Remember the Future

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Fig. 1: *Blue Marble*, Apollo 17's photograph of the Earth (original rotation).

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Climate Communication, Futures Design, Speculative Design, Extrapolative Scenario, Narrative Framework, Strategic Foresight, Research-based Storytelling

Abstract

If global heating spirals out of control, human civilization will not survive[1] — resulting in three-quarters of young people worldwide being frightened about the future.[2] Despite the alarming situation, there is room for hope: All the solutions we need to stabilize the climate are already in our hands — but we need to implement them rapidly.[3] To motivate (young) people to fight for a liveable future, this project shows them how humanity will have accomplished it:

In 2073, a climate activist looks back on crucial points in history and tells her story of how we achieved humanity's biggest challenge.

Remember the Future is an interview-like short film discovering the power of uplifting narratives within climate communication — translating scientific evidence into a storytelling framework set in a possible near future. Drawing on the history of speculative design, ecotopianism, and creative communication, this project combines narrative worldbuilding with strategic approaches — to set a vision for the *decisive* generation to work towards.

1 cf. Rich 2018
2 cf. Hickman et al. 2021 (p. 863)
3 cf. IPCC 2023 (AR6 SYR SPM p. 25, p. 30)

1 Introduction

Background and Motivation

The year I was born, the global community signed the Kyoto Protocol on greenhouse gas reduction. Since my childhood, I am interested in environmental protection, and as a result, switched to a vegetarian diet as a teenager. I wrote my first pre-scientific paper on climate change and protested at the People's Climate March for a systematic transition to renewable energy.

A year later, the Paris Agreement was signed, which currently, only one country in the world complies with.[4] I started my studies when Greta Thunberg started her school strikes for the climate. Despite being concerned with climate change, it wasn't until Thunberg's activism and an article in the NYT Magazine that I realized the full scope: Humanity isn't heading for a little less snow. It's heading for its own destruction. After years of side notes in the news about abstract climate goals not being met and a few more thunderstorms as a consequence, it suddenly became clear that climate change has become irreversible — all we can do now: prevent catastrophe. I ramped up my activism, protested at global climate strikes, volunteered with the Austrian Climate Popular Petition, and joined an international climate NGO.

Ironically, I study what fossil fuel companies have used for decades to spread lies, torpedo progress, and push humanity to the brink of extinction: creative communication. Consequently, I use what helped them wreck civilization for the joint effort trying to save it: foresight, strategy, and narrative worldbuilding. But this time, sparking hope.

4 Kottasová 2021

Change is coming, whether you like it or not.[5]

— Greta Thunberg

5 Thunberg 2019 (TC 4:19)

2

Research

2.1 Climate Change

2.1.1 Greenhouse Earth

ppm Parts per million

GHG Greenhouse gas(es)

For 800,000 years, carbon dioxide concentrations in the Earth's atmosphere have never exceeded 300 ppm.[6] For comparison, the modern human is around 200,000 years old, and the Neolithic Revolution (agriculture) took place around 10,000 BCE.[7] In 2022, we were at 417 ppm, the highest concentration in approximately 3 million years.[8] Greenhouse gases trap radiation inside the Earth's atmosphere, heating the planet significantly if not in equilibrium.[9] Carbon dioxide is the most important contributing GHG to climate change because of its sheer amount, longevity, and the challenges it presents to lower its anthropogenic emissions.[10]

2.1.2 Global Heating

Temperature GMST (Global Mean Surface Temperature) compared to the pre-industrial era.

Since the industrial revolution, human activities have caused the global surface temperature to rise by 1.1 °C.[11] While burning fossil fuels is the main factor, other unsustainable practices like deforestation, large-scale animal agriculture and some industrial processes have vastly contributed. "Global greenhouse gas emissions have continued to increase, with unequal historical and ongoing contributions arising from unsustainable energy use, land use and land-use change, lifestyles and patterns of consumption and production across regions, between and within countries, and among individuals […]."[12]

2.1.3 Consequences

The following is a simplified summary of the extensively corresponding consequences for humans. It aims to provide an insight and does not accurately represent the degree of complexity.

Climate change is already affecting many extreme events in every region worldwide.[13] Rising temperatures and interconnected shifts like ocean heating, loss of ice mass, and sea level rise lead to high-impact events like heatwaves, fires, droughts, floodings, coastal erosion, and more severe extreme weather events.[14]

These complications have massive consequences for life on Earth as a whole, including humans. Higher temperatures impact major health issues directly and indirectly. Droughts and biodiversity loss lead to water scarcity and food insecurity. Extreme weather and rising sea levels cause damaged infrastructure and — combined with food insecurity — displacement. Altogether, these effects force poverty and inequality to rise, increasing the risk of conflict.[15]

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6 cf. NOAA 2023
7 cf. Mellanby, Crawford, and Gray 2023
8 cf. NOAA 2023
9 IPCC 2022 (SR1.5 pp. 550-551)
10 Chandler 2020
11 cf. IPCC 2023 (AR6 SYR LR p. 6)
12 IPCC 2023 (AR6 SYR SPM p. 4)
13 cf. ibid. (p. 6)
14 cf. WMO 2023
15 cf. ibid.

2.2 Climate Catastrophe

2.2.1 Warming Scenarios (until 2100)

At two degrees more, the world's tropical reefs go extinct, the sea level rises several meters, and the Persian Gulf is abandoned. Plus three degrees results in forests in the Arctic and the loss of the majority of coastal cities. Four degrees means Europe is in permanent drought, large areas of China, India, and Bangladesh are deserts, the US Southwest is predominantly uninhabitable, and the sea has eradicated Polynesia.[16] "The prospect of a five-degree warming has prompted some of the world's leading climate scientists to warn of the end of human civilization."[17]

With current measures, global heating is headed for +3.2° by 2100 and is set to continue beyond this century.[18]

2.2.2 Scope

David Attenborough refers to climate change as the "biggest threat modern humans have ever faced."[19] The current UN Secretary-General António Guterres alerts: "Half of humanity is in the danger zone from floods, droughts, extreme storms, and wildfires."[20] Naomi Klein warns that these catastrophes should be seen as "a civilizational wake-up call."[21] Late astrophysicist Stephen Hawking identifies two problems as the biggest threat to life on Earth: A collision with an asteroid — and the climate crisis. The climate, of course, being far more urgent. Reaching tipping points could, as he analyzes, over time lead to temperatures like on Venus: more than 250 °C, with sulfuric acid rain.[22]

2.2.3 Tipping Points

What makes the climate crisis the most critical issue of our time is its potential for escalation. Interconnected and self-reinforcing so-called tipping elements within the Earth's climate system could initiate extreme global heating — for centuries to come. Sixteen of these regulate the entire climate system on Earth.[23]

Nine are already showing signs of instability — four of these are at risk at 1.5 °C global heating. Once triggered, they shift to undermining human life on the planet. For instance, the collapse of both the Greenland and West Antarctic ice sheets would result in 10 meters of sea level rise. There is scientific evidence of interconnectivity between such tipping elements, starting a domino effect far beyond human control.[24]

The ensuing consequences, like mass extinction, air pollution, and failing ecosystem functions, would position humanity's future at severe risk. In his keynote at the 2023 World Economic Forum, Johan Rockström, Director of the Potsdam Institute for Climate Impact Research, argues that this evidence demonstrates that 1.5 °C is a physical limit, not a political target.[25]

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16 cf. Rich 2018
17 ibid.
18 cf. IPCC 2023 (AR6 SYR SPM p. 7, p. 23)
19 UN 2021
20 Harvey 2022
21 Klein 2014 (p. 25)
22 Hawking 2020 (pp.172–173, p. 188)
23 cf. Rockström and Gupta 2023
24 cf. ibid.
25 cf. ibid.

2.2.4 Climate Science and Blocked Progress

Climate science dates back to the 19th century when Joseph Fourier modeled the greenhouse effect, and Eunice Foote discovered the greenhouse gases responsible for it.[26] About carbon dioxide, she concluded that "an atmosphere of that gas would give to our earth a high temperature; […]"[27] Her research did not find great acclaim within (the usually male-dominated) scientific organizations.[28]

In the 1950s, it was widely established within the scientific community that carbon dioxide causes global heating, leading to the first World Climate Conference in 1979 in Geneva.[29] Significant opportunities to reduce GHG emissions in the 20th century have been missed, notably (also) due to fake news PR by fossil fuel corporations. When NASA scientist James Hansen told the US Congress about climate change in the late 1980s, Exxon ramped up its misinformation campaign, questioning the scientific base of climate change. This propaganda machinery prevented the United States, China, and India from ratifying the Kyoto Protocol in the late 1990s.[30] The first COP under the UNFCCC was held 1995 in Berlin.[31]

COP Conference of the Parties ("World Climate Conference")

UNFCCC United Nations Framework Convention on Climate Change

2.2.5 Injustice

"Vulnerable communities who have historically contributed the least to current climate change are disproportionately affected […]."[32] More than three billion people live in areas highly vulnerable to climate change. The caused damage to ecosystems drives local species loss and food and water insecurity — primarily affecting marginalized and indigenous communities in the global south. In urban areas, economically and socially marginalized people face severe impacts on health, livelihoods, and infrastructure due to the rapidly changing climate.[33]

2.2.6 Urgency

Most of the dangerous tipping points would be reached between 1.5 and 2 °C, so it is vital to stay below 1.5°.[34] Taking into account that the Earth's surface temperature has already increased by 1.1 °C, the window of opportunity is closing rapidly.[35] If current emission trends continue, the remaining carbon budget will be used up in about six years.[36]

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26 cf. Easterbrook 2017, Huddleston 2019
27 Huddleston 2019
28 cf. ibid.
29 cf. Milman 2023, WMO 1979
30 cf. Hall 2015
31 cf. UNFCCC 1995 (p. 1)
32 IPCC 2023 (AR6 SYR LR p. 6)
33 cf. IPCC 2023 (AR6 SYR p. 66) (AR6 SYR SPM pp. 5–6)
34 cf. IPCC 2022 (SR1.5 p. 279)
35 cf. UN 2022
36 cf. MCC 2023

2.3 Solutions

2.3.1 Identifying Potential

UNEP UN Environment Programme
IEA International Energy Agency

The IPCC, UNEP, IEA, and others identify sectors in order to target mitigation potential and efforts. The sector separation is similar, yet has differences. Finance, for instance, is an important factor woven into other scopes by UNEP, while being targeted directly in a paper lead by Christiana Figueres, leading architect of the 2015 Paris Agreement.[37]

2.3.2 IEA Pathway[38]

The International Energy Agency provides a pathway to the 1.5 °C goal based on four pillars — noting that their focus lies on energy transition measures. This is an excerpt and does not mention all of the detailed information:

CCS Carbon Capture and Storage (technology, not yet efficient)
CDR Carbon Dioxide Removal (includes nature-based solutions)

- Energy: Decarbonizing electricity by tripling renewables until 2030 (from 2022 levels); accelerating energy efficiency and electrification (i.e., low-carbon transport)
- Forests: Reducing deforestation to net zero by 2030
- Beyond CO_2: Reducing methane emissions (i.e., from agriculture)
- CCS & CDR: 1.2 Gt of CO_2 by 2030

2.3.3 Table of Solutions[39]

IPCC Intergovernmental Panel on Climate Change

The climate organization Project Drawdown provides a detailed list of already available solutions and their prospective contribution to staying below +1.5 °C. It aligns with the IPCC's key findings, breaks the mitigation options into smaller, accessible parts, and delivers information to stakeholders interested in implementing them. The table identifies the following as the seven most impactful options for achieving the 1.5°-goal:

- Onshore Wind Turbines
- Utility-Scale Solar Photovoltaics
- Plant-Rich Diets
- Reduced Food Waste
- Tropical Forest Restoration
- Clean Cooking
- Family Planning and Education

37 cf. Figueres et al. 2017 (pp. 593–595), UN Environment Programme 2020
38 cf. IEA 2023 (p. 3)
39 cf. Project Drawdown 2020

2.3.4 IPCC Mitigation Options[40]

The IPCC provides a detailed list of concrete options for the near future, showcasing their potential contribution to net emission reduction. In conclusion, these are the seven most effective actions, in the order of the most significant positive impact:

Mitigation Efforts to limit global heating

- Solar and wind power
- Reduce conversion of natural ecosystems (i.e., stop deforestation)
- Carbon storage in agriculture (i.e., soil management, agroforestry)
- Ecosystem restoration (i.e., reforestation, wetlands)
- Fuel switching (i.e., electricity, hydrogen)
- Shift to sustainable healthy diets (i.e., plant-based)
- Reduce methane from fossil production

Carbon capture technologies have the least potential, with the highest initial costs. It is important to note that many actions are interconnected. For example, plant-based diets require less land and, therefore, less deforestation.

In a recent study, researchers present evidence on how the restoration and conservation of wild animals and their ecosystem roles are key to natural climate solutions.[41] In accordance with IPCC findings, nature-based solutions are an essential mitigation factor.

2.3.5 Conclusion

The science is clear: We have all the necessary technologies we need. We "just" lack the political will for action, speaking in Stephen Hawking's words.[42] A renowned climate writer sums up: "The most urgent problem is getting politicians and business to quickly scale up the technologies we already have in order to make immediate emissions cuts and keep global warming from spiraling out of control."[43]

The IPCC concludes in its AR6 Synthesis Report: "There is a rapidly closing window of opportunity to secure a liveable and sustainable future for all […].[44] […] The choices and actions implemented in this decade will have impacts now and for thousands of years […]."[45]

AR6 Sixth Assessment Report

SYR Synthesis Report (summary)

40 cf. IPCC 2023 (AR6 SYR LR p. 69)
41 cf. Schmitz et al. 2023 (p. 324)
42 cf. de la Garza 2022, Hawking 2020 (p. 173)
43 de la Garza 2022
44 IPCC 2023 (AR6 SYR LR p. 53)
45 IPCC 2023 (AR6 SYR SPM p. 25)

a) **Feasibility of climate responses and adaptation, and potential of mitigation options in the near-term**

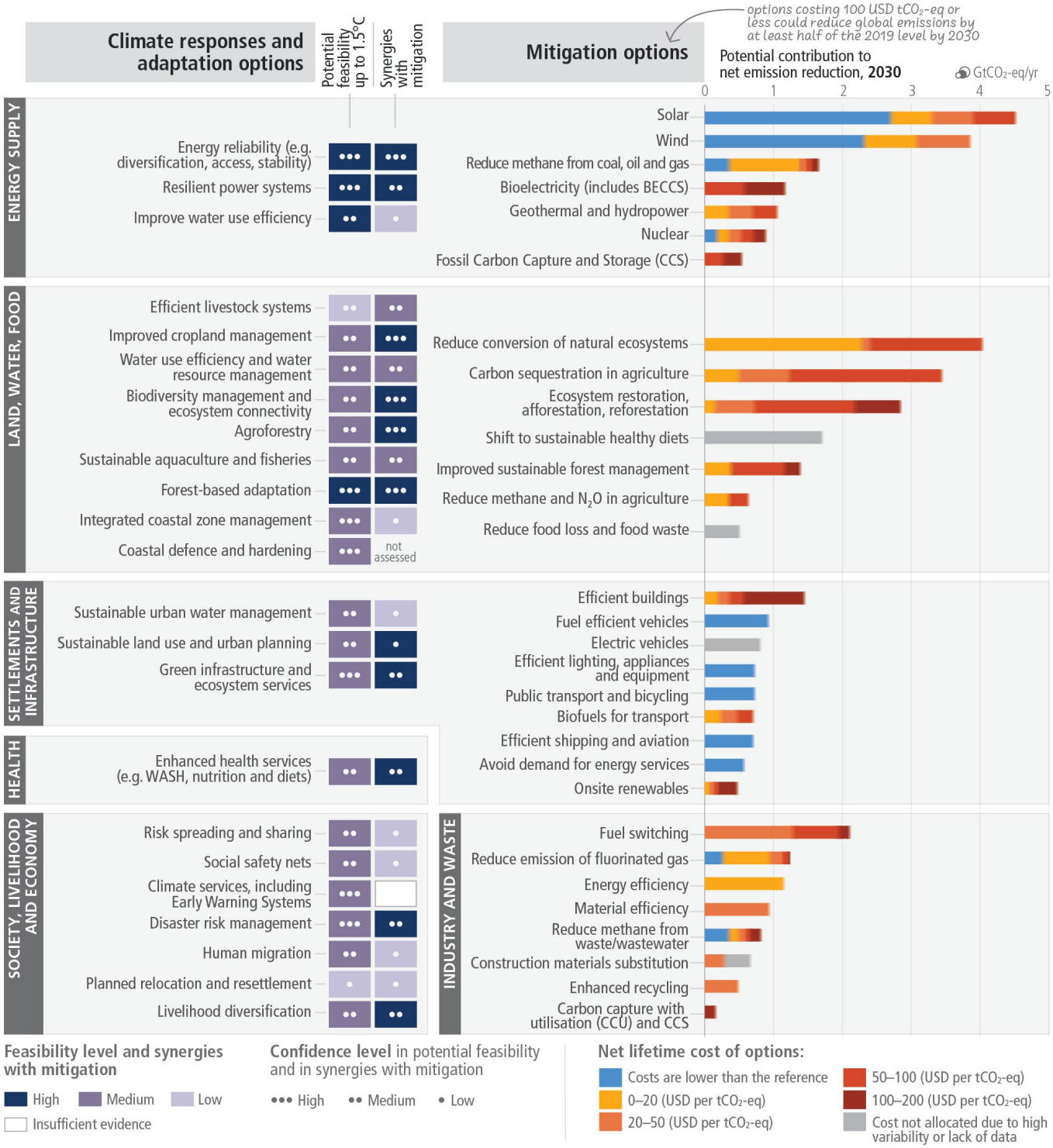

Fig. 2: Climate change mitigation options for the near term, provided by the IPCC. Excerpt a) of the SPM.7 figure published in the AR6 SYR.

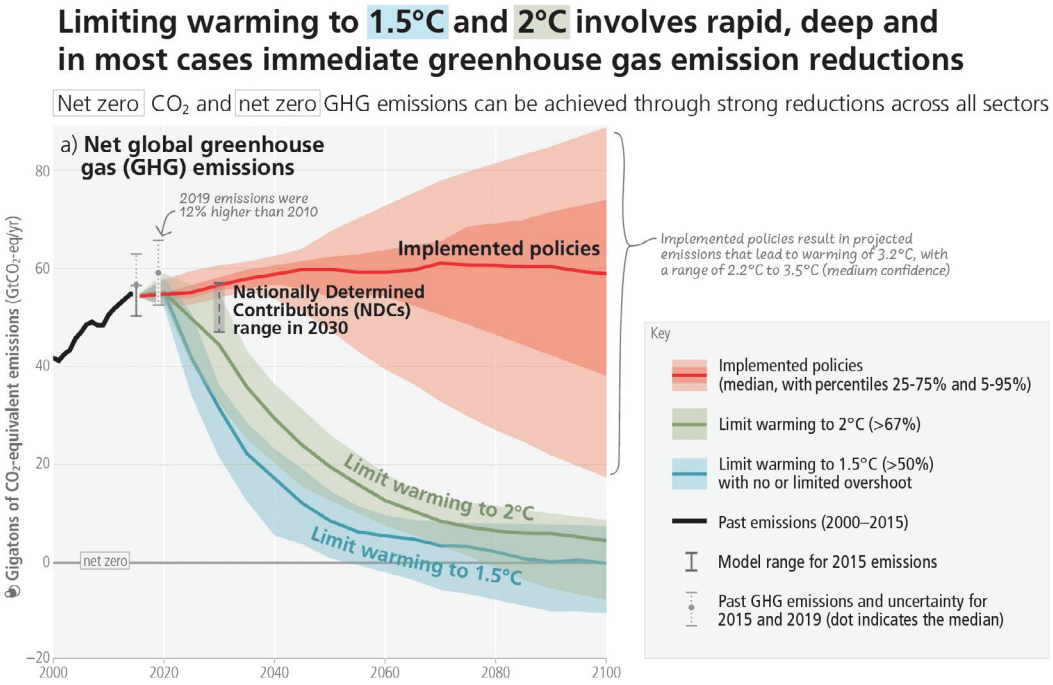

Fig. 3: GHG reduction pathways (global) provided by the IPCC.
Excerpt a) of the SPM.5 figure published in the AR6 SYR.

2.4 Social Change

Political action and social change are deeply interconnected. Throughout history, there is evidence of how minority groups within a population influence and transform society. There is a difference in numbers and intensity, on which the following investigation elaborates.

2.4.1 3.5 percent Active Engagement

Nonviolent protests are particularly effective: "[Erica] Chenoweth and [Maria J.] Stephan collected data on all violent and nonviolent campaigns from 1900 to 2006 that resulted in the overthrow of a government or in territorial liberation."[46] Their research exemplifies that if nonviolent protests achieve a threshold of 3.5 percent of people engaging actively in a movement, success is highly likely and even seems guaranteed.[47] "Countries in which there were nonviolent campaigns were about ten times likelier to transition to democracies within a five-year period compared to countries in which there were violent campaigns — whether the campaigns succeeded or failed,"[48] according to the co-author of the study, Chenoweth. Because even if some of the campaigns proved unsuccessful in the short term, the nonviolent campaigns tended to encourage moderates or reformers within the ruling system to initiate changes and liberalize the nation gradually.[49]

Scholar Isabel Bramsen concludes that the key to success remains nonviolence: "It's [now] an established truth within the field that the nonviolent approaches are much more likely to succeed than violent ones."[50]

3.5 percent applied to absolute terms means a large number of people. Applied to the United States, "it would be around eleven-and-a-half million people today." Chenoweth describes this figure as "three times the size of the 2017 Women's March."[51] Furthermore, it would need mass noncooperation (between protestors and the elite) retained for nine to eighteen months.[52]

It is significant to remark that the research conducted by Chenoweth and Stephan studies revolutionary campaigns successfully overthrowing governments. As Kyle R. Matthew argues, these principles cannot be applied the same way to protests in the context of liberal democracies because the data overwhelmingly draws from circumstances in autocratic regimes and military forces as occupants.[53]

46 Nicholasen 2019 (a)
47 cf. ibid.
48 ibid.
49 cf. ibid.
50 Robson 2019
51 Nicholasen 2019 (a)
52 ibid.
53 cf. Matthews 2020 (p. 591)

2.4.2 Critical Mass

Research studying social change reveals that there is, in fact, a threshold within a social setting. Once a minority group reaches the critical mass of 25 percent, the behavior of the rest of the community changes rapidly and significantly.[54] The head of the study, Damon Centola, concludes: "Activist groups at or above 25 percent were able to change the social norms in their communities."[55]

The discoveries apply particularly to social media, online settings, and social groups like workplaces. In the real world, "a committed group of individuals who reaches the tipping point can effectively change the culture of an entire organization."[56]

On another note, authoritarian governments and organizations can utilize this tipping point dynamic to control people. As an example, employees of a non-democratic government use fake accounts on social media platforms and influence the opinions and behaviors of online discussion groups in a coordinated effort.[57]

The potential of shifting social conventions also applies to bullying in chatrooms or the style of political dialogue.[58] "If a critical mass of people engage in uncivil or aggressive behavior in these social settings, and the tipping point is reached, then others will adopt it, too […]."[59]

2.4.3 Strategic Approaches

While social media platforms are beneficial in mobilizing immense crowds of people in a short amount of time, numbers alone do not lead to success, as Chenoweth, the co-author of the groundbreaking study on civil resistance, refers to sociologist Zeynep Turfecki in an interview.

Chenoweth argues that strategy is critical when it comes to creating social change. Effective nonviolent campaigns often require years of preparation. For instance, when the anti-apartheid movement in South Africa organized a total boycott of white businesses, they needed enough stockpiled essentials to keep the embargo active for months.[60]

2.4.4 Changing Paradigms

> *"So how do you change paradigms? Thomas Kuhn, who wrote the seminal book about the great paradigm shifts of science, has a lot to say about that. In a nutshell, you keep pointing at the anomalies and failures in the old paradigm, you keep speaking louder and with assurance from the new one, you insert people with the new paradigm in places of public visibility and power. You don't waste time with reactionaries; rather you work with active change agents and with the vast middle ground of people who are open-minded."* [61]

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54 cf. Centola et al. 2018 (p. 1116)
55 Centola 2019
56 ibid.
57 cf. ibid.
58 cf. ibid.
59 ibid.
60 cf. Nicholasen 2019 (a), Nicholasen 2019 (b)
61 Meadows 1999 (p.18)

2.5 Accelerating Social Change

2.5.1 Social Tipping Points

PIK Potsdam Institute for Climate Impact Research

In 2020, a team of leading interdisciplinary scientists researched the Social Tipping Points associated with accelerating favorable change within societies regarding the climate crisis. PIK identifies six Social Tipping Elements (STE) potentially triggered by corresponding Social Tipping Interventions (STI).[62]

2.5.2 Energy

The authors define the critical threshold for the social tipping element of energy production and storage systems (STE1) as “The price of fossil-fuel-free energy becoming lower than the price of fossil-fuel energy”.[63]

This particular tipping point has already been crossed: In the early 2020s, renewable power turned out to undercut the prices of any other fossil alternative. At the same time, solar became the cheapest form of energy ever.[64]

The International Energy Agency projects that emissions of fossil fuel energy will peak in 2025.[65] Solar capacities are expected to grow rapidly within just a few years, becoming the dominant energy source on the globe by 2027.[66] Taking into account that the IEA has a track record of underestimating the unprecedented growth of renewables, these milestones might be reached even earlier.[67]

62 cf. Otto et al. 2020 (p. 2359)
63 ibid. (p. 2358)
64 cf. IRENA 2021 (p. 4), Kurmelovs 2021
65 cf. IEA 2022 (p. 21)
66 cf. McCormick 2023
67 cf. Kurmelovs 2021

2.5.3 **Prospect**

It would take about ten years for Social Tipping Element 2 (Human settlements) to be tipped by CO_2-neutral cities. In contrast, a divestment movement could trigger element 3 (Financial market) within just a few hours, undermining the profitability of fossil fuel exploitation.

The most difficult components to move are elements 4 (Norms and value systems), with an estimated three to four decades, and 5 (Education system), which would take about 10–20 years. STE4 is reached when fossil fuels are commonly considered immoral. STE5 can contribute significantly: Education gradually promotes awareness of climate protection and the consequences of global heating. Issue 6 (information feedback), in turn, could be overturned in a few years based on the number of institutions that disclose their emissions.

It is important to note that positive, mutually reinforcing feedback loops exist beyond STE4 and STE5. The financial market influences energy production, while energy supply affects cities and settlements. Furthermore, information transparency can drive the financial market.

Although governments naturally have the most paramount influence and responsibility for leadership, other actors can work significantly towards social tipping interventions: Citizens and communities can contribute to a decentralized energy supply (STI1.2). Teachers and schools can work towards a climate-smart education (STI5.1). Financial investors can divest from fossil fuel corporations (STI3.1), and companies can promote emission transparency (STI6.1).[68]

68 cf. Otto et al. 2020 (pp. 2359–2362)

2.6 Speculative Design

Speculative design is an approach to "not only create things but ideas."[69] It imagines possible scenarios beyond traditional forecasting — not aiming to predict the future but to provoke debate and discussion about what kind of future is desirable.

The field was defined by the practice of Anthony Dunne and Fiona Raby. It is grounded in critical thinking, explores moral and societal implications of different tools, technologies, and developments — and draws from theory, philosophy, futurology, and various art forms, including literary fiction. Speculative design examples include immersive installations, concept products, and narrative methods. Some are hypothetical, while others are prototypes or tangible data translations.[70]

This design approach can be crucial in considering forthcoming consequences, especially in an increasingly complex and uncertain world.

In an essay, the internationally renowned speculative designer and futurist Anab Jain pleads for radical, new ways of designing in light of the climate crisis and the hegemonic extractivist structures, usually neglecting indigenous wisdom and alternative concepts of community and care. There are no easy fixes for complex problems in this era of unprecedented interconnectivity — emphasizing the need to think beyond the existing paradigms of top-down design practices.[71]

2.6.1 Speculative Evidence

Anab Jain argues that a "drive for data as evidence has led to the unshakeable belief that data *is* evidence."[72] She questions how data is generated, the generator's and interpreter's biases, and why often nothing is being done despite a lot of available information.[73]

Translating data into experiences, visuals, or tangible objects can help close the gap between knowledge and action — and deliver critical understandings for decision-makers. In many cases, "speculative, yet concrete forms of evidence have become powerful catalysts for directly informing energy policy, product innovation, and new business models."[74]

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69 Dunne and Raby 2013 (p. U1)
70 cf. Dunne and Raby 2013 (p. 11–34)
71 Jain 2023
72 Jain 2017
73 cf. ibid.
74 ibid.

2.7 Communication Problem

Based on the harsh facts, the urgency of the crisis, and the significant number of accessible solutions, we should already be in the midst of a profound socio-economic transformation. But that is not the case.

Baseline

Global North "Developed" regions, formerly addressed as "First World Countries" (mainly in the Northern Hemisphere)

Global South "Developing" (often exploited) regions, formerly addressed as "Second/Third World Countries" (mainly in the Southern Hemisphere)

While the Most Affected People have already necessarily taken action with adaptation measures in many places — given the dramatic situation, too little is still happening, especially in the Global North. The Global North is much more responsible for the climate crisis, while at the same time, the consequences are far less severe compared to regions of the Global South.[75]

Global Climate Justice & Responsibility

There are reasons why economically strong countries must lead the way in climate action: First, they have caused most of the crisis and are thus primarily responsible (Moral-Legal Dimension). Second, as a result, they can have the most significant impact (Effective Dimension). Third, high-income countries have the resources to make the change fast, sustainable, and socially just (Practical Dimension).

Climate Communication

For decades, the dramatic facts about the climate crisis were hardly communicated to the broader public, and further information was not accessible adequately. Since the catastrophic effects became noticeable worldwide, this has changed, but the focus rests on the shocking consequences due to psychological and media biases ("Bad News are Good News").[76]

Neuroscience Insights

A look into neuroscience provides a possible explanation for why people do not act accordingly despite (or even because of) the overwhelming truth: When a human individual is confronted with stress, the prefrontal cortex, which is responsible for cognitive thinking and decision-making, shuts down. This part of the brain, in fact, requires the most energy in relation to its mass. Critical reflection and deeper thinking are consequently blocked — the brain switches to a default mode that was evolutionarily advantageous for human survival.[77]

Meta-silence

Eviatar Zerubavel identifies a psychological phenomenon driven by human biases: Meta-silence. Humans do not talk about the fact that they do not talk about the elephant in the room (the climate crisis).[78] However, addressing the problem contributes significantly to the need for more understanding, action, and urgency. Climate scientist Katherine Hayhoe argues that speaking with other people about the climate is essential, connecting with them based on shared values and interests.[79]

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75 Summary of the research
76 cf. Trussler and Soroka 2014 (p. 360)
77 cf. Leanse 2017 (p. 16–17)
78 cf. Marshall 2014 (p. 81–83)
79 cf. Hayhoe 2018

Problem

These are possible factors preventing people in the Global North from becoming more vigorous advocates for climate action. The drastic facts lead to reactance and overwhelming perceptions — perceived powerlessness. In a global survey among young people, nearly half said climate anxiety affects their daily lives. Three-quarters responded that they think the future is frightening.[80]

Naomi Klein argues that "a great many of us engage in this kind of climate change denial. We look for a split second and then we look away. Or we look but then turn it into a joke ('more signs of the Apocalypse!'). Which is another way of looking away."[81]

The main coping mechanisms: Hypernormalization and doom.
Both discourage people from taking action: a vicious circle.

80 cf. Hickman et al. 2021 (p. 863)
81 Klein 2014 (p. 3)

The key important thing is to give people hope that we can get through — because if you don't have hope, why bother?[82]

— Jane Goodall

82 Goodall 2021 (TC 5:14)

3

Project

3.1 Concept

Problem

The climate crisis threatens the survival of humanity. The solutions are already there; the political will to scale and implement them is still missing. The existing options are overshadowed by fossil propaganda, among other things, and the situation's complexity is exploited to sow doubt.

The harsh reality of the climate crisis generates hyper normalization and doomsday sentiment, especially among young people. Both lead to inactivity, while active climate protection is more urgent than ever.

Mission

The goal is to break the vicious circle and build a virtuous one: Turning Future Anxiety into Future Excitement. The project serves as an element to make triggering social tipping points more feasible and provides activists and change-makers with a concrete vision of the future they fight for.

Concept

The concept utilizes a change of perspective combined with research-based storytelling. An optimistic but realistic extrapolative scenario and strategic storytelling framework are developed based on current developments and scientific facts. In this possible future, humanity has reached the 1.5° target with low overshoot and stabilized the climate.

To make this world tangible, a contemporary witness, meanwhile grandma, tells us from a personal point of view what happened back then (i.e., currently), how she became a climate activist, and what tremendous efforts led to humanity "saving" the climate.

Medium

A short film tells the story in an entertaining and exciting way. The film portrays the interviewee, a now 74-year-old climate activist, reflecting on her youth, activism, and the significant changes in her own words — speculative visual evidence, produced with generative artificial intelligence, supports the credibility of her descriptions.

Strategy

The foundation of the short film is a strategic storytelling framework. Based on that concept, the plan is to develop further iterations and grow the project into a series.

With additional films, it is possible to create cross-cultural angles on the worldbuilding archetype and target similar audiences within the efficiency parameters — for example, characters and stories based on activists and pioneers from the Global South.

Audience

The efficiency parameter for the target group of this project is based on the realization that one does not need to address "everyone" to drive active change — it is enough to work with "active change agents and [...] the vast middle ground of people who are open-minded".[83] Applied to the project and this iteration, the focus is on climate activists and climate-aware young people (about 16 to 30) in (Central) Europe. Climate-aware parents between 30 and 50 complete the extended target group.

83 Meadows 1999 (p. 18)

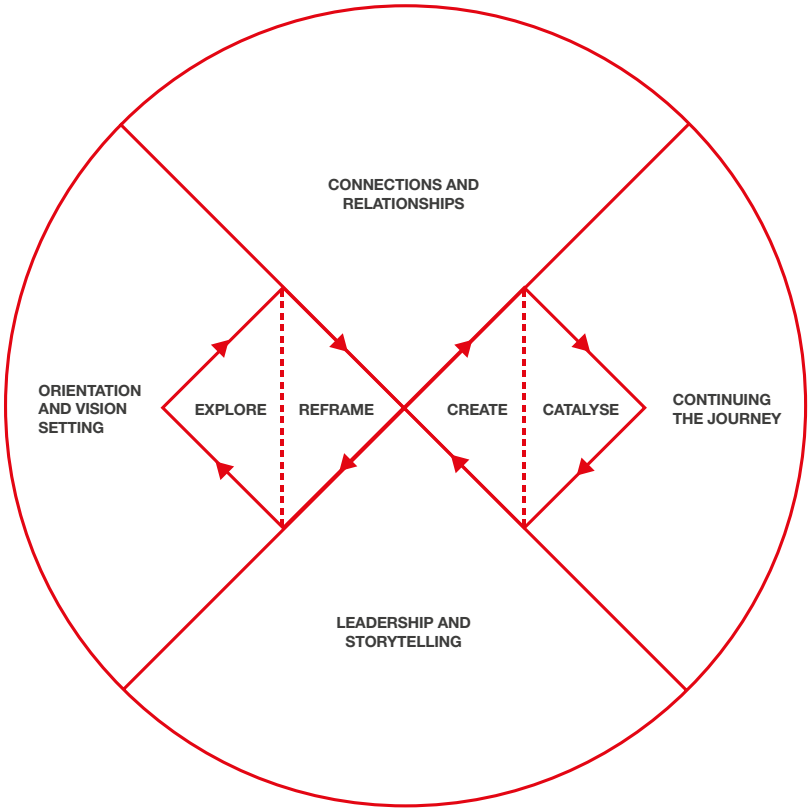


Fig. 4: Systemic Design Framework, evolved version of the Double Diamond. Published by the Design Council.

3.2 Process

Design Process

The project is conducted in an iterative design process based on the Design Council's Systemic Design Framework (evolved Double Diamond approach). Each of the three main parts of the project (concept, narrative, realization) went through the Explore/Reframe/Create/Catalyse process — beginning with the concept and concluding with the realization.

Approach

What would a contemporary witness tell us 50 years from now? The project focuses on personal highlights that correlate with world events. The interview consists of contextual descriptions, emotional anecdotes, and more detailed narratives that underpin the individual experience.

3.3 Inspiration & References

3.3.1 Inspiration

Several people, works, and ideas have helped shape the concept and realization of the project. The work is located in the field of climate fiction — in contrast to science fiction, the climate crisis and its effects are centrally thematized. Another inspiration, Solarpunk, is an artistic countermovement to technoid-dystopian Cyberpunk, and ecologically utopian in principle.

Pioneering researcher Jane Goodall, the visionary politician and philosopher Wangari Maathai, and the political system critiques and proposals of Naomi Klein and Ann Pettifor provide essential inspiration for the project's direction. Luisa Neubauer, the "German Greta Thunberg," inspires the concept and the film's lead role. The primary direction of the project is based on arguments by historian Rutger Bregman and Christiana Figueres, architect of the Paris Climate Agreement — the latter also delivers a blueprint for the developed scenario in her book published with Tom Rivett-Carnac. Anab Jain's leading Speculative Design work inspires the general approach and its artistic realization.

The following pages present an overview and a more detailed list of visual and conceptual references.

Fig. 5: Interviewees depicted in *the Intersection* (Superflux).

Fig. 6: Stills from *Extrapolation*.

Fig. 8: Grant Associates' *Gardens by the Bay* in Singapore (Solarpunk architecture).

Fig. 9: *Dear Alice* (Solarpunk aesthetics).

3.3.2 Conceptual and Stylistic References

Books & Reports

The Future We Choose (Christiana Figueres, Tom Rivett-Carnac)
Ecotopia (Ernest Callenbach)
The World We Once Lived In (Wangari Maathai)
Hot Money (Naomi Klein)
Das Ende der Klimakrise (Luisa Neubauer, Alexander Repenning)
Gegen die Ohnmacht (Luisa Neubauer, Dagmar Reemtsma)
The Case for the Green New Deal (Ann Pettifor)
Utopien für Realisten (Rutger Bregman)
AR6 Special Report 1.5 (IPCC)
AR6 Synthesis Report (IPCC)

TV & Film

The Intersection (Anab Jain, Superflux)
The Swarm (ZDF and others)
Extrapolations (Apple TV+)
Memories of the Future (BBC)
Mother Arkah (Andreas Palfinger)
Dear Alice (The Line)
2040 (Damon Gameau)

Concepts & Art

Solarpunk
Planet City (Liam Young)
Mitigation of Shock (Anab Jain, Superflux)
Cascade Inquiry (Anab Jain, Superflux)

Fig. 7: Docuseries *Memories of the Future*.

Fig. 11: Film still of *Planet City* (Liam Young).

Fig. 10: Detail of *Mitigation of Shock* (Superflux).

3.4 Worldbuilding & Extrapolative Scenario

An extrapolative scenario was developed based on past world events, the IPCC reports, the Potsdam Institute's research on social tipping points, and the third chapter of Christiana Figueres' book — explaining how the world would look like in 2050 if temperature rise stays below 1.5 °C, and which efforts could lead there.[84] An excerpt with crucial points and their interconnectivity is shown here (Fig. E). Fig. F shows the entangled points of the transformative shift that is part of the macro-scenario.

84 Figueres and Rivett-Carnac 2021 (p. 28–41)

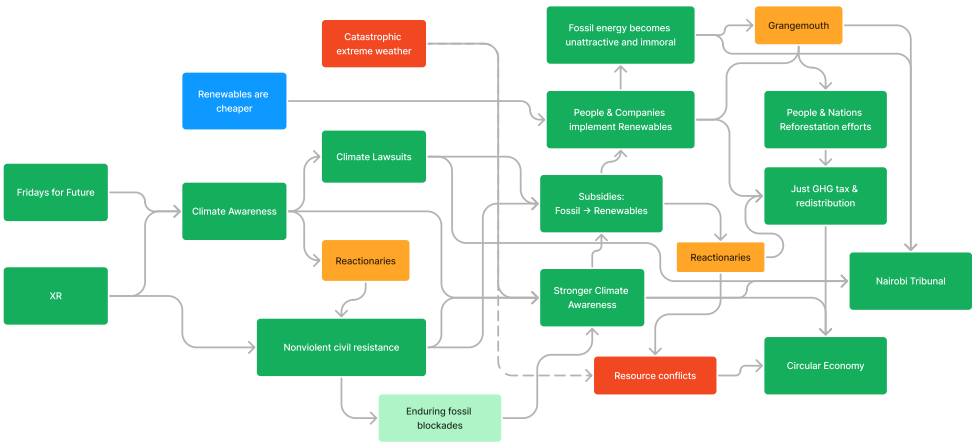


Fig. 13: Speculative optimistic extrapolation of the transformative shift (approx. 2020s to 2030s, with effects until 2040s).

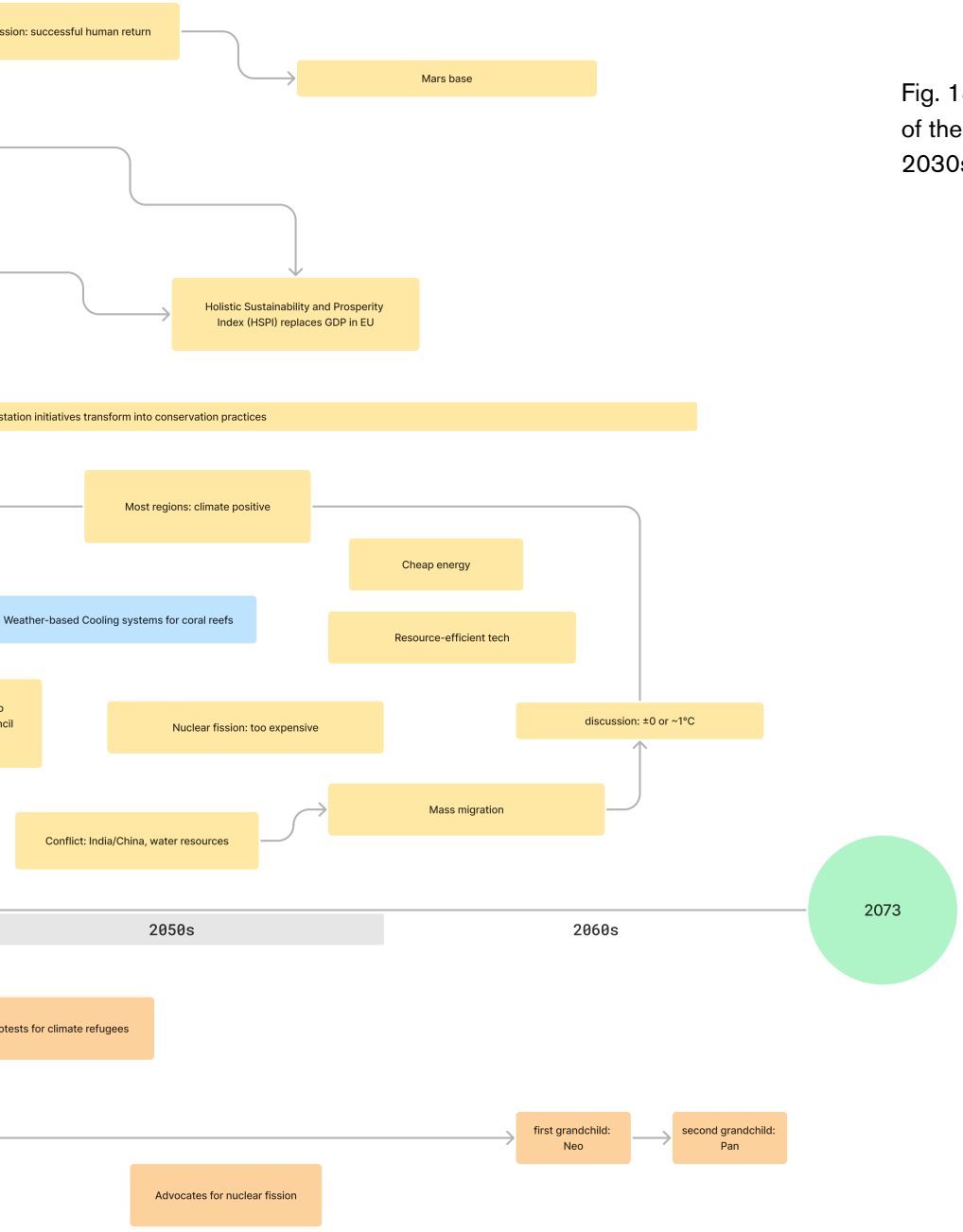


Fig. 12: Extrapolative scenario (macro level).

3.5 Speculative Narrative

The extrapolated scenario was transformed into a speculative narrative that tells the personal highlights of the main character, climate activist Carina Fuchser. The structural synopsis corresponds to the way it is presented in the audiovisual work, but only some aspects are used in the short film to keep it engaging.

Narrative

Carina, now in her mid-70s, looks back on her life and the challenges that have led to humanity stabilizing the climate at around +1.5°. She talks about her childhood in Bavaria, where she was born in 1998. There was still snow in the mid-2000s, and she loved to go sledding with her siblings. Her volunteering time in India left its mark on her: Already, the effects of the climate crisis were dramatic, especially in the Global South: massive heat waves — so hot that birds fell from the sky. Even in her home country, she noticed multiple "floods of the century" within just a few years. She became increasingly aware of the profound problem and that things weren't looking great. Carina decided to study environmental and bioresource management at Boku, where she met Anna, who took her to the first climate strikes. Inspired by Greta Thunberg, they co-founded Fridays for Future in Vienna.

She tells of the ever-growing "climate strikes" and that the activists, in particular, had to defend themselves against hatred, insults, and violence. The protests were having an effect, albeit a timid one: the climate crisis had finally arrived in the public consciousness and was causing more significant pressure to be directed at governments and organizations. All around, the world was already going up in flames: unprecedented heat waves, gigantic forest fires, extreme droughts, and floods. Despite the apparent escalating crisis, the lip service paid by the powerful remained unfulfilled. And so demonstrations increased while other actors exercised civil disobedience. By all possible means and at all levels, attempts were made to get politicians to fulfill their social duties — because time was running out—constitutional lawsuits, general strikes, fossil blockades, mass demonstrations, awareness-raising, and civil disobedience.

More and more communities, cities, and companies began to take the transformation into their own hands. They organized their own independent and low-cost energy supply. They subsidized public transport and cycling. They planted forests and renaturalized peatlands. They supported farmers in adopting healthier soils and regenerative practices, increasing their yields. Energy Communities, ongoing mass protests, and more and more companies pushed policy to stop the disadvantage of renewables. Stricter laws were enforced while villages, cities, and countries competed to become energy independent the fastest. Seagrass farms helped replace inefficient CCS technologies as well as provide healthy food and bioresources.

Time and again, there were counter-initiatives and setbacks, such as the attack on an oil refinery. The corporation blamed the climate movement, but it quickly became public as an insurance scam. This made even more people aware of what was going on, and the outcry led to an ordered transformation of the (remaining) fossil fuel industry to post-fossil.
The transformation was not convenient. Despite the consensus to promote climate protection, too few people knew about the need for rapid and profound changes — with the (long-term positive) effects on everyday life. Therefore, there were repeated attempts to divide society.

In addition, there was the adaptation to the dramatic impact at +1.5°. Despite better yields in regenerative agriculture, floods, and droughts destroyed many crops. Water shortages worsened, including in Europe. Even here, access to water is severely limited. Many people had to flee to survive at all and were met with hatred and exclusion. Conflicts over resources have been an enormous challenge that can be managed, though not perfectly, thanks to new awareness, better rules, and the circular economy. Mangrove forests off coasts and solar-powered pumping systems continue to help keep many regions habitable.

After a long struggle, Carina and her then-husband decided to have children after all. Because in the 2030s, it became clear that the worst had probably been averted and that the world's climate would stabilize as efforts progressed. Meanwhile, she is a happy grandmother and enjoys spending time with her grandchildren. The sledding that she enjoyed so much as a child is hardly possible anymore, but she helps them build tree houses. Her grandchildren are enormously proud that their grandma "saved the world with the others," Carina appeases.

Based on the guidelines and judgments of the International Court of Justice, as well as the conventions of the climate conference in Belém, the Nairobi Tribunal took place in the 2040s. There, decision-makers of fossil corporations and their political accomplices were convicted of ecocide and crimes against humanity, some even posthumously. Carina's son was eager to go when he heard that his mom was going to put climate criminals behind bars — but Carina had an observer role. Despite the tribunal's limited direct impact, it was an important milestone toward the now-prevalent perception of fossil energy as immoral, deadly, and long outdated.

Carina views the current discussion of returning to a pre-industrial climate (±0°) with great interest. The Most Affected People and Areas argue for a return because they are disproportionately affected by the impacts, while the Global North has been able to adjust and adapt more easily. Well-adapted regions are hesitant, knowing that the effort is their responsibility. Carina is unsure if it is actually possible. However, her eyes sparkle at the thought of living in a Europe with snow and more water. Hopefully, her great-grandchildren will live to see it.

4

Realization

4.1 AI-copowered Interview Short Film

Film was chosen as a medium because it can convey information and stories in a form that is easy to grasp — and allows for a wide range of narrative and visual design possibilities. Another essential reason is distribution and accessibility: in the digital age, short films can be distributed quickly, easily, and globally. Combining auditory and visual components makes a film even (partly) accessible to people who are able to perceive only one of the two layers.

4.1.1 Realism

Another key aspect of the project is the demand for realism. Both story and visual realization should appear as credible as possible. To achieve this, real footage is combined with AI-generated images. This combines the advantages of a realistic representation of people with the possibilities of time-efficient image generation.

4.1.2 Depicting a Future

In contrast to the usual science fiction, this narrative is different: Instead of a high-tech vision, a future is shown that has mastered the climate crisis through nature-based solutions, among other things. To emphasize the goal of realism, the fact that the future always consists of a large portion of the past is included. The actual median of the visual aesthetics of architecture and typography, for example, changes slowly, while (popular) fashion iteratively follows recurring trends.

4.2 Production

Casting
Ingrid Porzner is an actress, director, and theater pedagogue who grew up in Franconia, Bavaria, and now lives in Vienna and Bressanone, after a long time in Sri Lanka and South Tyrol. Among other things, she is involved with “Omas gegen Rechts” (“Grannies against the Right”), a group of activist seniors that was founded in Vienna and is now active internationally. The experienced actress takes on the role of Carina Fuchser, which involves Porzner’s biography in some aspects — for example, her upbringing, and time in South Asia.

Set Design
The set design was deliberately kept simple to keep the focus entirely on the person and their narrative. A too-detailed set would risk recipients questioning the story’s credibility based on specific objects. An abstract ray in the background highlights the silhouette of a plant against an opaque material, reminiscing a part of a futuristic small-scale greenhouse.

Lighting
A key light shines through another plant on the protagonist to support the setting and narrative, casting a subtle floral shadow on the actress. An additional light source softens the main light. In the background, another light source produces an atmospheric interior.

Location
The shooting took place in the multimedia studio of the Angewandte, which is equipped with cutting-edge lighting technology. It allows for a consistent shooting situation that would not be possible on location. In the studio, it is also possible to keep the shown environment abstract, while noise interference is minimal.

Fashion and Styling
Fashion and styling are central to the narrative because it focuses on the portrayed person. Based on conversations with fashion experts and the extrapolative scenario, apparel was selected to meet the challenges of a 1.5-degree hotter world: Light-colored clothing supports the reflection of solar radiation. Similarly, a wide cut supports the body’s temperature-regulating functions. The material and hairstyle are firm to withstand extreme weather events better. In order to visually show that this is not contemporary clothing, materiality and design language play a significant role. Therefore, a futuristic suit with coherent styling was chosen to meet the requirements of extrapolated usability as well as the aesthetic demands of a speculative near-future context.

Direction of Photography
The interview situation was recorded simultaneously with two cameras to be able to achieve flexibility in editing — and to put the emphasis on touching moments. Camera one was used to shoot a medium shot as the main picture, while camera two was used to shoot static and handheld close-ups from slightly different perspectives. The chosen settings are based on the human seeing experience; the focal lengths of the lenses as well as the framing and aperture, come close to the human vision.

Editing
Medium shots and close-ups are edited to create contrast and support the statements. In combination with AI-generated imagery and graphs as speculative evidence, a media synthesis emerges that visually substantiates the protagonist's descriptions.

Grading
Contrary to the classic science-fiction cliché, the color grading is kept warm. It references the global heating of 1.5 °C and the everyday use of solar energy — additionally, a high-contrast style distances itself from contemporary visual interview scenarios.

Sound
The protagonist's spoken word takes up the soundscape's central part. Sequences generated by an AI — based on Vivaldi's Four Seasons (Winter and Summer) — are used to emphasize and support the emotional effect of the video. The instrumental translation differs strongly from the original.

Fig. 14: The close-up camera during the film shoot.

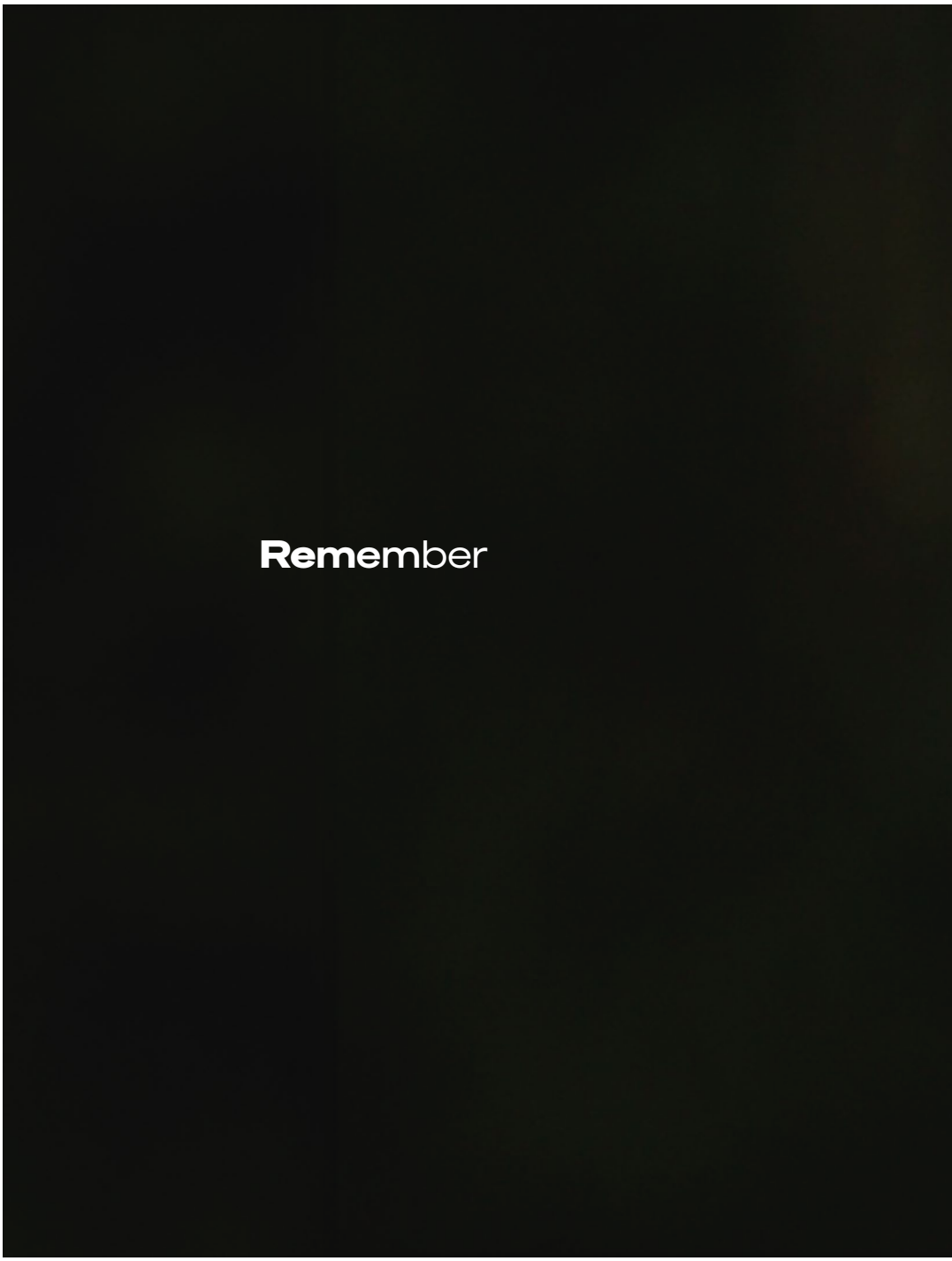
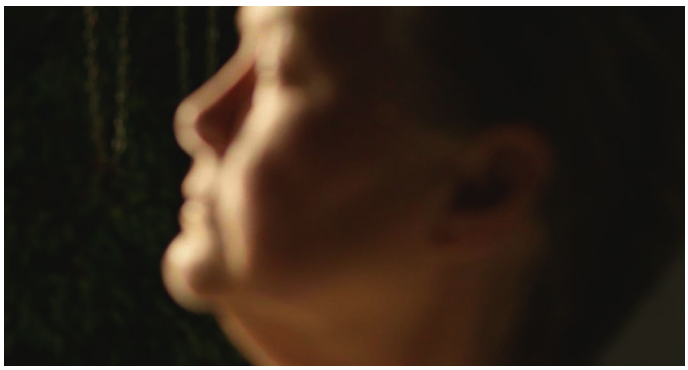


Fig. 15: Key visual.

the Future



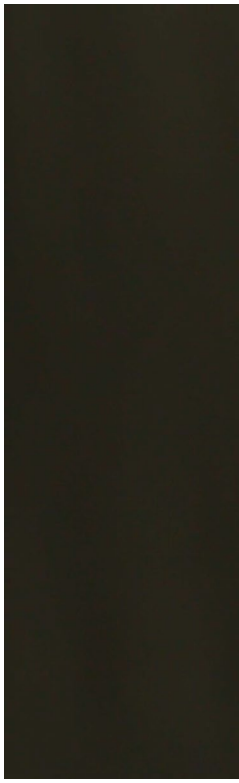


Fig. 16: Film stills.

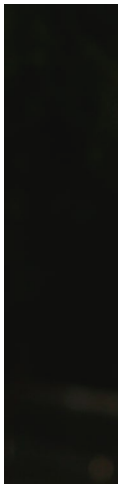


Fig. 17: Film stills.

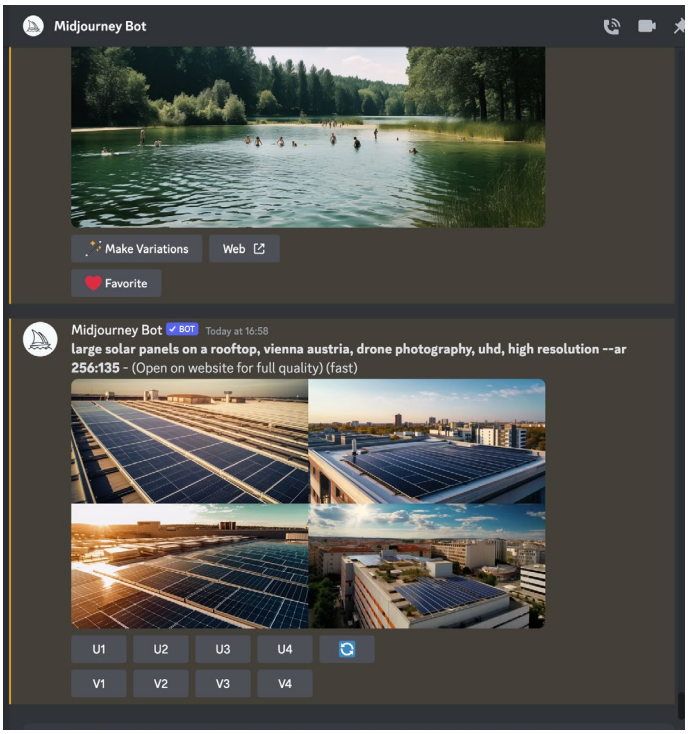


Fig. 18: AI image generation with Midjourney: Step 1. One prompt leads to an overview of four images. The user can choose to upscale (U#) or generate variations (V#) — "#" refers to image number.

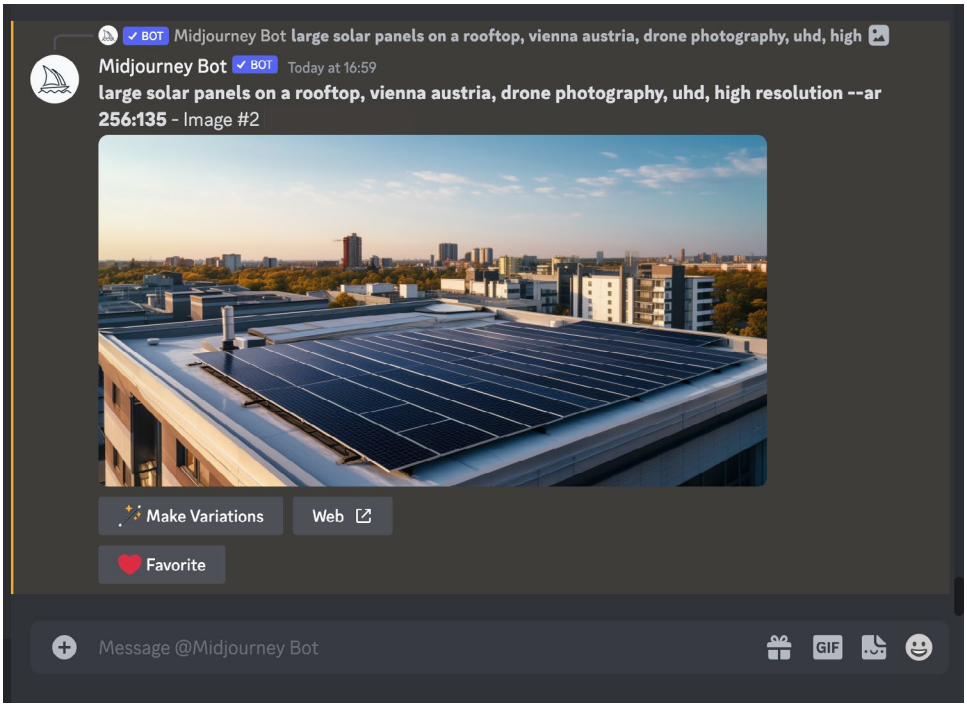


Fig. 19: AI image generation with Midjourney: Step 2. The "upscaled" (higher resolution) version of the selected image (#2 here).

4.3 Speculative Evidence

4.3.1 Fabricating Evidence

In science fiction films, elaborate special effects and computer animation depict a world that does not exist. For *Remember the Future*, there were two obstacles: the realistic version is not feasible in the scope of the work, and the more viable version via gaming engines would mean too strong a stylistic break with the filmed material. Generative Artificial Intelligence solves both problems, with a tolerable side effect: the limitation to static or semi-animated images. This makes it possible to communicate realistic-looking images of the future without a Hollywood budget.

4.3.2 Generative AI

Generative Artificial Intelligence is a system of artificial neural networks that computes new outputs from training data and "prompts" (concrete inputs) based on the architecture of the human brain. The training data, inputs, and outputs can be texts, code, images, and music.

4.3.3 Image Generation

The first examples of AI-generated images, including Google's Van Gogh knockoff from 2016, were a sensation.[85] However, the results at the time had a strong style that could be described as computer-psychedelic. In 2022, there was a massive push for AI systems' visual quality and coherence. For the first time, it was possible to have realistic-looking images generated in various styles — even photorealism. Dall-E, Midjourney, and Stable Diffusion gradually made their beta versions publicly available.[86] One of the most powerful systems, Midjourney, with the latest version 5, is used for this project.

4.3.4 Midjourney

Via an interface (i.e., a website, or in this case, a chatbot in Discord), users enter a so-called prompt (text, keywords, parameters) to have an image constructed. The process is called text-to-image. Midjourney can also generate new images based on existing ones (image-to-image) and combine both of these processes (image + text prompts). The system comes up with four slightly different images for a single prompt. Users can choose to upscale one or more of the outcomes, generate variations, or send a new prompt. While the rendering time for AI images is fast, it usually needs multiple attempts to get to a satisfactory result. AI systems are biased, sometimes leading to wrong or even problematic outcomes.

4.3.5 Utilization

AI-generated images are shown instead of elaborate special effects to support the actress' narratives with speculative evidence. These were animated in a simulated 3D effect — similar to the documentary style of Ken Burns — to enhance the visual experience and credibility.

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85 cf. Cascone 2016

86 cf. OpenAI 2022, Midjourney 2022, Stability AI 2022

Fig. 20: AI-generated speculative evidence.

Fig. 21: AI-generated speculative evidence.

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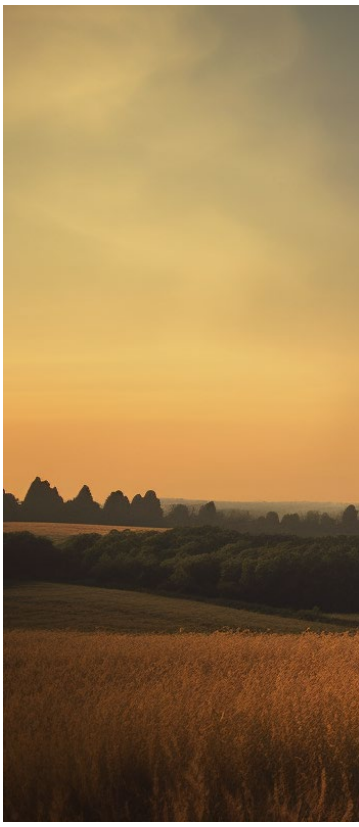

Fig. 22: AI-generated speculative evidence.

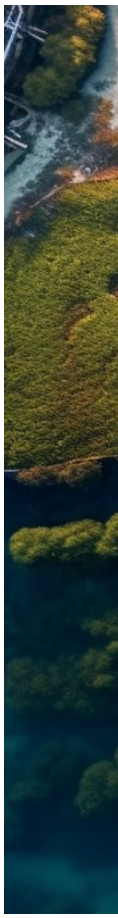

Fig. 23: AI-generated speculative evidence.

Fig. 24: AI-generated speculative evidence.

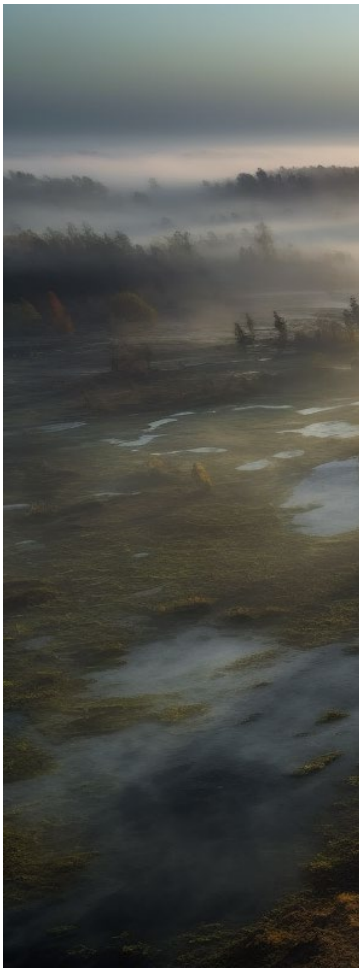

Fig. 25: AI-generated speculative evidence.

Fig. 26: AI-generated speculative evidence.

Fig. 27: Title design, set in Söhne Breit. Weights used based on the Bionic Reading® technology.

Bionic **Read**ing® **i**s **a** **n**ew **met**hod **facili**tating **t**he **read**ing **proc**ess **b**y **guid**ing **t**he **ey**es **thro**ugh **te**xt **wi**th **artif**icial **fixa**tion **poi**nts. **A**s **a** **res**ult, **t**he **rea**der **i**s **on**ly **focu**sing **o**n **t**he **highli**ghted **init**ial **lett**ers **a**nd **le**ts **t**he **bra**in **cen**ter **comp**lete **t**he **wo**rd. **T**he **Bio**nic

Fig. 28: A text set in Bionic Reading®.

Fig. 29: Example of the Spritz methodology.

4.4 Speculative Typography

4.4.1 A Short History of Western Typography

Typography is, seen from a macro level, a long-lasting part of visual culture. One of the still most-used grotesque typefaces, Futura, is about a century old.[87] What has changed dramatically over time, though, is publication: It evolved from clay tablet imprints to stone engraving to ink lettering to movable type — and experienced another transformation with digital techniques.

Frank Waldman identifies an innovation gap between how we read and our available technology.[88] There are two captivating examples of new ways that reimagine reading:

4.4.2 Spritz

Based on Waldman's findings, Spritz utilizes the fact that the brain can read faster than the eye. The approach does not use the traditional typesetting in lines and paragraphs. It works on screens, showing one word at a time, at the best position for the brain to process it — dramatically increasing user reading speed.[89]

4.4.3 Bionic Reading®

Developed by Swiss graphic designer Renato Casutt, Bionic Reading® highlights the first letters of a word in bold so that the brain can grasp the terms more easily. The method works both on digital interfaces and in print since it operates within the existing line/paragraph framework of typesetting. According to the designer, it significantly helps readers with dyslexia, also improving the reading speed for neurotypical people.[90]

4.4.4 Title Design

The typeface selected for the title design and main headlines in the short film is Söhne Breit. The forms of the typeface are clearly based on Akzidenz Grotesk — the stylistic consistency is in turn, based on Helvetica.[91] The use of the broad weights of Söhne emphasizes the visualization of possible futures. Although the legibility advantage of sans-serif typefaces is scientifically disputed, they are now prevalent — especially in digital applications.[92] In addition, the width communicates reliability, and the overall feel pays homage to the use of wide Eurostile/Microgramma in science fiction films from different eras.[93]

Combined with a speculative, visually evolved use of the Bionic Reading® methodology, it uses a smoother iteration between bold/regular to render it visually conceivable.

87 cf. Eisele et al. 2017 (p. 35)
88 cf. Waldman 2015
89 cf. Waldman 2015
90 cf. Kirchner 2022
91 cf. Sowersby 2019
92 cf. Vecino et al. 2022 (p. 1)
93 cf. Addey 2014

4.5 Context

In an artistic-speculative context, the short film is part of a series with contemporary witnesses presented in an exhibition at the *Museum of Climate History* — making the stories more tangible with artifacts, interactive installations, and further information. Correspondingly, other realizations of the underlying concept are possible as part of such an exhibition: letters from futures or the past, adaptive efforts such as climate bunkers, or a *mission control room* for global climate stability.

In the real world, the short film will be shown at the official Austrian Youth Climate Conference (LCOY Austria), which will take place at the Angewandte later this year. Together with the event team and the LCOY network, we could make the project available to other climate conferences and climate empowerment initiatives.

LCOY Local Conference of Youth. National conference reporting to the global COY and COP.

4.6 Credits

Concept, Direction, Artistic Supervision	Gerald Geier
Acting (Carina Fuchser)	Ingrid Porzner
Conceptual and Artistic Consulation	Matthias Spaetgens Bouchra Khalili Birgit Hertel Anab Jain Johannes Lotze Martin Klaffensteiner Katja Hummer Lisa Schultz Andreas Putz Ellen Petry Leanse
Direction of Photography	Oscar Pecher
DOP Consultation	Albert Car
Production Supervision	Anthony F. Guedes
Production Support	Lucia Quiqueran David Hampel Margareta Felicia Stern Martin Klaffensteiner Angelika Kessler Katharina Steiner Tobias Raschbacher Fabian Draxl
Fashion	Chun
Styling	Alice Neumann
Fashion Consultation	Stefan Schönauer Liam Pfefferkorn
Production Consultation	Flora Mair Olivia Andert
Editing	Kilian Floch
Sound Design	Leonie Roithner Kilian Floch
Project Consultation	Paulus Dreibholz Astrid Seme Tessa Sima Julia Bichler Julia Presslauer Manuela Hausmann Wolfgang Neipl Jan Jancik

5

Reflection

Potential and Limitations

Despite the lack of resources, it was possible to create an impressive work thanks to many fantastic people supporting the project with their expertise. Learnings from the first film can be applied to future ones, hoping to line up the resources needed to develop and implement them on an even higher level. More consistent speculative evidence, beyond AI-generated images, would currently only be possible with Hollywood budgets — but one can remain curious in which direction generative AI and visualization engines will develop.

Next Steps

Based on further feedback, the post-production of the short film can be further improved to advance the aesthetic quality and, thus, the coherence of the concept. Additionally, it is feasible to submit the short film to festivals to promote the narrative outside of the core target audience and build a network of potential supporters for the subsequent iterations of the project.

In the long term, working with activists worldwide to develop characters and stories and cast them into narrative formats such as short films would be extremely exciting. The goal would be to tell the stories more diverse and compellingly, prepare actors and actresses more intensively, and collaborate even more with other creatives for production and cinematography. Furthermore, it would be intriguing to explore other media and different uses of artificial intelligence to assemble more interactive encounters for recipients. For example, an AI-powered lifelike avatar that directly answers viewers' questions, whether in Virtual, Extended, or Mixed Reality.

5.1 Conclusion

The project merges conceptual and artistic realms, boosted by the approaches taught at Angewandte and beyond. Combining the communication-based method of the Class for Ideas (Matthias Spaetgens) with the conceptual-futuristic practice of Design Investigations (Anab Jain), the project explores the immense potential of strategic narratives on individuals and societies. It is an example of strategic foresight, translating current scientific evidence into possible futures — not shying away from complexities and entanglements but embracing them as a crucial part of human and planetary existence.

Apart from deepening my interest in environmentalism, global challenges, and speculative design, it gave me even better opportunities to connect with experts, conduct extensive research, and accumulate valuable insights by immersing in different notions of science, art, and communication. Foresight, scenario development, and research-based storytelling are the foundation for this extensive research-creation project, leading to more learnings: filmmaking and cutting-edge design processes. Receiving support from many talented people contributed significantly to it, and the feedback I acquired from the audience was already profoundly affirming.

In conclusion, working on *Remember the Future* has been a fantastic endeavor, providing me with an in-depth understanding of different strategic and artistic approaches — and the opportunity to combine them uniquely. The deep learnings gained in speculative design, filmmaking, and state-of-the-art design practices will immensely benefit my future path. At the same time, the produced short film sets the stage for further iterations.

5.2 Acknowledgements

This comprehensive project was only made possible due to the immense support of many wonderful people, to whom I would like to express my sincere gratitude.

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Because the way we asked
our parents: How was it
during National Socialism?
What did you know?
What did you do?

In the same way, our children and grandchildren will one day ask us:
How was it with the climate?
What did you know?
What did you do?[94]

— Helga Kromp-Kolb

94 Szigetvari 2019

Glossary

Acronym	Term	Explanation
	Adaptation	Efforts to minimize the effects of the climate crisis.
	Anthropogenic	Originating in human activity.
AI	Artificial Intelligence	
	Circular Economy	An economic framework based on three principles: eliminate waste and pollution, circulate products and materials, and regenerate nature.
CO2-eq / CO2e	CO2 equivalent	The amount of CO2 emission that would cause the same integrated radiative forcing or temperature change, over a given time horizon, as an emitted amount of a GHG or a mixture of GHGs.
COP	Conference of the Parties	“Climate Conference”
GHG	Greenhouse gas	
GDP	Gross Domestic Product	
IPCC	Intergovernmental Panel on Climate Change	“World Climate Council”: official UN scientific body to inform United Nations institutions and governments, run by WMO and UNEP.
IEA	International Energy Agency	
IMO	International Maritime Organisation	United Nations Organization
IRENA	International Renewable Energy Agency	
AR	IPCC Assessment Report	
SR	IPCC Special Report	
SYR	IPCC Synthesis Report	
	Kyoto Protocol	Adopted in 1997 (COP3). OECD countries and others agreed to reduce their anthropogenic GHG emissions by at least 5 percent below 1990 levels.
	Linear Economy	Current economy: finite resources are extracted to make products that are used and then thrown away (‘take-make-waste’).
	Mitigation	Efforts to limit global heating.
NDC	National Determined Contributions	
	Paris Agreement	Adopted in 2015 (COP21). Main goal: ‘Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels.’
PIK	Potsdam Institute for Climate Impact Research	
C	Scenario category (C1-C8)	Describing scenarios from limit warming to 1.5° (C1) to exceed warming of 4° (C8).
SSP	Shared Socio-economic Pathway	Describing the socio-economic trends underlying the scenario.
STE	Social Tipping Element	
STI	Social Tipping Intervention	
SDGs	Sustainable Development Goals	The 17 global goals for development for all countries established by the United Nations through a participatory process and elaborated in the 2030 Agenda for Sustainable Development, including taking urgent action on climate change.
UN	United Nations	
UNESCO	United Nations Educational, Scientific and Cultural Organisation	United Nations Organization
UNEP	United Nations Environment Programme	United Nations Organization
UNFCCC	United Nations Framework Convention on Climate Change	Adopted in 1992 and entered into force in 1994. 196 States & EU. The Convention’s ultimate objective is the ‘stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.’
WHO	World Health Organisation	United Nations Organization
WMO	World Meteorological Organisation	United Nations Organization
	Linear Economy	Current economy: finite resources are extracted to make products that are used and then thrown away (‘take-make-waste’).

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Bibliography

Addey, Dave. 2014. ‘Fontspots: Eurostile’. Typeset In The Future (blog). 29 November 2014. https://typesetinthefuture.com/2014/11/29/fontspots-eurostile/.

Cascone, Sarah. 2016. ‘Google’s Artificial Intelligence Paintings Auction’. Artnet News (blog). 2 March 2016. https://news.artnet.com/market/google-inceptionism-art-sells-big-439352.

Centola, Damon. 2019. ‘The 25 Percent Tipping Point for Social Change’. Psychology Today, 28 May 2019. https://www.psychologytoday.com/us/blog/how-behavior-spreads/201905/the-25-percent-tipping-point-social-change.

Centola, Damon, Joshua Becker, Devon Brackbill, and Andrea Baronchelli. 2018. ‘Experimental Evidence for Tipping Points in Social Convention’. Science 360 (6393): 1116–19. https://doi.org/10.1126/science.aas8827.

Chandler, David. 2020. ‘Greenhouse Gases’. MIT Climate Portal. 30 September 2020. https://climate.mit.edu/explainers/greenhouse-gases.

Dunne, Anthony, and Fiona Raby. 2013. Speculative Everything: Design, Fiction, and Social Dreaming. Cambridge, Massachusetts ; London: The MIT Press.

Easterbrook, Steve. 2017. ‘The Discovery of the Greenhouse Effect | Serendipity’. Serendipity (blog). 9 March 2017. http://www.easterbrook.ca/steve/2017/03/the-discovery-of-the-greenhouse-effect/.

Eisele, Petra, Annette Ludwig, Isabel Naegele, and Gutenberg-Museum Mainz, eds. 2017. Futura: The Typeface. Translated by Phyllis Elago. London: Laurence King Publishing.

Figueres, Christiana, and Tom Rivett-Carnac. 2021. The Future We Choose: The Stubborn Optimist’s Guide to the Climate Crisis. London: Manilla Press.

Figueres, Christiana, Hans Joachim Schellnhuber, Gail Whiteman, Johan Rockström, Anthony Hobley, and Stefan Rahmstorf. 2017. ‘Three Years to Safeguard Our Climate’. Nature 546 (7660): 593–95. https://doi.org/10.1038/546593a.

Garza, Alejandro de la. 2022. ‘We Have Enough Climate Tech. What We Need Is Political Will | Time’. TIME, 7 April 2022. https://time.com/6165094/ipcc-climate-action-political-will/.

Goodall, Jane, in: CBS. 2021. Jane Goodall’s Message of Hope. CBS. https://www.youtube.com/watch?v=E6YiyQiWzWA.

Hall, Shannon. 2015. ‘Exxon Knew about Climate Change Almost 40 Years Ago’. Scientific American, 26 October 2015. https://www.scientificamerican.com/article/exxon-knew-about-climate-change-almost-40-years-ago/.

Harvey, Fiona. 2022. ‘How UN Secretary General Became an Outspoken Voice for Climate Action’. The Guardian, 4 November 2022, sec. Environment. https://www.theguardian.com/environment/2022/nov/04/un-secretary-general-antonio-guterres-cop27-climate-action.

Hawking, Stephen W. 2020. Kurze Antworten auf große Fragen. Translated by Susanne Held and Hainer Kober. Sechste Auflage, 2021. Stuttgart: Klett-Cotta.

Hayhoe, Katharine. 2018. ‘Katharine Hayhoe: The Most Important Thing You Can Do to Fight Climate Change: Talk about It | TED Talk’. TED Talk. https://www.ted.com/talks/katharine_hayhoe_the_most_important_thing_you_can_do_to_fight_climate_change_talk_about_it.

Hickman, Caroline, Elizabeth Marks, Panu Pihkala, Susan Clayton, R. Eric Lewandowski, Elouise E. Mayall, Britt Wray, Catriona Mellor, and Lise van Susteren. 2021. ‘Climate Anxiety in Children and Young People and Their Beliefs about Government Responses to Climate Change: A Global Survey’. The Lancet Planetary Health 5 (12): e863–73. https://doi.org/10.1016/S2542-5196(21)00278-3.

Huddleston, Amara. 2019. ‘Happy 200th birthday to Eunice Foote, hidden climate science pioneer | NOAA Climate.gov’. NOAA (blog). 17 July 2019. http://www.climate.gov/news-features/features/happy-200th-birthday-eunice-foote-hidden-climate-science-pioneer.

IEA. 2022. ‘World Energy Outlook 2022’. International Energy Agency. https://iea.blob.core.windows.net/assets/830fe099-5530-48f2-a7c1-11f35d510983/WorldEnergyOutlook2022.pdf.

———. 2023. ‘Credible Pathways to 1.5 °C - Four Pillars for Action in the 2020s’. International Energy Agency. https://iea.blob.core.windows.net/assets/ea6587a0-ea87-4a85-8385-6fa668447f02/Crediblepathways-to1.5C-Fourpillarsforactioninthe2020s.pdf.

IPCC. 2022. Global Warming of 1.5°C: IPCC Special Report on Impacts of Global Warming of 1.5°C above Pre-Industrial Levels in Context of Strengthening Response to Climate Change, Sustainable Development, and Efforts to Eradicate Poverty. 1st ed. Cambridge University Press. https://doi.org/10.1017/9781009157940.

———. 2023a. 'Climate Change 2023: Synthesis Report'. A Report of the Intergovernmental Panel on Climate Change. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. Geneva: IPCC. https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf.

———. 2023b. 'Sixth Assessment Report | Synthesis Report'. Slide Deck, Interlaken, Switzerland, March 20. https://www.ipcc.ch/report/ar6/syr/downloads/press/IPCC_AR6_SYR_SlideDeck.pdf.

———. 2023c. 'Summary for Policymakers. In: Climate Change 2023: Synthesis Report'. A Report of the Intergovernmental Panel on Climate Change. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. Geneva: IPCC. https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_SPM.pdf.

IRENA. 2021. 'Renewable Power Generation Costs in 2020 - Executive Summary'. International Renewable Energy Agency. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/Jun/IRENA_Power_Generation_Costs_2020_Summary.pdf?rev=-99943124d5804ae38da7a7a6661f2cc7.

Jain, Anab. 2017. 'Can Speculative Evidence Inform Decision Making Today?' Superflux (blog). 31 May 2017. https://superflux.in/index.php/speculative-evidence-inform-decision-making/.

———. 2023. 'Radical Design For A World In Crisis', 25 April 2023. https://www.noemamag.com/radical-design-for-a-world-in-crisis.

Kirchner, Malte. 2022. 'Bionic Reading: Wie eine typografische Methode das Web lesbarer machen soll'. heise online, 14 June 2022. https://www.heise.de/news/Bionic-Reading-Wie-eine-typografische-Methode-das-Web-lesbarer-machen-soll-7140358.html.

Klein, Naomi. 2014. This Changes Everything: Capitalism vs. the Climate. 1st Edition, 2015. London: Penguin Books.

Kottasová, Ivana. 2021. 'Not a Single G20 Country Is in Line with the Paris Agreement on Climate, Analysis Shows'. CNN, 15 September 2021. https://www.cnn.com/2021/09/15/world/climate-pledges-insufficient-cat-intl/index.html.

Kurmelovs, Royce. 2021. '"Insanely Cheap Energy": How Solar Power Continues to Shock the World'. The Guardian, 24 April 2021, sec. Australia news. https://www.theguardian.com/australia-news/2021/apr/25/insanely-cheap-energy-how-solar-power-continues-to-shock-the-world.

Leanse, Ellen Petry. 2017. The Happiness Hack: How to Take Charge of Your Brain and Program More Happiness into Your Life. Naperville, Illinois: Simple Truths.

Marshall, George. 2014. Don't Even Think about It: Why Our Brains Are Wired to Ignore Climate Change. First U.S. edition. New York, NY: Bloomsbury USA.

Matthews, Kyle. 2020. 'Social Movements and the (Mis)Use of Research: Extinction Rebellion and the 3.5% Rule' 12 (July): 591–615.

MCC. 2023. 'Remaining Carbon Budget – Mercator Research Institute on Global Commons and Climate Change (MCC)'. 2023. https://www.mcc-berlin.net/en/research/co2-budget.html.

McCormick, Myles. 2023. 'Solar Set to Overtake Other Energy Sources by 2027'. Financial Times, 27 February 2023, sec. Solar power. https://www.ft.com/content/beaed1d3-1478-49c1-ae9c-4fe5ade62b5d.

McKeever, Vicky. 2021. 'Nearly Half of Young People Worldwide Say Climate Change Anxiety Is Affecting Their Daily Life'. CNBC, 14 September 2021. https://www.cnbc.com/2021/09/14/young-people-say-climate-anxiety-is-affecting-their-daily-life.html.

Meadows, Donella. 1999. 'Leverage Points: Places to Intervene in a System'. The Sustainability Institute. https://donellameadows.org/wp-content/userfiles/Leverage_Points.pdf.

Mellanby, Kenneth, Gary W. Crawford, and Alic William Gray. 2023. 'Origins of Agriculture - Research Techniques | Britannica'. In Britannica. https://www.britannica.com/topic/agriculture.

Midjourney [@midjourney]. 2022. 'We're Officially Moving to Open-Beta! […]' Tweet. Twitter. https://twitter.com/midjourney/status/1547108864788553729.

Milman, Oliver. 2023. 'Revealed: Exxon Made "Breathtakingly" Accurate Climate Predictions in 1970s and 80s'. The Guardian, 12 January 2023, sec. Business. https://www.theguardian.com/business/2023/jan/12/exxon-climate-change-global-warming-research.

Nicholasen, Michelle. 2019a. 'The Lasting Power of Nonviolent Resistance—Part 1'. Blog. Weatherhead Center for International Affairs (blog). 24 January 2019. https://epicenter.wcfia.harvard.edu/blog/lasting-power-nonviolent-resistance.

———. 2019b. 'The Lasting Power of Nonviolent Resistance—Part 2'. Blog. Weatherhead Center for International Affairs (blog). 20 March 2019. https://epicenter.wcfia.harvard.edu/blog/lasting-power-nonviolent-resistance-part-2.

NOAA. 2023. 'Climate Change: Atmospheric Carbon Dioxide | NOAA Climate.gov'. 12 May 2023. http://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide.

OpenAI. 2022. ‘DALL·E Now Available in Beta’. 20 July 2022. https://openai.com/blog/dall-e-now-available-in-beta.

Otto, Ilona M., Jonathan F. Donges, Roger Cremades, Avit Bhowmik, Richard J. Hewitt, Wolfgang Lucht, Johan Rockström, et al. 2020. ‘Social Tipping Dynamics for Stabilizing Earth’s Climate by 2050’. Proceedings of the National Academy of Sciences 117 (5): 2354–65. https://doi.org/10.1073/pnas.1900577117.

Project Drawdown. 2020. ‘Table of Solutions’. Project Drawdown. 5 February 2020. https://drawdown.org/solutions/table-of-solutions.

Rich, Nathaniel. 2018. ‘Losing Earth: The Decade We Almost Stopped Climate Change’. The New York Times Magazine, 1 August 2018. https://www.nytimes.com/interactive/2018/08/01/magazine/climate-change-losing-earth.html.

Robson, David. 2019. ‘The “3.5% Rule”: How a Small Minority Can Change the World’. BBC, 14 May 2019. https://www.bbc.com/future/article/20190513-it-only-takes-35-of-people-to-change-the-world.

Rockström, Johan, and Joyeeta Gupta. 2023. ‘Leading the Charge through Earth’s New Normal’. Presented at the World Economic Forum, Davos, January 23. https://www.weforum.org/events/world-economic-forum-annual-meeting-2023/sessions/leading-the-charge-through-earths-new-normal/.

Schmitz, Oswald J., Magnus Sylvén, Trisha B. Atwood, Elisabeth S. Bakker, Fabio Berzaghi, Jedediah F. Brodie, Joris P. G. M. Cromsigt, et al. 2023. ‘Trophic Rewilding Can Expand Natural Climate Solutions’. Nature Climate Change 13 (4): 324–33. https://doi.org/10.1038/s41558-023-01631-6.

Sowersby, Kris. 2019. ‘Klim Type Foundry · Söhne Design Information’. Klim Type Foundry Blog (blog). 26 November 2019. https://klim.co.nz/blog/soehne-design-information/.

Stability AI. 2022. ‘Stable Diffusion Public Release’. Stability AI (blog). 22 August 2022. https://stability.ai/blog/stable-diffusion-public-release.

Szigetvari, András. 2019. ‘Klimaforscherin zieht drastischen Vergleich zu Debatte übers Fliegen’. DER STANDARD, 24 June 2019. https://www.derstandard.at/story/2000105337541/klimaforscherin-loest-mit-drastischem-vergleich-neue-debatte-ueber-das-fliegen.

Thunberg, Greta. 2019. ‘Greta Thunberg to World Leaders: “How Dare You? You Have Stolen My Dreams and My Childhood”’. Speech presented at the UN Climate Action Summit 2019, New York, NY, USA, September 23. https://www.youtube.com/watch?v=TMrtLsQbaok.

Trussler, Marc, and Stuart Soroka. 2014. ‘Consumer Demand for Cynical and Negative News Frames’. The International Journal of Press/Politics 19 (3): 360–79. https://doi.org/10.1177/1940161214524832.

UN Environment Programme. 2020. ‘The Six-Sector Solution to the Climate Crisis’. UN Environment. 7 December 2020. https://www.unep.org/interactive/six-sector-solution-climate-change/.

UN. Press Release. 2021. ‘Climate Change “Biggest Threat Modern Humans Have Ever Faced”, World-Renowned Naturalist Tells Security Council, Calls for Greater Global Cooperation | UN Press’, 23 February 2021. https://press.un.org/en/2021/sc14445.doc.htm.

———. Press Release. 2022. ‘Window of Opportunity to Keep 1.5 Degrees Celsius Alive Will Close Forever without Sustained Emission Cuts, Secretary-General Warns, at Expert Group Launch | UN Press’, 31 March 2022. https://press.un.org/en/2022/sgsm21220.doc.htm.

UNFCCC. 1995. ‘Provisional Agenda and Annotations, Including Suggestions for the Organization of Work’. In . Berlin. https://unfccc.int/cop4/resource/docs/cop1/01.pdf.

Vecino, Sara, Jonas Mehtali, Javier de Andrés, Martin Gonzalez-Rodriguez, and Daniel Fernandez-Lanvin. 2022. ‘How Does Serif vs sans Serif Typeface Impact the Usability of E-Commerce Websites?’ PeerJ Computer Science 8 (November): e1139. https://doi.org/10.7717/peerj-cs.1139.

WMO. 1979. Proceedings of the World Climate Conference - a Conference of Experts on Climate and Mankind. WMO. Geneva: WMO. https://library.wmo.int/index.php?lvl=author_see&id=5288#.ZGDzOi9Bx0s.

———. 2023. ‘State of the Global Climate 2022’. ArcGIS StoryMaps World Meteorological Organization (WMO). 17 April 2023. https://storymaps.arcgis.com/stories/6d9fcb0709f64904aee371eac09afbdf.

Our choices will reverberate for hundreds, even thousands, of years.[95]

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