imagine and govern diverse climate futures are increasingly coming to the forefront of sustainability debates and practice' but how at the same time 'social science scrutiny of such processes has been minimal' (2018: 104). They propose to classify the processes of foresight and scenario thinking as belonging to what they label 'anticipatory climate governance,' defined as 'the evolution of steering mechanisms in the present to adapt to and/or shape uncertain climate futures' (2018: 104). Commenting on this point, they make a point my work in this thesis takes to heart and tries to address: 'seeking to shape an unknown and largely unknowable future is fraught with normative and scientific uncertainties and conflicts' (2018: 104). Their observation captures well a significant part of the intuition that formed the amazement which brought this entire study to be. Conscious of such uncertainties, Vervoort and Gupta advocate a need for a framework for social science analysis of scenarios, which they choose to formulate in the form of five key questions of a relatively pragmatic nature: 'Why is a foresight exercise undertaken?; Who is involved in a foresight process?; How is the future conceptualized in a given foresight process, in terms of its knowability and manageability?; What diverse futures are imagined?

How do the futures imagined in the foresight process impact the present, in terms of decision-making and policy choices?' (Vervoort and Gupta 2018: 107).

There exists further attempts to formulate a framework to analyse future-making techniques from critical positions. One important example is by interdisciplinary scholar of climate futures Jeroen Oomen et al. (2022), articulating an approach which they conceptualise as 'dramaturgical analysis,' attuned to 'specific sets of arrangements, competencies, meanings and identities underpinning a way of imagining the future and of going about things' (2022: 259). For us, it is important to note that there seems to be a growing recognition that the tools to critically address different futuring techniques, including scenario thinking, are missing. Coming from a critical perspective, Oomen et al. conclude their paper noting how 'the ubiquity of forecasts, projections and scenario-modelling in public policy, politics and business planning in modern society creates a particular range of imagined futures, delimited in the ways they can imagine futures' (2022: 266) raising important questions about the political dimensions inherent in scenario thinking, or, to speak with Andersson again, questioning their potential role as 'tools of influence' (Andersson 2020: 737). Such framing suggests a need to further question the notions of plausibility and possibility of the imagined. We shall pick up those threads in Chapter 5.

The field of scenario application, as I have observed in the opening paragraphs (and elsewhere: Korbański (2023) unpublished), is extremely diverse, reflected in the diverse nature of work addressing it, which thinks scenarios through the prism of issues such as assumptions uncertainty by Giacomo Marangoni et al. (2017), scenario performance by Jiesper Pedersen et al. (2021), justice dimensions by Natalia Rubiano and Wim Carton (2022) or scenarios misuse by Roger Pielke and Justin Ritchie

(2021). In addition, The Working Group II report of the AR6 IPCC provides its own review of the literature 'on the use of narratives and storylines based on projected scenarios, which points out the conservative character of these concepts whose performative effect tends to preserve the status quo and the current socioeconomic relationships', quoting the work of Malm and Hornborg, 2014; Chollet and Felli, 2015; Lövbrand et al., 2015; Demortain, 2019 and Theys and Cornu, 2019 (IPCC WGII: 135) These papers problematise the themes of the anthropocene subject, the neoliberal depoliticisation of climate politics and the notion of risk, but they do not speak directly to the explicit figure of scenario as a subject in its own right.

They do, however, provide some relevant insights for us. For example, the paper by economist Jacques Theys and historian Pierre Cornu programmatically sets out an agenda that this current work tries to address: the authors postulate a need to, among other things, observe 'the contexts in which different scientific disciplines were led to create new concepts linked to the temporalities of environmental issues and to retrace their genealogy, to follow the controversies linked to their unfolding, and to measure their performance' (Theys and Cornu 2019: 387). The method of hauntological analysis I propose and develop here is an attempt to take all these concerns to heart (similarly to, e.g., Oomen et al. with their concept of 'dramaturgical analysis').

The above examples come primarily from the diverse yet cognate fields unified in that they, in one way or another, explicitly address the use of scenarios in the context of climate change. It is not, however, the only way to tell the story of scenario use. Alternatively, one could also choose to approach it from a very different perspective, the one provided by the field of future studies, originating in the research projects of RAND Corporation and Hudson Institute we have already come across, epitomised by Herman

Khan's and Anthony J. Wiener's *The Year 2000: A Framework for Speculation on the Next Thirty-Three Years* (1967). As I observed elsewhere (Korbański (2023), unpublished) among the key texts in that tradition are Wendell Bell and his *Foundations of Future Studies* (1997); Kerstin Cuhls's and her work on future forecasting (2003); Peter Bishop et al.'s work on scenario techniques (2007) and Sohail Inayatullah's taxonomy of futures thinking methodology (2008). Common to them is that they take scenario thinking and forecasting as a given and focus on working out its principles, rather than questioning the ontological and epistemological foundations scenarios lie upon — which is precisely the opposite approach to the one this work sets out to undertake. To take the next step towards this goal, let me now move on to present the theoretical background informing this endeavour.

4. Theoretical background

...it seems to be easier for us today to imagine the thoroughgoing deterioration of the earth and of nature...

Frederic Jameson

In her brilliant critique of the notion of Anthropocene, Kathryn Yusoff observes how 'the fabulation of beginnings in the Anthropocene is tied to the present and its politics' (Yusoff 2018: 60). Allowing myself a little *détournement*, I could say that in this work, my interest lies in investigating *the fabulation of the futures*, or, what Janasoff calls in her *Imagined and Invented Worlds* 'fabrication of the future' (Janasoff 2015: 337). I find the parallel with Yusoff accurate, because as in the case of her investigation, the practice I address here is, too, tied to the present and, as such, to the same hegemonic politics this present entails. In the broadest sense, then, this is a work concerned with a critique of an element of the politics of future(s), and it is in this respect that I will be analysing the notion of scenario, informed by the various theoretical inputs that I will now present.

If I stated earlier that my foundational amazement was not a free-floating, kairotic event, it is because I have read the passages from the AR6 at a very particular historical moment, when — to borrow a line from marxist cultural scholar McKenzie Wark — it is conclusively shown that 'continuing to misvalue the whole world can't go on. Sooner or later (but probably sooner), it will crash the whole climate system of the planet' (Wark 2021: 16). The certitude that Wark expresses seems currently as unequivocal as is the attribution of responsibility for global warming to human activities (SYR: 4). This fact is not only accepted by the critical theorists — like Wark herself — who have recognised it long time ago, but also by the hegemonic class: so much so, that Buller has recently proposed

that we have already left the denialist era and entered one of green capitalism which willingly embraces this conclusion: '"listen to the science" is by now a cliché' (Buller 2022: 21; see also Painter 2023).

But the cosmos of the kairos was shaped also — or, perhaps, I should say primarily — by another set of ideas. Namely, I read the passages from the IPCC through the prism of a certain cluster of concerns circulating around left-oriented academia and some of its many fringes, concerns which inform my thinking about not only climate and environmental collapse but the world at large. If they are not explicitly coherent and self-conscious enough to form a 'school', I would argue they share enough sensitivities to think them together — common for them is the central problem of *imagination*, a theme more and more salient in critical theory of (especially) the past decade, including the broadly understood environmental humanities.

One of the main theorists concerned with this topic — within contemporary Western thought — is Mark Fisher. He famously articulated the diagnostic *capitalist realism* thesis, raising the question of whether alternatives to capitalism are imaginable, a thesis secreted in Frederic Jameson's remark — recycled time and again in various critical texts — that 'it is easier to imagine the end of the world than the end of capitalism' (Fisher 2009: 3). I cover this more extensively elsewhere (Korbański 2022). To put it in the context of this investigation, let me note that this impulse towards the imagination problematics coincides with the coming of age of scenario thinking in climate science, as testified by the work of Moss et al. 2010, Kriegler et al. 2012, or O'Neill 2014 we reviewed in the preceding chapter: as if the cultural and scientific tendencies followed similar intuitions.

While one of the most explicit voices asking this question on the left academia, Fisher is by no means the only one nor even the first to explore the theme of imagination — before him, the topic was famously addressed by philosopher and social critic Cornellius Castoriadis (1987), though Fisher does not draw on him explicitly. Instead, he prefers to build on the work of philosopher Gilles Deleuze and psychoanalyst Félix Guattari and their *Capitalism and Schizophrenia* (1977; 1987), literary and cultural critic Frederic Jameson's *Postmodernism, or, the Cultural Logic of Late Capitalism* (1991) and sociologist Jean Baudrillard *Simulacra and Simulation* (1983) to name the most important influences — these are the voices that inform Fisher's though as well as the theoretical trajectory this very work draws from.

Imagination plays an important role in the thought of other contemporary critical theorists. Let me offer a handful of examples here. Anthropologist David Graeber states how 'the last thirty years have seen the construction of a vast bureaucratic apparatus' that 'exists to shred and pulverize the human imagination, to destroy any possibility of envisioning alternative futures' (2011: 31-32); McKenzie Wark points out how 'capitalism [...] renders everything precocious — except its own hold on imagination' (2021: 22)' while philosopher and critic Franco 'Bifo' Berardi's work takes up the problem of how 'the line of escape from the inevitable is the inconceivable: what we are currently unable to conceive of, to imagine, and therefore unable to see. Future is not prescribed but inscribed' (2017: 163). Kathryn Yusoff and Jennifer Gabrys approach imagination as 'a way of seeing, sensing, thinking, and dreaming that creates the conditions for material interventions in, and political sensibilities of the world' (2011: 561). Let us note, in passing, how these concerns seem universal on the critical left academia, transcending even the alleged rift between the historical and new materialisms.

In that perspective, the question about the imagination is a political question about the possibility to think and/or create something novel — as well as about the possibility and the need for the unexpected (Judith Butler, 'Climate Sorrow' lecture at the University of Copenhagen 2023) — as opposed to the mere reconfiguration of the existing elements. It is about questioning not only the particular instantiations of, but most importantly, the very conditions of possibility of the current regimes of the (im)possible and (im)plausible, with a view to the emancipatory potential such themes carry. These often predominantly (though not exclusively) theoretical concerns gain new urgency today, in the moment of climatic and environmental collapse: Butler's is one example of trying to think about those themes together. Another is Yusoff and Gabrys, making the connection between the imagination and environmental and climatic concerns explicit. Prefiguring this entire nexus of problems is the lesser-known observation by Jameson, who observes that 'it seems to be easier for us today to imagine the thoroughgoing deterioration of the earth and of nature than the breakdown of late capitalism' (Jameson 1994: xii). 'Perhaps', he adds, 'that is due to some weakness in our imaginations' (1994: xii).

A parallel impulse in the field of what could be called — let us finally coin this provisional term — 'critical imaginary studies', comes from the field of science and technology studies and the canonical work of Janasoff and Kim into imaginaries, first formulated in their seminal 2009 paper on *sociotechnical imaginaries*, which 'at once describe attainable futures and prescribe futures that states believe ought to be attained' (Janasoff and Kim 2009: 120). If the trajectory of Fisher's imagination questioning belongs to Marxian cultural critique rooted in, as we have noted, the various strands of post-structuralist Western thought, then imaginary studies *a'la* STS resonate more with environmental social sciences. What both these strands have in common, is that they recognise the political

question about power as located at the centre of their respective analyses of imagination and imaginaries. Simply put, for both, imagination is inseparable for power relations: prefiguring the future is an inherently political act. Anticipating the discussion, let me observe how the hauntological analysis that I will develop in Chapter 6 explicitly engages this question. To build a theoretical bridge here, let me suggest that a figure providings the most explicit link between the two strands I identify here is political theorist Bob Jessop and his work on the material/semiotic dynamics of imaginaries within the framework of political cultural economy, drawing heavily from Marxian thought (Jessop 2013). It is also Jessop who points out — *vide* Marxist philosopher Louis Althusser (1971) — the link between the concern with imagination and ideology as present in *German Ideology* (Marx 1932). Following this suggestion, the question of the imaginary and imagination can be traced back to the very centre of a key Marxian concern.

On this note, let us further observe that the theme of imagination also appears already on the first page of *Capital*, at the very outset of Marx's analysis of the commodity form. The commodity, Marx says, satisfies human needs 'of whatever kind' and 'the nature of these needs, whether they arise, for example, from the stomach, or the imagination, makes no difference' (Marx 1990: 125). Tellingly, a footnote links such needs to the workings of desire (1990: 125) — four sentences is thus all it takes to cover the distance between *Capital* and *Capitalism and Schizophrenia*. But I digress: my point is that given how central the analysis of the commodity form is for the analysis of capitalist societies, a case can be made that to read imagination as being, *a fortiori*, one of the core elements of Marx's critique of the capitalist mode of production. Interestingly for us, the original German term used by Marx that the canonical English translation renders imagination is *die Phantasie*, connoting, perhaps a more familiar *fantasy*, and at the same time suggesting a tension that imagination bears

within itself: infused, as it is, with a potentiality of the phantasmagorical, perhaps — we could say — of something haunting, ontologically unstable, hovering in between the actual and the virtual (compare to Castoriadis 2005: 264 on Marx, Aristotle and the notion of imagination as *phantasy*).

How do scenarios fit into this picture? We have seen how the etymological dictionary defines them as 'imagined situations.' But of course, there is more to this question than just a formal definition alone. Let us note that as 'foresights' (AR6), they appear to serve the same structural function as the envisioning of the alternatives that Fisher's critique of capitalist realism — adorned with a tellingly interrogative subtitle 'is there no alternative? — calls for. To the extent that scenarios are concerned with envisioning futures, from the perspective articulated by the critical imaginary studies, they can be said to be examples of imagination *par excellence*, even if the IPCC itself is careful to never use that term, neither in the Chapter I of the AR6 WGIII we quoted from in the opening paragraphs nor the SYR we shall consult in Chapter 7.

This absence is all the more conspicuous if one consults the Vervoort and Gupta article cited by the AR6, where one will find out that they define climate foresight processes as 'approaches that aim to *imagine* and pre-experience challenging futures' (2018: 104); that they speak of the need to *'imagine* (and seek to govern) transformative and uncertain climate futures' (2018: 104) and, to give one more example, they note how 'foresight can, in practice, not only help to *imagine* but also shape policy choices in the present' (2018: 105) [my emphasis]. Scenarios — however sophisticated the methods for creating them may be — on a fundamental ontological level, are imaginations of the future. As such, the critical concerns that pertain to imagination, pertain to scenarios as well.

One further aspect explicitly noted by Vervoort and Gupta is the link between the imaginary practice of scenario thinking and the political dimension it implies, an aspect also noted by the critical school. A good dose of linguistic acrobatics, however, takes place when introducing the notion of scenarios in the AR6: the theme of imagination is absent, substituted by a rather puzzling (from the point of view of scientific *episteme*) notion of 'pre-experience' — and yet, none of it can mask the fact that scenarios are in fact examples of imaginary practice and as such, the critical concerns pertaining to the notion of imagination articulated above pertain to them in equal measure. Through scenarios, science imagines. And while not all imagining is about the future, all thinking about the future is, necessarily, imagining. It is now the moment, with this preparatory exposition in mind, to take the next step of our investigation and proceed to see how the imaginative practices of scenarios are (and how they are not) defined by those who use them.

5. Scenarios

…what these are and what they are not…

Royal Dutch Shell

As noted earlier, born out of the field known as future studies and futurology in the 1960s', climate and emission scenarios are a central component of the IPCC's work (Moss et al. 2010: 749). But what are they, exactly? How are they understood by those who use them? There is an ample and diverse literature — both scientific and not — that can help us answer those questions. It is so diverse, in fact, that an early-day sociological study of scenarios, Garb et al., tellingly speaks of a 'considerable variety' verging onto 'chaos' in this respect (2008: 1). A certain pattern, however, can be discerned among this ostensible disarray: no matter who introduces them, scenarios are virtually always characterised in a twofold way, positively and negatively. To borrow from some of the precursors of scenario thinking, Royal Dutch Shell: 'To get the most from them, it is important to know what these are and what they are not' (Shell 2023). Taking this observation as our clue, let us use it as a framework for our own account. As we go on, we should not limit ourselves to the descriptive register only, but, where appropriate, we shall already engage with a critique that will inform the subsequent analysis.

Let us begin with the latter instance, with what the scenarios are said to *not* be. Commencing with the IPCC and the AR6, the first negative characterisation it provides differentiates scenarios from the 'distinct' though 'interrelated' and 'sometimes confused' concepts of narratives and storylines (IPCC WGII: 135) to then state that scenarios 'are neither predictions nor forecasts' (IPCC WGII: 143). Similarly, one of the most seminal works on climate scenarios — Moss et al. (2010) — observes that scenarios are not 'forecasts or predictions' nor are they employed to

'predict the future' (2010: 748 and 747; 754). To complicate the matter somewhat, in the same article, the authors also state how scenarios are developed to produce 'decadal predictions' (2010: 754), putting a question mark over the ontological status of scenarios, as well as their epistemological characteristics — a point we will return to. For now, let us continue with another negative formulation from a similarly key text from a related field of speculative design, explaining how the idea behind employing scenarios is not to 'pin the future down' (Anthony Dunne and Fiona Raby 2013: 2). Human geographers Jevgeniy Bluwstein and Connor Cavanagh follow suit: 'scenario archetypes are perhaps best conceptualised as optimisations, rather than as forecasts' (2022: 10). This should be enough to illustrate that no other point seems to be reiterated so consistently across the vast spectrum of scenario definitions: scenarios are not predictions, they are not forecasts — they do not offer a crystal ball for the future as both Moss et al. (2010: 754) and Royal Dutch Shell (Shell 2023) put it.

These contemporary formulations echo one of the earliest examples of a definition of the notion of scenario, namely Daniel Bell (1970) and his work on *The Commission on the Year 2000*, in collaboration with Herman Kahn and Anthony J. Wiener. Already in this succinct text, programmatic for the field of future studies, Bell explains that employing scenarios does not imply a claim to possess the ability to 'predict the future' if only because 'there is no such entity as the future. There are many possible futures' (Bell 1970: 264). Still, the sense that despite this declarative disavowal of the term 'forecast' some element of it haunts scenario thinking seems to be at least as old as the method itself. The review of Kahn and Wiener's *The Year 2000: A Framework for Speculation on the Next Thirty-Three Years* (1967) from the 1968 issue of *Science* opens with this lengthy, rich and telling invocation: 'From the dark art of the necromancer, the darker arts of the soothsayer, the magician, the gypsy's

tea leaves, the witch who describes the future by interpreting the entrails of some recently dead creature, we have emerged into the gray art of forecasting' (Moore 1968: 647).

We shall address this onto-epistemo-temporal entanglement that haunts scenario thinking from its very inception in the process of hauntological analysis in due time. For now, let us conclude this overview of negative accounts by consulting a concept of 'forward-looking statements' as understood by the U.S. Private Securities Litigation Reform Act of 1995. While it is routinely disclaimed in small print by various business actors, here I choose to quote from the cautionary endnote on the same Royal Dutch Shell website referred to at the beginning of this paragraph:

> Shell's scenarios are not intended to be projections or forecasts of the future. Shell's scenarios, including the scenarios contained in this content, are not Shell's strategy or business plan. [...] Scenarios, therefore, are not intended to be predictions of likely future events or outcomes and investors should not rely on them when making an investment decision with regard to Shell plc securities' (Shell 2023).

If I opt for collapsing both the chronologies and the domains in this exposition — instead of keeping them neatly separated — it is to deliberately emphasise how diverse the field of application of scenarios is and, historically, has been. In doing so, I want to illustrate how close the similarity between different applications of the scenarios have been and still remains across ontologically and epistemologically diverse disciplines, including climate science.

Furthermore, I want to illustrate an ostensible paradox this entanglement implies: depending on the domain, scenarios hold different epistemic, legal and political weight. Whereas in the IPCC scenarios are

building blocks of climate science discourse connoting scientific certitude and claims to knowledge, when presented by Shell, they turn into something that 'should not be relied on' when making investment decisions. If that is the case, then scenarios' social (and we could add: political) performativity (Oomen et al. 2021) becomes an even more pressing issue.

At any rate, the point is that given this diversity of applications, it is impossible to understand climate scenarios as unproblematically isolated, well delimited and independent scientific 'tools'. Rather, when analysed in the broader context presented here, they appear to be a part of a larger ecosystem that seamlessly traverses the porous and fluid ontological borders between the scientific (the IPCC), business (Shell), legal (Private Securities Litigation Reform Act of 1995) or creative (Dunne & Raby 2013) fields. Approaching them differently, in their sole capacity as climate science tools, may lead to a distortive, tunnel-vision perspective that fails to account for the complex character that scenarios exhibit. To make a similar point with Garb et al., scenarios can be understood as 'social objects, operating in the social sphere' (2008: 2). Their ontological status — what are they? — as well as their epistemological status — what do they allow to know? — require scrutiny. Because from there, there is only one step to the relations of power that infuse them and the politics they create.

We have seen what the scenarios are not. In the process, we managed to distil a number of critical points which warrant further investigation. Let us now take a look at positive definitions of scenarios, consulting the same sources as previously and also with the aim to perform a preliminary critical assessment as a ground for the subsequent hauntological analysis.

Consulting the AR6, the first thing to note is that the linguistic gymnastics that we came across earlier continues: scenarios are called,

after Vervoort and Gupta, 'foresights' (2018: 104). This term is normally defined as 'the ability to predict what will happen or be needed in the future' (Oxford Dictionary) — which is interesting, given how we have just seen the volume of the efforts to ward off the idea that scenarios are predictions. The ontological status of scenarios becomes less and less clear as one goes on defining them.

For Moss et al., scenarios describe 'plausible trajectories of climate conditions and other aspects of the future;' they are 'expert judgements' (2010: 748). This later characterisation is interesting in that its epistemological status is at best unclear (what are 'judgements'?; is 'expert' an argument from authority?), the former, in that it employs the notion of plausibility, which, too, seems to lack a clear-cut epistemological character. From the perspective of critical imagination studies, this second point is of essence. Within that critical perspective, the very question of what appears to be plausible is not a given but rather one of the principal questions to be asked — e.g. 'Bifo' Berardi's entire project unravelled in his *Futurability* is devoted to this precise problem; both Fisher and Greaber make precisely these questions: 'What is possible? What is plausible? How do those two interact?' central to their respective work. Importantly, 'What futures are seen as "plausible"?' is also among the oscillatory questions that help Vervoort and Gupta — a source employed by the AR6 itself — to formulate their own framework for scenario analysis (2018: 107), further reinforcing the point I am making here. Read from that perspective, one cannot simply take the notion of plausibility for granted.

Or can one? The term, it seems, is often used *prima facie* in mainstream science: the expert judgements referred to by Moss et al. are said to concern '*plausible* future emissions based on research into socioeconomic, environmental, and technological trends represented in integrated assessment models' (2010: 748) [my emphasis]. As the reader will perhaps

remember from the opening paragraphs, the IPCC too employs the term. The AR6 positively defines scenarios as 'plausible descriptions of how the future may develop, based on a coherent and internally consistent set of assumptions about key driving forces (e.g., rate of technological change, prices) and relationships (Annex II: Glossary)' (IPCC WGII 2022: 135), which is even more perplexing given how it bases its own use of scenarios on Vervoort and Gupta (2018) who do, as we have seen, problematise the notion of plausibility. To give one more example from the field of sustainability sciences, scenarios are understood 'as coherent and plausible stories, told in words and numbers, about the possible co-evolutionary pathways of combined human and environmental systems' (Swart et al. 2004: 139).

Let us reiterate that plausibility — on any plane not governed by the geophysical laws — must be read not as an absolute term but instead as relative to the framework within which it is formulated. E.g. what was plausible in Ancient Egypt may not be in the neoliberal twenty-first century West. While one way to make this point would be to enumerate various elements of the framework that are operative in the creation of what appears plausible — historical, economical, cultural, sociotechnical, etc. — one could also try to make a more structural, general point, encompassing all these domains. To do so, let me draw on 'Bifo' Berardi's account of morphogenesis from his *Futurability* (2017), in which he distinguishes between emergence and generation:

> Emergence is the surfacing of a concatenation that did not exist before. Generation, in contrast, is the production of forms according to a code. The process of generation is an automated process of morphogenesis, while emergence is the autonomous expression of an unprecedented form ('Bifo' Berardi 2017: 26)

I want to argue that this distinction offers us a language to understand plausibility as dependent on the operative framework of the code — in the IPCC's terms, 'a coherent and internally consistent set of assumptions' — and as such privileging the occurrences of generation over those of emergence. In this context 'Bifo' speaks of a 'paradigmatic capture', i.e. of 'the reduction of the range of possibilities inscribed in the present to a pattern that acts as a formatting gestalt' and proposes that there lies the operation of the 'dominant paradigm' (2017: 17).

In this reading, the very notion of plausibility becomes questionable. We noted earlier in Chapter 4 how, according to 'Bifo', 'future is not prescribed but inscribed' (2017: 164). A similar point can be made using Deleuze and Guattari's analysis of the emergence of the revolutionary potential of desire and the 'new regime' from *Anti-Oedipus* and their vocabulary of a break within the socius and between two forms of socius (2021: 395-396) — something I signal cognizant of the importance Deleuze and Guattari and their thought bear for Fisher, 'Bifo' and Yusoff, although it is one of the many angles I cannot not explore further. To give a less abstract example of how plausibility is relative to the system's (code's) formulations and assumptions using the particular example of climate modelling, let me once more refer to Rubiano's and Carton's work on the (in)justice in climate models (2022). If I allowed myself this lengthy theoretical detour, it was because it was necessary in order to make an important point: the use of the term plausibility in the attempts to define scenarios introduces an ambiguity into the very heart of this definition as used by the IPCC and, a fortiori, climate science. While the plausibility of the material geophysical processes is non-negotiable, the 'social, behavioral, economic, and policy' — to return to Edwards's formulation — is.

Our next example comes from *Speculative Everything*, where the authors Dune and Rabby provide another positive characteristic of

scenarios, basing it on the example of — by now this should come with little surprise — Shell (this name comes up so often that I will henceforth just shorten it out of space considerations). The company used scenarios to explore 'alternative economic and political futures to ensure' that it will be 'prepared for and thrive in a number of different futures' (Dune and Rabby 2013: 4). There is an explicit pragmatic character to this characterisation of scenarios, indeed making them into a 'tool' that can be used instrumentally to achieve particular goals. In Shell's case, according to Dunne and Rabby, this meant 'to ensure that they would survive through a number of large-scale, global, economic, or political shifts' (2013: 4). Let me note here that taking, as its positive example, a company that is widely recognised to be co-responsible for the current climate crisis and global warming and to propose to employ its methods should at the minimum, raise some concern. While not a novel tactic — think of, e.g., Xenofeminism, which advocates for the practice of appropriating and translating of oppressive mechanisms for emancipatory purposes (Laboria Cuboniks 2018) — in the uncritical form exemplified by the authors of *Speculative Everything* it may be welcomed with a scepticism as to its analytical neutrality.

To conclude this section, let us note how scenarios are defined by SYR, which we will return to in Chapter 7. It is worth quoting at length:

> Modelled scenarios and pathways are used to explore future emissions, climate change, related impacts and risks, and possible mitigation and adaptation strategies and are based on a range of assumptions, including socio-economic variables and mitigation options. These are quantitative projections and are neither predictions nor forecasts (SYR 2023: 9).

By now, these formulations will perhaps read as nothing new, neither in their negative nor in their positive formulations. We have seen how they

appear in a variety of modifications across a variety of discursive fields, and we have explored the potential problems they imply. The interesting part is their most immediate continuation:

> Global modelled emission pathways, including those based on cost effective approaches, contain regionally differentiated assumptions and outcomes, and have to be assessed with the careful recognition of these assumptions. Most do not make explicit assumptions about global equity, environmental justice or intra-regional income distribution. IPCC is neutral with regard to the scenarios in the literature assessed in this report, which do not cover all possible futures. (SR 2023: 9)

This claim to neutrality, read against the critical material presented so far, raises some questions. It can also be read against the IPCC's own words: as Rubiano and Carton note, in AR5 the IPCC itself states how 'scenarios tend towards normative, economics-focused descriptions of the future' (IPCC in Rubiano and Carton 2022: 3) — a characterisation barely compatible with the claim to neutrality. As such, this claim is contradictory, reading a bit like a gesture of Pontius Pilate, excusing himself from facing the inevitably politically burdensome role of presenting the scenarios based on normative sets of assumptions. As Garb et al. put it,

> it is important to emphasize that the influence of scenarios is not simply through changes in explicit knowledge and understanding, but also through more implicit shifts in how problems are framed. For example, a scenario storyline casts some aspects of the world as fixed (and implicitly not the objects of policy intervention), and others as variable (Garb et al. 2008: 2).

If more reasons were needed, let me offer this controversial neutrality claim as the final one to motivate my entire project developed here and as yet another rationale to develop the method that I will now proceed to present — hauntological analysis.

6. Hauntology

…they are always there, spectres, even if they do not exist, even if they are no longer, even if they are not yet…

Jacques Derrida

Drawing on Mark Fisher's notion of *hauntology* (Fisher 2014), in this section I will develop it into a method of analysis attuned to the epistemo-onto-temporal modalities operative in the figure of scenarios, modalities which the preceding analysis strived to signal. In following the intuition to draw from the lexicon of cultural studies in order to analyse scenarios — as I have realised only *post factum* — I follow a tendency not uncommon for the investigations of future discourses and imaginaries. For example, to analyse the social performativity of imagined futures, Oomen et al. propose an analytical concept of 'dramaturgical regime' (2021: 254) while in his book titled simply *The Future*, anthropologist Marc Auge pivots his analysis of futurity around the analytical figure of the *plot* [fr. *intrigue*] (Auge 2014). These examples speak to a proposition made by Yusoff and Gabrys, observing that

> imaginative practices from the arts and humanities play a critical role in thinking through our representations of environmental change and offer strategies for developing diverse forms of environmental understanding from scenario building to metaphorical, ethical, and material investigations' (2011: 1)

further justifying the intuition to propose hauntology as a method of analysis operative in this work. The potential scope of application of this approach goes beyond scenarios alone: think, e.g., how the related concepts employed by the IPCC — narratives and storylines — are also borrowed from cultural idiolect.

It bears noting that in the particular case of scenarios, this pull towards the cultural register can be explained, in part, by the very etymology of the word: we have seen how the original meaning of a 'sketch of the plot of a dramatic work' stems from the art discourse and underwent a semantic metamorphosis to also mean *imagined situation* only in the 1960s (Harper 2022) — I have covered this in my brief critical history of the term earlier in Chapter 2. Here, I would like to suggest that the result of this semantic transformation — the passage from the non-scientific language game to a scientific one which nevertheless does not abolish the original register — results in an ambivalence which continues to haunt the figure of scenario all the way down to the present-day. Recall some of the examples we came across earlier: how scenarios are referred to not as proof but as an 'expert *judgement*' or the concerns about the various 'normative and scientific uncertainties and conflicts' they introduce into the discursive fields they become a part of. The proposed method of hauntological analysis is an attempt to unpack the various tensions emergent through this ambivalence.

I have, however, also other motivations to develop hauntology into an analytical tool. Firstly, I intend this work to contribute not only to the human ecology corpus but also to the currently growing body of work inspired by the thought of Mark Fisher. As such, my work attempts to serve as a connective tissue between his predominantly culture-centred critique, environmental humanities and scholars working with the themes of culture, power and sustainability. The central concept around which this endeavour pivots — in this work — is the notion of imagination, which I elaborated on in Chapter 4. It is a project, I believe, with exciting prospects for both the Fisherian and environment-ecological scholarships, something I tried to explore also elsewhere in my comparative study of Mark Fisher and Andreas Malm (Korbański 2022).

Most importantly, however, my reasons are epistemological: a gesture towards hauntology strives to work out an analytical tool from beyond the sphere of what Fisher himself called 'business ontology' (Fisher 2009: 17), in and of itself a symptom of *capitalist realism*. The idea here is to work out, to recall Yusoff's formulation, new grammars, which would — as much as possible — offer new and alternative ways to conceptualise climate futures, ways freed of their neoliberal, managerial, green capitalist luggage (see: Buller 2022). This legacy, I believe, is discernible even on the most immediate linguistic level in a good deal of hegemonic work on scenarios, signalled through a variety of subtle yet telling slips of the tongue — e.g. thinking of the recipients of the scenario-based climate science as 'end users', scenarios as answering a 'demand' or 'meeting targets' (Moss et al. 2010: 750; 751; 752-753). Hauntology postulates recognising — and counteracting — various tendencies to repeat such established patterns. To motivate this point differently, on a plane other than the aesthetic one, I believe that creating non-hegemonic analytical tools must be seen as a pressing task given the close entanglements of scenario thinking and the corporate world we have noted in the preceding chapters while looking at the example of Shell.

There is, then, a need for a critical analytical tool that could answer the challenge posed by the alternative — once more, I am drawing on the critical sensitivity of Yusoff — between a declarative 'cozy, "innocent" universal realism' of scenario thinking and the critical supposition that it may, instead, be a 'structuring device' (2018: 80). This bears repeating especially in the context of what she calls the 'declared innocence of the acts of description' (2018: 81) which are only too easily recognisable in the declarative utterances made by the IPCC and climate science: 'IPCC reports are neutral, policy-relevant but not policy-prescriptive' (IPCC: 2023). To return to a more subject-specific example, is not this 'declared

innocence' what can be discerned in the claim to scenarios' neutrality that we have analysed in the concluding paragraphs of the previous chapter? The problem identified by Yusoff is that it opens the way to replicate political divisions — and, we may add, patterns — while at the same time obscuring them (2018: 80). Expressed in Marxian terms, this could be translated into the vocabulary of ideology critique — providing an additional link to the theoretical background this work is nested in — though I would like to point to yet another expression of this intuition. Namely, I want to refer to the thought of Martin Savransky, who, considering this fissure, underscores what I understand to be an aspect of central importance for human ecology, i.e. the material doings of the discursive formations. 'Stories' he says 'do things',

> they infect our lives and practices, they weave and tear worlds, they shape how they might come to be inhabited. We live and die by the stories we tell. Thus, no story can claim innocence (Savransky 2021: 13).

What, then, is hauntology, and how do I propose to develop it into a method of investigation? The term appears across a number of Fisher's texts, but it receives its most consistent treatment in one of his most well-known essays, 'The Slow Cancellation of the Future', titled after a phrase from Franco 'Bifo' Berardi coined in his *After the Future* (2009). The titular cancellation, for Fisher, is a diagnosis of the cultural inertia of the postmodernity in which the capacity to create novel forms — Fisher uses examples from popular music — has vanished (2014: 9). As such, it is the condition that characterises *capitalist realism* and is the main theme of the opening chapter of his eponymous work (Fisher 2009) — expressed differently, this is another formulation of the 'crisis of imagination' we surveyed in Chapter 4.

The analysis of the 'The Slow Cancellation of the Future', despite the fact that the title may suggest otherwise, is primarily oriented towards the past: the postmodern present remains bound to the repetition of the forms known from the past, explains Fisher, connoting Jameson's notion of 'nostalgia mode', which is 'a formal attachment to the techniques and formulas of the past, a consequence of a retreat from the modernist challenge of innovating cultural forms adequate to contemporary experience' (Fisher 2014: 11). These cultural phenomena are, for Fisher, symptomatic of a more general tendency which is, in its nature, political through and through, and speaks directly to the post-Fordist, neoliberal turn towards globalised capitalism and consumer society (Fisher 2014: 15).

Characteristically of Fisher's style of theorising, he uses the cultural register to make a more general point, basing his analysis in the field of music: if for him 'music culture is in many ways paradigmatic of the fate of culture under post-Fordist capitalism' (2014: 16) then we may add that the fate of culture is paradigmatic of capitalist realism in general. The way he uses the notion of hauntology repeats this double movement of specific and general levels of analysis, which he notes in the conclusion of his essay: 'There is the specific sense', says Fisher, in which hauntology can be 'applied to music culture, and a more general sense, where it refers to persistences, repetitions, prefigurations' (2014: 28).

Hauntology, as Fisher observes, 'explicitly brings into play the question of time' (2014: 18) and serves as a concept allowing Fisher to articulate — and criticise — the temporal interrelations amplified by and characteristic of capitalist realism. He borrows the concept from philosopher Jaques Derrida and his *Specters of Marx* (1994). As Fisher explains, Derrida uses the term to express the idea that 'everything that exists is possible only on the basis of a whole series of absences, which precede and surround it, allowing it to possess such consistency and intelligibility that it does'

(2014: 17-18). Drawing on the work of another philosopher, Martin Hägglund, Fisher observes that hauntology, in contrast to 'the traditional 'ontology' that thinks being in terms of self-identical presence', allows one to think what is not fully present, what 'has no being in itself but marks a relation to what is no longer or not yet' (Hägglund in Fisher 2014: 26). The emphasis, we could say, shifts from thinking about the ossified essence towards thinking about relations, of which, given the characteristics of temporality, there are two, the *no-longer* and *not-yet*. This, in turn, leads Fisher to postulate two types of hauntology:

> The first refers to that which is (in actuality is) *no longer*, but which *remains* effective as a virtuality (the traumatic 'compulsion to repeat', a fatal pattern). The second sense of hauntology refers to that which (in actuality) has *not yet* happened, but which is *already* effective in the virtual (an attractor, an anticipation shaping current behaviour) (2014: 19).

Fisher's essay is primarily interested in the scope delineated by this former type of hauntology, the 'no longer' kind. Unfortunately, an exploration of the entire potential of those two directions lies outside of the scope of this investigation. Since my primary focus in this work is the figure of scenarios, I will privilege exploring the latter type of Fisher's typology, operating in the future modality, the 'not yet'. Apart from that principal reason — as well as from the simple space considerations — the 'not yet' hauntological modality also speaks directly to the concern uncovered by the literature review, epitomised by Oomen et al. and their preoccupation with the performativity of the imagined futures which are *already effective*: 'The future' they say 'is always also influential in the present' (2022: 254). Or to use Fisher's formulation from another essay, the concern with simulated computer models understood as 'fake futures which will never appear but which are *immediately effective, already re-organising space*' (Fisher 2018: 714) [my emphasis]. While exploring

only one type of hauntology ranks among the most significant limitations of this current work, it is at the same time an exciting prospect for further investigation that I plan to take on in my subsequent work.

Returning to Fisher. He seems aware that his framing of the temporal modalities through the vocabulary of *haunting, ghosts* or *spectres* may be somewhat confounding, which he addresses in his text:

> Is hauntology, then, some attempt to revive the supernatural, or is it just a figure of speech? The way out of this unhelpful opposition is to think of hauntology as *the agency of the virtual*, with the spectre understood not as anything supernatural, but as that which acts without (physically) existing (2014: 18).

Hauntology, then, is the approach that is concerned, first and foremost, with the agency of the virtual. In this reading, scenarios are literally that which acts without yet existing. To situate this concern in the broader context of *capitalist realism*, let us note — it is an insight we owe to the Marxian critique of ideology as well as to e.g. 'Bifo' Berardi — that the actual taking place in the present can also be understood as imagined, as an actualised virtuality. Following this line of thought, it seems to me that the key problem diagnosed by Fisher in his thesis on capitalist realism, the key point he tries to articulate, is not only the hegemony of *capitalism* but a failure to recognise that when it passes as *realism* it is because we fail to acknowledge that it, too, is *brought about by imagination*: it is one possibility actualised out of many. The hauntological tension between the virtuality and actuality helps us articulate this point that the traditional ontology of ossified presences renders invisible and hardly utterable.

Let us note here that significant parallels can be drawn between Fisher's account and the concept of quasi-cause (based, in turn, on Deleuze) developed by a philosopher and social theorist Brian Massumi *en cours* his

analysis of the relation between fear and threat in his *Ontopower* (2015). While neither Fisher nor Massumi make the connection to one another explicit — it is rather an undercurrent operating implicitly through their shared Deleuzian commitments — the similarities between their accounts are striking. 'The threat', Massumi says,

> as such is nothing yet — just a looming. It is a form of futurity, yet has the capacity to fill the present without presenting itself. Its future looming casts a present shadow, and that shadow is fear. Threat is *the future cause of a change in the present*. A future cause is not actually a cause; it is a virtual cause, or quasi-cause. Threat is a futurity with a virtual power to affect the present quasi-causally (2005: 175). [my emphasis]

While applied to a different case, and while not using the term hauntology *explicite*, Massumi seems to be offering an example of what can be called hauntological analysis in its 'not yet' variation (compare to Ana Alacovska and Macon Holt, who made me aware of this connection (2023: 8)). Important notions in Massumi's formulation are the *relationality* between the virtual and the actual and the way in which a shadow (a spectre) is cast upon (haunts) the present: crucially, this future cause affects (is performative) in the present, which makes him postulate that:

> Although they are in different tenses, present and future, and in different ontological modes, actual and virtual, fear and threat are of a piece: they are indissociable dimensions of the same event. The event, in its holding both tenses together in its own immediacy, is *transtemporal* (2005: 175-176).

While exploring different phenomena than us, namely fear and threat, Massumi's analysis — analytically and structurally — corresponds to the logic of the hauntological approach.

It is important to note that while constructed by both Fisher and Massumi as an element of their larger critique of neoliberal capitalism, the mechanisms of hauntology are formulated on an ontological plane. It means that while the particular historical moment and the relations of production do shape the particular ways in which the virtualities of the past and of the future affect the present, the very mechanism of such affecting is not in itself characteristic of neoliberal capitalism or of the era of climate collapse. In other words, the hauntological 'agency of the virtual' — or, to return to Savransky's phrase, the power of stories to 'do things' — is, and I use this word very reluctantly, universal. It is, ontologically speaking, inescapable.

It is precisely in this sense that 'the agency of the virtual' can — and indeed, does — become an arena of contestation, a field of a power struggle: it is an unavoidable given, always there, and as such an inherently political phenomenon. What follows is that imagination, too, is an inherently political act: imaginations expressed in the form of scenarios are no exception. This alone suffices to illustrate how the claims to neutrality made by the IPCC in relation to its use of scenarios are contradictory in terms — there are simply no 'neutral' scenarios, and hauntology is (one of the) mechanisms permitting us to dispel this illusion. Moreover, if there is an argument to be made that there are contexts in which the agency of the virtual is of relatively lesser importance, climate science and related climate discourses hardly qualify as one. On the contrary: temporality and futurity being central figures of such discourses make their critical analysis a fundamental task.

Furthermore, the neoliberal, hegemonic bias permeating the models and scenario thinking — criticised in, e.g., the work of Rubiano and Buller and expressed by various other scholars that we referred to earlier in the course of this work — exploits the fact that the past, the present and the future are hauntologically interrelated. To the degree that the traditional ontology speaks to the contrary, it becomes, if perhaps inadvertently, complicit in this exploitation — which makes the need for counter-hegemonic voices the more pressing. In their recent lecture (May 2023) on climate sorrow at the University of Copenhagen, philosopher Judith Butler observed how the individualising tendencies that work against relationality are characteristic of neoliberal ideology of individualism — while not a novel critique, it bears repeating that the phenomena we investigate, culturally speaking, do not happen in a void. One other voice working to denounce such illusions is, of course, Yussof. Another, whom I also keep returning to in this work, is Martin Savransky — the list is of course much longer. My point, however, is that hauntological analysis, while undeniably useful for critical theory with a counter-hegemonic agenda, is not exclusively applicable to this tradition only — the fact that it finds its particular critical use at this very historical juncture is a result of the shortcomings and injustices of this juncture itself. In that, we may say, it resembles Roland Barthes's method of mythology, which too is a formal, ontological method of a structural semiotic analysis that finds its expression and application as a historically specific method of ideology critique (Barthes 1957). But with such observations, we are moving perhaps too far away from the main argument of this work.

To recapitulate. The above discussion should suffice to construct a provisional outline of a definition of hauntological method. Hauntology is an approach that 1) acknowledges and problematises 'the agency of the virtual'. It does so by oscillating between the ontological poles of the

virtual and the actual. 2) It 'explicitly brings into play the question of time' and 'marks a relation to what is no longer or not yet'. It thinks of the present relationally and sees both the past and the future as being of 'one piece' with the present. 3) It introduces the concept of 'quasi-causality' in recognition of the capacity of that which is either 'no longer' or 'not yet' to influence the present (for quotation sources consult the preceding paragraphs).

Taken together, these points constitute a framework of problems that the hauntological analysis will seek to unravel in the discursive artefacts it will analyse. In our case, this artefact is SYR, the IPCC AR6 Synthesis Report — taking the insights from this chapter, I will now use it as an example of how to analyse some of the hauntological aspects of the use of the figure of scenario in climate science. Of course, this analysis must be understood as a very preliminary one, and in need of subsequent expansion through engagement with the relevant segments of the AR6 proper — something that this work cannot undertake at present. Its role here is therefore to signal central key tendencies and open avenues of further investigation.

7. The IPCC AR6 Synthesis Report

…future experiences depend on how we address climate change…

The IPCC

Quoted by the AR6, Theys and Cornu — on whose programmatic invocation we have drawn earlier in our literature review — outline the following task for the critical investigation of present-day environmental and climatic temporalities. Proposing 'that we face a deep crisis of the representation of time,' they call for 'a serious effort of re-conceptualising temporality, as well as for new conceptions of its relationship to society, nature, and politics' (2019). The hermeneutic procedure put forward by the hauntological analysis in the preceding chapter comes towards this demand. In this chapter, I will put it to the test to analyse the use of the figure of scenario in The Synthesis Report (SYR) of the IPCC Sixth Assessment Report (AR6).

What role do scenarios play in the SYR's architecture? Already the document's table of contents can provide us with some clues. There we can learn that The Synthesis Report is divided into three main chapters: SPM.A 'Current Status and Trends', SPM.B 'Future Climate Change, Risks, and Long-Term Responses', and SPM.C 'Responses in the Near Term'. Along these three main parts, one more element is listed — a segment the IPCC calls a 'box' — titled 'Scenarios and Pathways'. That it is singled out here, on par with the three main chapters, suggests that it is considered a principal element of the document's logic and exposition. Importantly, the two terms, as explained in the Report, are treated in the document's idiolect as synonymous: 'in the literature, the terms pathways and scenarios are used interchangeably, with the former more frequently used in relation to climate goals' (SYR: 9). Another point important to note from the perspective of the hauntological analysis is the temporal markers

employed — we come across the temporal modalities of *current*, *future, long-term* and *near-term*. We will soon analyse how these modalities become operational in employing the figure of scenarios in the document.

Already this simple analysis of the formal structure of SYR suggests that scenarios constitute significant elements of the Report. This significance is not, however, equally distributed. To make this point let us observe how the opening pages of the first main part on *Current Status and Trends* — the one which, e.g., unequivocally attributes global warming to human activities — is free of any references to scenario thinking. It is written predominantly in the past tense and refrains from making appeals to the future or from using future tense at all. As such, the topics covered by the subsections of this part — namely, 'Observed Warming and its Causes', 'Observed Changes and Impacts' and 'Current Progress in Adaptation and Gaps and Challenges' — make virtually no use of scenario thinking, focused as they are on the observed phenomena. In the hauntological terms, we could say that they privilege the actual over the virtual. This illustrates how there is a segment of climate science that is articulated without using scenarios, mainly the physical science basis, so the work of Working Group I. While this working group still does use scenarios as a tool to describe the *possible climate futures* (WGI: 15) as a part of its toolbox, this use is far from exhausting the full scope of its agenda. At any rate, the closest this initial part of SYR gets to articulating any future-oriented notion is when it introduces the figure of 'planning' and, in a rare exception, observes, in the future tense, that adaptation gaps 'will continue to grow at current rates of implementation' (SYR: 8).

As far as SYR's architecture is concerned, it is only at that stage that the notion of scenarios is introduced — and with them, the future-oriented part of the report commences, in the Box titled 'The use of scenarios and modelled pathways in the AR6 Synthesis Report'. It is a place from which

I have quoted in Chapter 5 while analysing the way the term is defined in the SYR. The figure of scenario is then present in the final subsection of the first part, titled 'Current Mitigation Progress, Gaps and Challenges'. Those sections further introduce the dates of 2100, 2050, 2070 and 2030 (SYR: 9-10) as reference points for the Report's analysis. One additional future date is privileged in the Report, 2040, distinguishing between two temporalities operative in the document 'the near term is defined as the period until 2040. The long term is defined as the period beyond 2040' (SYR: 3). All of the above dates are selected because they are functional as conventions around which the scenario thinking can coagulate, rather than because there is anything in and of itself distinctive of those dates from the purely scientific perspective — as such, their importance is, first and foremost, discursive.

Is it possible to discern any logic in how the scenarios are operative in the SYR? Hauntology would be interested in identifying the way it maps on the modalities of the actual and virtual. One could suspect that the virtual will correspond to the not-yet modality characteristic of the future, so that it would, in turn, map on the IPCC's own matrix of current (actual) and future, long-term and near-term (virtual modalities). Interestingly, this does not seem to be the case. Instead, the section on the *'current* mitigation progress' [my emphasis] relies heavily on future projections and employs virtual scenario thinking. What logic is operative here, then? It appears that one important dividing line runs between the section on 'adaptation' — not concerned with scenarios or the future — and the section on 'mitigation', in which scenario thinking is prominently present. In hauntological terms, the adaptation section is expressed in the actual mode, while the mitigation is in the virtual one. While pursuing this line of investigation further falls outside of the scope of this investigation — focused on exposing the ontological, epistemological and temporal modalities rather than on explaining them — I note it as one insight that

the hauntological analysis is capable of providing, as such suggesting its usefulness as propaedeutics for further critical work.

As such, to grasp the logic constitutive of the actual and virtual fields operative in the text, the 'current' and 'future' dichotomy does not seem sufficient: we have to look further. One other structuring dichotomy in the text is the division into two types of changes in global surface temperature: 'observed (1900-2020)' and 'projected (2021-2100)' (SYR:8). It clearly corresponds to segments without and with the use of scenarios. On a semantic level, it corresponds to the virtual and actual modalities. Both logics fall back on an underlying *ontological* difference: the observed (actual) is juxtaposed with the projected (virtual) modality.

This dichotomy between the observed and projected is one that receives explicit attention and is actively reproduced in the document at other pivotal moments of SYR's exposition. A central segment where it is employed is an illustration presenting the way 'adverse impacts from human-caused climate change will continue to intensify' (SYR: 7). It is a colour-coded timeline — popularised by e.g. *The Economist* 'Climate Issue' cover from 2019 — with the global temperature change levels corresponding to different shades of colours, ranging from light blue signifying a slight negative change to deep purple signifying a positive 4 degrees Celsius change. The horizontal bar begins in the year 1900 with light blue colours and, as it moves to the right, becomes more and more orange and red. In the year 2020, a vertical line cuts through it — it is a year demarcating the line between the observed and projected modalities of the chart. To the right of this fissure, the time splits into parallel timelines, representing five different future emission scenarios with different projected temperature changes, all continuing towards the 2100, where the chart ends. To mind comes the quote from Bell from the times of infancy of scenarios thinking: 'there is no such entity as the future. There

are many possible futures' (Bell 1970: 264). Underneath the temperature chart, timelines of different exemplary generations are presented, namely those born in the 1950, 1980 and 2020, with their respective average lifespans of 70 years projecting into the future. The headline explains: 'the extent to which current and future generations will experience a hotter and different world depends on choices now and in the near-term' (SYR: 7).

Read through a hauntological lens, this diagram illustrates how the relation between the actual and the virtual is conceived in a one-directional fashion: the choices taken in the present will affect the future. There is no scope for hauntological quasi-agency, no agency of the virtual at play. According to the logic of the IPCC, the actual will affect the for-the-time-being-virtual, and the present will shape the 'not yet': this future depends on the choices taken now.

This temporality has its counterpart in the way the past is conceived: SYR also notes how the past is operative in shaping the present: 'Pathways and opportunities for action are shaped by previous actions (or inactions and opportunities missed) [...] and enabling and constraining conditions' (SYR: 26). The simple, linear model of temporal causality applied in the SYR is at play here as well: the past influences the present through the actual presence of the actual conditions resulting from any actions or inactions. On the hauntological reading, the 'no longer' is active not only through the actual forms it produced, but also through the virtual presence of the traumatic 'compulsion to repeat' we observed earlier with Fisher — these patterns are reproduced on the level of assumptions feeding into the models. This compulsion then reappears operatively in the future scenarios produced by the present and returns as a boomerang to performatively affect this present — this would be a hauntological reading of scenarios as 'pathways', as extrapolations of the known following a given path, a trajectory. To use 'Bifo' Berardi's vocabulary, this point can be

expressed in terms of generation, of the 'the production of forms according to a code' (Berardi 2017: 26).

This logic has its consequences for the way the future is conceived. It should be clear by now that — on the hauntological reading — to simply state, as the IPCC does, that the present actions will shape the future is not the entire story, because, in the quasi-causal manner that the hauntology recognises, these very imaginations of the future actively shape the choices of the present. 'Future experiences depend on how we address climate change' explains the graph (SYR: 7). And yet, nowhere does it problematise the converse idea that the 'not yet' of the future also influences the present. What we end up with is a temporal Möbius strip of sorts where the patterns of no longer of the past inform the present, which, in turn, imagines the future infused with these patterns. Recall here 'a formal attachment to the techniques and formulas of the past' of the Jamesonian nostalgia mode that Fisher connotes when theorising hauntology (2014: 11). The future, then, in turn, haunts the present with those projections which, in effect, lock it up in the smooth flow of the process of generation. It is not hard to see how this circuit — as one amplifying the existing patterns — has a clear political dimension. Through this circular amplification, power is exercised. A counter-hegemonic scenario thinking must attempt to enact a rupture in this circuit, tearing it apart in order for a possibility of, to return to the twin concept employed by 'Bifo', emergence, 'the surfacing of a concatenation that did not exist before' (Bifo), which is only possible if one dismantles the operation of the code. This is not an easy task, perhaps a paradoxical one: it has to challenge the ontology itself.

The current climate collapse is — in the strongest sense — the ultimate example of such dismantling, exposing as it is the many material contradictions of the system that brought it about. The greatest paradox of

this collapse is that the system refuses to recognise the fact that its code is being dismantled in this unprecedented manner and continues to believe instead — a form of 'cruel optimism', to borrow from cultural theorist Lauren Berlant (2011) — that it can still rely on this very code to address the collapse, by simply inscribing the collapse into its own logic as an additional axiom (compare to Deleuze and Guattari 2021: 271-301). This is the logic operative in the 'green capitalism' thesis (Buller 2013). This miscomprehension — operative in its temporal modality through the figure of scenario in the climate science of the IPCC — is a tragic one. Unless attended to and corrected, it will cost us all a livable planet.

These remarks bring us to a concrete, historico-political plane, through which this ontological mechanism is expressed today. To the particular way scenarios are constructed and formulated, fed as they are by the assumptions of 'econometrics' (compare to political theorist Timothy P. Mitchell 2014) privileged by the current, neo-liberal configuration of globalised capitalism. As the IPCC says 'Around half of all modelled global emission pathways assume cost-effective approaches that rely on least-cost mitigation/abatement options globally. The other half looks at existing policies and regionally and sectorally differentiated actions' (SYR: 9). And indeed, this presence of a foreign body of the economics in climate science, leading to something approaching a personality split, is clearly discernible in between the lines of the Report. That the same text that, on the one hand, informs how e.g. the projected sea level rise is in the range of 2-6 metres (SYR: 19) should simultaneously worry that 'ambitious mitigation pathways' will imply 'large and sometimes disruptive changes in economic structure, with significant distributional consequences, within and between countries (SYR: 33) is a piece of telling evidence of how much this split is operative in the climate science discourse. As such, the pathways and scenarios used by climate science, embedded with the assumptions privileging economic over environmental concerns, cannot be read as

‘innocent’ stories (Savransky); they cannot claim the position of ‘cozy, “innocent” universal realism’ to return to Yusoff formulation (2018: 80). This innocence is doubly absent: ontologically, through the hauntological structures governing the processes of futuring through scenarios, and historically, through a particular expression they find under present-day late-capitalism.

Hauntological analysis allows for a recalibration of the lens with which to read SYR and its use of the figure of scenarios. It is not focused on considering the differences between the content of the particular scenarios considered by the report, nor it is interested in framing them in terms of utopia or dystopia. Instead, it allows us to examine the often implicit assumptions that underlie the use of the scenarios in the first place, alongside exposing the ontological, epistemological and temporal logics operative in their use. Those mechanisms, in turn, operative in concrete historical circumstances, can be further analysed in terms of how they are always also more than mere structural relations, formed as they are under a late-capitalist regime, which infuses them with its own specific meanings and employs them to its own specific aims — but this, again, is a subject for another project…

8. Conclusion

…let us finally imagine, for a change…

Karl Marx

The time has come to tie all the loose ends and conclude my investigation. I have commenced these pages by noting how my investigation was born out of a certain amazement, which I was at the time unable to clearly articulate, in confirmation of Roland Barthes's dictum that 'the incapacity to name is a good symptom of disturbance' (2000: 51). As a way of addressing it, I have posed three questions of investigation that this work set out to answer: *What are scenarios? How do they work? Why are they used?* Let me now conclude by answering them in turn.

What are scenarios? The title of this work — 'Exploring the Future in a What-if Mode' — is taken directly from the IPCC phrasing. It is a way in which the IPCC defines scenarios and tries to capture the way it understands the way they are operative. As my analysis tried to illustrate, there seems to be a twofold problem with this characterisation: scenarios are not only exploring, and not only the future. The insights from the critical imaginary studies and from the hauntological analysis insist on understanding scenarios as examples of a practice of imagination which is operative in the present — in this, I share the conclusions expressed also by the critical scholarship on climate scenarios. Rather than understanding them according to the definition provided by the IPCC as 'plausible descriptions of how the future may develop', I would characterise them *as a specific form of imagination: structuring, non-innocent, future-oriented stories which virtually affect the present quasi-casually*. I have noted how plausibility is itself a structuring concept depending on the context of its use. Calling scenarios descriptions does not capture their operative character — non-innocent stories seem a more accurate choice

here. And while indeed concerned with the future, because they do not simply describe it, they are rather future-oriented and these future visions always bear the hauntological power to affect the present quasi-causally. They are not just accounts of how this future 'may develop' — they are a part of this development.

How do they work? I have noted how scenarios can be analysed on two levels — respectively, epistemo-onto-temporal and the concrete historico-political. The answer to my second question can be found in the former. The hauntological account tried to spell the structural relations between the modalities of lingering not yet, the present, and the already effective yet to come. With 'Bifo' Berardi we were able to formulate the manner in which the generation is a production of forms according to a code — to the degree that scenarios are hauntological in their nature, they display an ontological tendency towards the perpetuation of the code. Scenarios in their future prefigurations work in a manner intertemporally linking those modalities, something that I tried to illustrate with the figure of Möbius strip. While it is true that, as IPCC wants, 'the extent to which current and future generations will experience a hotter and different world depends on choices now and in the near-term', it has to be observed how those choices, in turn, depend on the imaginations of the future that scenarios offer — along with the assumptions they make, the patterns they repeat, and the ways they distinguish between what is deemed fixed and what is variable.

Why are they used? With these final remarks on the way scenarios work — on a structural level — we smoothly segue into our final question and with it, into the historico-political aspect of this investigation. Since the definition of scenarios I propose understands them as examples of imagination, and since imagination is inherently political, this final question inevitably enters this sphere. The cosy, innocent, declarative

universal realism of their predictions is simply untenable on hauntological reading. From their roots in the military-industrial complex futurology projects, through their historical closely knit ties with the corporate world — not least with fossil capital — scenarios are pragmatic tools, 'tools of influence' which allow for means for controlling the unforeseeable (*vide* econmentality), they are — to quote from philosopher and writer Georges Bataille's *Accursed Share* — providing the 'conditions of security'. For, as he reminds us, 'A capitalist speculation requires a rigorously established order, where it is possible to see ahead of one' (Bataille 2019: 156). Climate collapse — if anything — is the complete undoing of such order, the order that currently makes capitalist realism. In the final analysis, scenarios are perhaps trying to enable precisely that: to enable seeing ahead, to secure order that disappears as we speak. 'As for the future' — says the quote picked by the IPCC from Antoine de Saint-Exupéry's *Citadelle* as its motto — 'your task is not to foresee it, but to enable it'.

Emerging from this critique seems to be a task of critical scenario building — one nested outside the dominant structures of business ontology and capitalist realism — which would be to undo the illusions of its hegemonic counterpart, taking into account scenarios' epistemo-onto-temporal and the historico-political characteristics. Only seemingly it is a novel task. To invoke Marx one last time, he encouraged, in the same chapter on the commodity form we have consulted prior: 'let us finally imagine, for a change, an association of free men, working with the means of production, held in common' (Marx 1990: 171). And, structurally, that is what the hauntological scenario thinking must strive for, too. Not 'to enable the future', but 'to imagine, for a change'.

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