

REFERENCE FORESIGHT SCENARIOS OF THE GLOBAL STANDING OF THE EUROPEAN UNION IN 2040

EU Policy Lab

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STRATEGIC FORESIGHT

GEOPOLITICS

SCENARIOS

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REFERENCE FORESIGHT SCENARIOS OF THE GLOBAL STANDING OF THE EUROPEAN UNION IN 2040

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EU Policy Lab

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We experiment with the new, the unprecedented and the unknown. We seek to augment our understanding of the present, challenge and reinvent the way we think about the future.

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Abstract

Recent events, such as the COVID-19 pandemic or the Russian invasion of Ukraine, made clear that being prepared for the unknown and unexpected becomes increasingly important. Foresight scenarios are a practical tool that can help improve decision making in a context of turbulence, uncertainty, novelty, and ambiguity.

To increase preparedness for an uncertain future, the JRC facilitated a foresight process to develop four reference foresight scenarios. This participatory process was based on the Oxford Scenario Planning Approach and engaged more than 100 experts. The reference foresight scenarios explore the global standing of the European Union in 2040. In total, they depict four distinct and plausible futures: Storms, End Game, Struggling Synergies, and Opposing Views.

The reference scenarios can support decision-makers in several ways, for example by stress-testing current and future policies and policy initiatives, by raising strategic discussions and discussing future implications for a specific policy field, and by increasing futures literacy.

Acknowledgments

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Lastly, we also thank our reviewers for their comments and suggestions for improvement.

Executive summary

This report summarises the results of a foresight process to develop Reference foresight scenarios of the future global standing of the European Union (EU) in 2040. Foresight scenarios are a tool for improving strategy development and decision-making in the contexts of turbulence, uncertainty, novelty, and ambiguity. Recent events, such as the COVID-19 pandemic and the Russian invasion of Ukraine, have shown that being prepared for the unknown and unexpected has become increasingly important. The reference scenarios presented in this report aim to help decision-makers increase the preparedness of their organisations under increasingly unpredictable circumstances (Section 1).

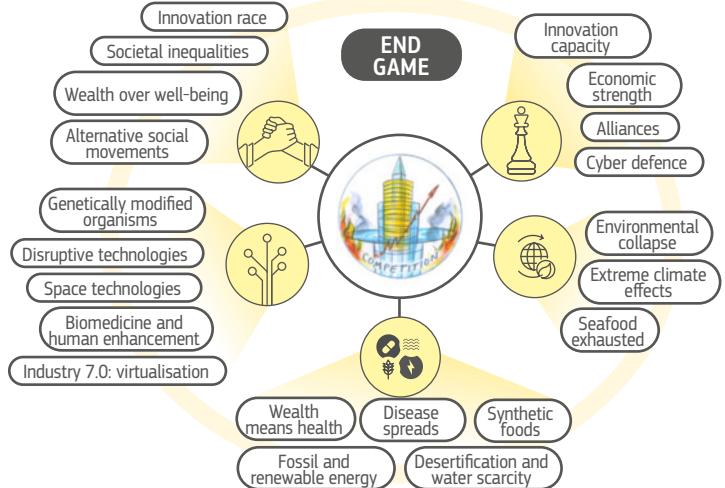
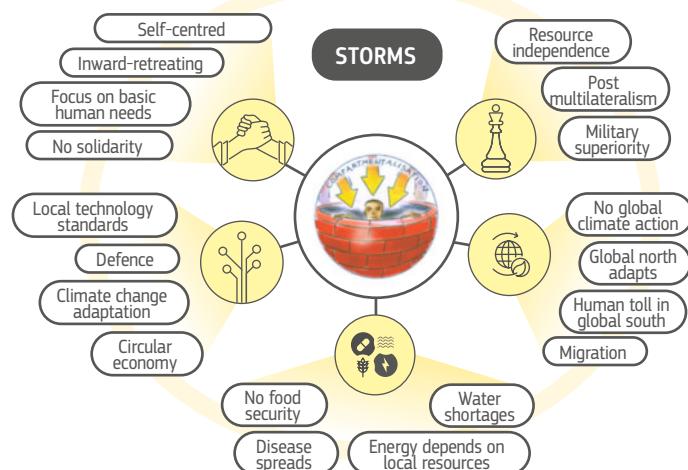
The Joint Research Centre used the Oxford Scenario Planning Approach to develop the scenarios, which involved more than 100 experts (Sections 2 and 3). Over the course of two and a half years, four reference scenarios were developed, validated, applied, and improved in an iterative process to ensure their relevance and robustness. These four scenarios are called ‘reference’ scenarios because they represent a forward-looking framework that provides a reference for use in policymakers’

debates about potential futures. By design, these scenarios are broad, and therefore able to adapt easily to specific topics and policy fields. They describe four distinct but internally coherent, or plausible, futures. These scenarios do not predict the most or least likely or desirable futures. Instead, they address different uncertainties and depict the outcomes to which these uncertainties might lead. Hence, the scenarios force readers to leave their comfort zones and think about unexpected developments. The four scenarios are named *Storms*, *Endgame*, *Struggling synergies*, and *Opposing views*. The following figure (page 10) shows an overview of these scenarios and their key drivers.

The reference scenarios are a practical tool that can support decision-makers in several ways (Section 4).

1. Reference scenarios can be used to evaluate whether policies and policy proposals are future-proof. Assessing policy options using the scenarios will allow policymakers to determine whether a policy option would perform well under different and sometimes difficult circumstances. Because it is easy to

Overview of the reference scenarios

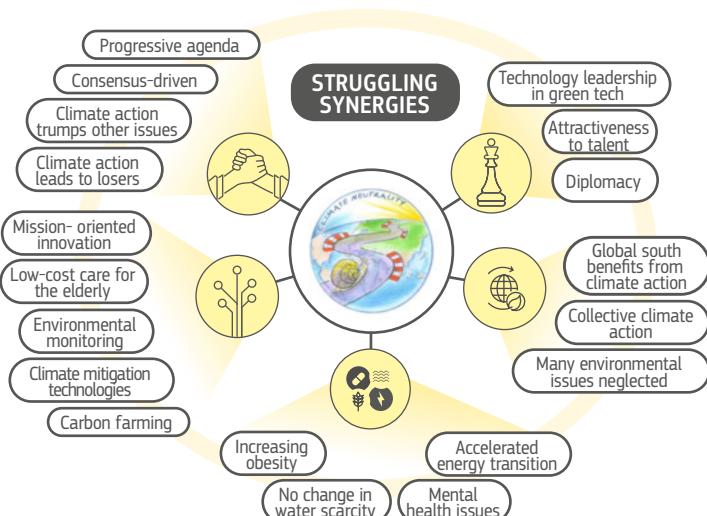


This is a world where...

societies became more self-centred and retreated inwards, strengthening the role of nations and regional blocs.

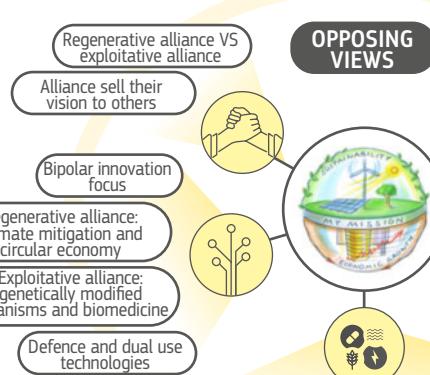
This is a world where...

economic growth and competitiveness trump well-being and social equality.



This is a world where...

there is a strong multilateral determination to fight climate change while side-lining other aspects of sustainability.



This is a world where...

society is divided into a regenerative and an exploitative alliance and both try to impose their paradigm.

use, stress testing can play an important role in policy development and support the EU's Better Regulation Agenda.

2. Reference scenarios can be used to think about future challenges and how they are linked. Thinking systematically about future pathways can enable policy makers to reflect on future relevant policy fields from a broad perspective and how existing policy fields might develop in a general context, including potential implications for a specific policy area.
 3. Reference scenarios can be used to develop futures literacy. Through participatory processes including creative foresight exercises, such as serious games, participants can discuss possible future policy designs, and gain new perspectives on the future.



1. Introduction

Background

The European Commission's 2020 Strategic Foresight Report announced that a set of reference foresight scenarios would be developed with the main objectives of informing future policy debates, providing tools for building more coherence among policies, and ensuring that policies are appropriate for the future (European Commission, 2020a). With these objectives in mind, the Joint Research Centre EU Policy Lab developed a set of four scenarios regarding the EU's global standing in 2040 and the conditions in which Europe could operate in the longer-term future. In 2020, the process was begun to support the development of a report on *Shaping and Securing the EU's Open Strategic Autonomy by 2040 and Beyond* (Cagnin et al., 2021), which includes first versions of the scenarios. Since then, the scenarios have been enriched and refined through several iterations. They were further validated through participatory workshops and interviews. This report presents the final versions of the scenarios and explains their development in detail.

These scenarios are aimed at facilitating discussions about the challenges, opportunities,

priorities, capacities, and vulnerabilities the EU might face in the future. The four scenarios cover the main uncertainties regarding the EU's future. Therefore, in principle, all four scenarios should be used as a set. Hence, in examining a range of different future contexts, we are able to uncover the most challenging questions and challenge our assumptions about the world we currently live in and the future we would like to shape.

The report is organised as follows:

- Section 1 describes how the reference scenarios were developed.
- Section 2 describes the main trends and uncertainties that served as a basis for scenario building.
- Section 3 presents the four reference scenarios.
- Section 4 provides information about the potential applications of the reference scenarios.



Foresight scenarios

WHY

Why are foresight scenarios helpful?

In these times of increasing **T**urbulence, **U**ncertainty, **N**ovelty, and **A**mbiguity (TUNA), the traditional “predict and control” approaches to linear planning are not fully equipped to address current challenges and understand their implications. Scenario planning helps to deal with these challenges by making alternative futures tangible (Ramirez and Wilkinson 2016; Chermack, 2022; Mukherjee et al., 2020). This method has been proposed and used to improve decision-making processes under conditions of high uncertainty and turbulence (Varum and Melo, 2010).

WHAT

What are foresight scenarios?

Scenarios are neither predictions of the future nor projections extrapolated from the present or the past. Exploratory scenarios, such as the set presented here, do not necessarily describe desirable futures¹, such as those based on political ambitions. Instead, they represent plausible futures with diverse trends, uncertainties, and events that interact in specific coherent and systematic ways (Amer et al., 2013).

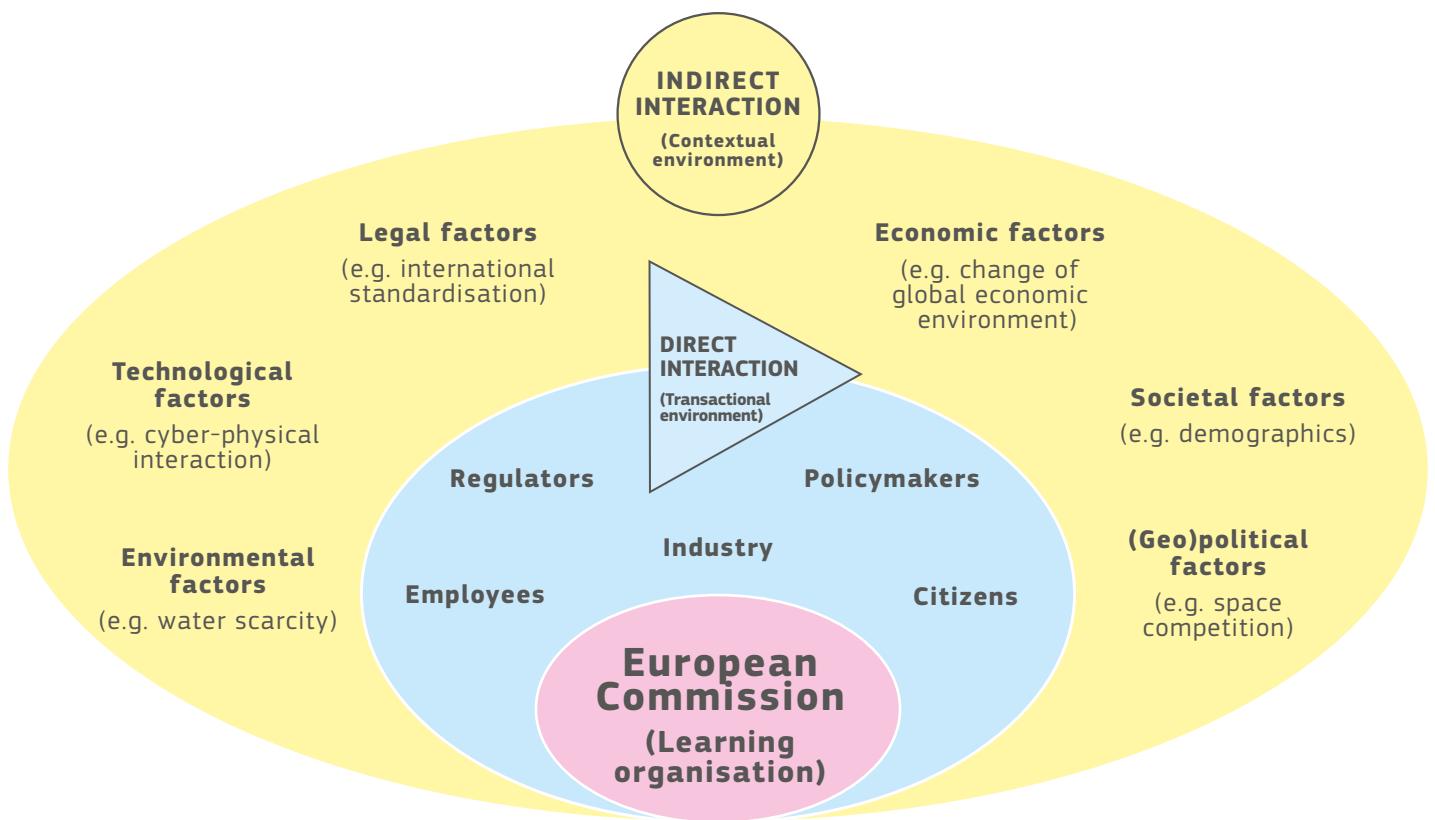
HOW

How can foresight scenarios support decision-makers?

Foresight scenarios help identify and explore key uncertainties by enabling the imagining of different futures. Considering the uncertainties and trends that lie ahead and their combinations, they describe alternative development trajectories that allow for discussion of their possible implications. They are meant to question our assumptions about the past, present, and future, to move stakeholders from their comfort zones in developing strategies (Scoblic and Tetlock, 2020). Therefore, foresight scenarios can support decision-making processes by broadening the perspectives of decision-makers (Schulte et al., 2021).

¹ Here, a distinction should be made between exploratory descriptive scenarios on one hand and normative scenarios on the other. Normative scenarios describe a desirable future and start with a desirable future endpoint (van Notten et al, 2003). For a recent example of normative scenarios, see the forthcoming Science for Policy report supporting the 2023 Strategic Foresight Report of the European Commission.

Figure 1: Contextual and transactional environments



Source: Adapted from van der Heijden, 1996

The process of scenario building

Developing the scenarios is a collective learning process. It offers to the participants a possibility to question their assumptions about the future and embark on a journey to investigate how the future could evolve. Consequently, this process contributes to further development of the foresight literacy of all participants in this process.

The scenarios presented in this report were developed through a participatory process based on the Oxford Scenario Planning Approach (Ramirez and Wilkinson, 2016). This approach enables participants to understand the frames² they use when they look at the world around them and to experience alternative frames in different future contexts.

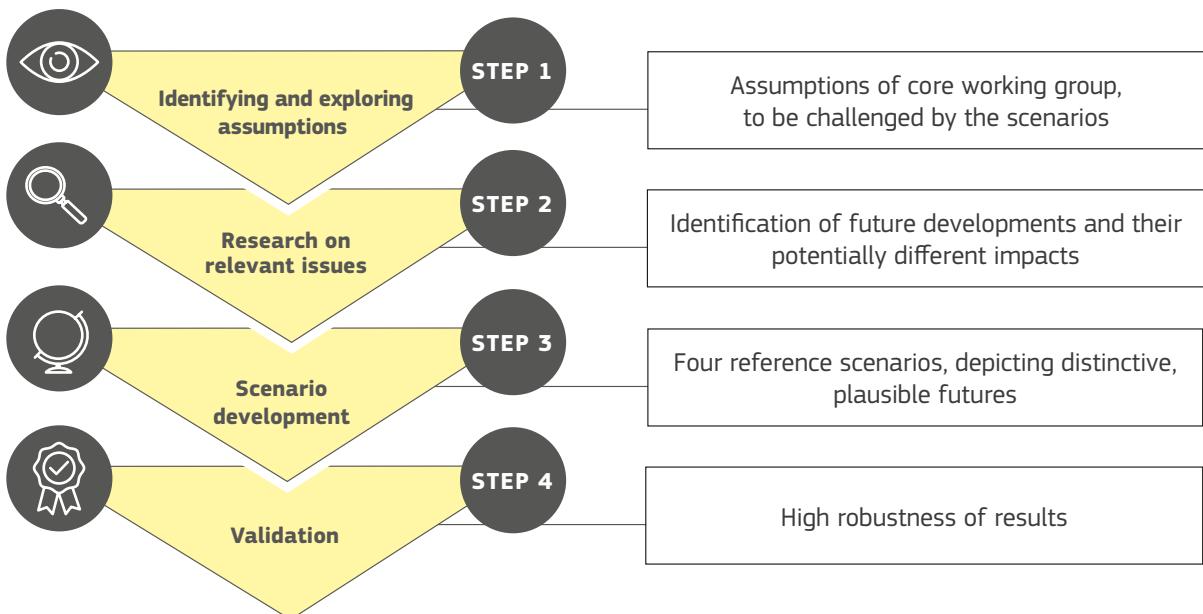
In this approach, the contextual and transactional environments are distinguished (Figure 1). At the core of the learning and reframing process is

the examination of a set of factors that cannot be directly influenced by decision-makers (the contextual environment, e.g. the geopolitical positioning of different countries, and the impact of climate change worldwide). Although the influence on the contextual environment is limited, it is key in the success of an organisation to understand how it can impact its future (van der Heijden, 1996). The process then examines how these factors shape and influence the immediate environment (the transactional environment that decision-makers can influence). This approach allowed us to consider the big picture by broadening the perspective, understanding its implications for the transactional environment, and drawing conclusions on possible reactions of relevant stakeholders in different settings (Ramirez and Wilkinson, 2016).

Because of COVID-19 restrictions, the scenario-building process was conducted online through eight co-creation workshops with an informal

² Framing refers to the ways the individuals in a society perceive the reality. Frames are mental representations that help us interpret the reality. In this context, reframing means changing a perspective when looking at things or situations and thus changing a meaning (Burgess, 2013)

Figure 2: Scenario development process



working group, consisting of colleagues from 20 European Commission services (steps 1–3 below). The goal of the participatory approach was to include a range of perspectives in the scenario-building process to go beyond individual biases regarding the likelihood or desirability of thinking about the future. This function was strengthened through the use of the inductive scenario planning approach³, which foster multidimensional thinking (Schirrmeyer et al., 2020). In Step 4 (a validation workshop and interviews), a wider range of stakeholders, including experts from 18 European Commission services, academia, industry, think tanks, and civil society organisations, were engaged in this process. Furthermore, the Joint Research Centre strengthened the robustness of the scenarios through additional research and interviews with experts. Figure 2 shows an overview of the step-by-step process used in the collective scenario building.

Step 1: Identifying and exploring assumptions

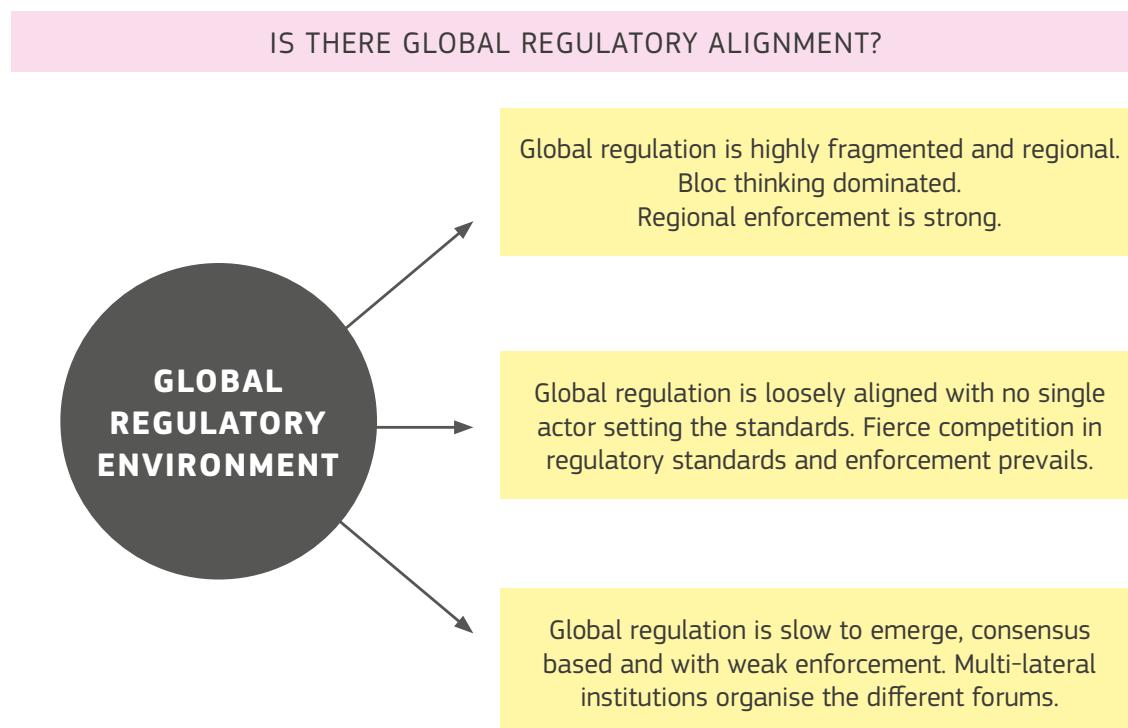
In the first workshop, the working group discussed individual and collective assumptions regarding the EU's standing in 2040 because they frame the ways in which the future is envisioned and shaped. The working group identified 49 assumptions (Appendix 1, page 61). These were later challenged in the scenarios and a validation workshop confirmed that the scenarios covered all the identified assumptions.

Step 2: Research on relevant issues

In addition to assumptions, the working group explored important issues that would influence the EU's standing in 2040, and thus should be researched. The main criteria for the selection of these issues were general ignorance, unfamiliarity, discomfort, and curiosity. These issues were then clustered into seven research areas: i) geopolitics,

³ Scenarios can be built in an inductive or deductive way. In the inductive approach, scenarios are built through a combination of multiple factors, while in the deductive approach they are built in a 2x2 matrix after the identification of two drivers with highest uncertainty and importance.

Figure 3: Example factor card



ii) technology, iii) environmental sustainability, iv) economy, v) global social values, vi) regulatory environment, and vii) demography: Research across these areas was undertaken by the JRC. Section 2 summarises the insights gained from these areas. This research formed the basis for the development of factor cards (see Figure 3) that included relevant future developments and the potential outcomes of each development.



Step 3: Scenario development

Scenarios were developed during several workshops. At the beginning, the participants were divided into five breakout groups. Each breakout group selected three to five factor cards, each from a different research area, according to what they considered the most pertinent for the future. The groups then built micro narratives by connecting the factor cards. The workshop yielded a total of 22 micro narratives, which were then clustered into four comprehensive prototype scenarios (see Figure 4).

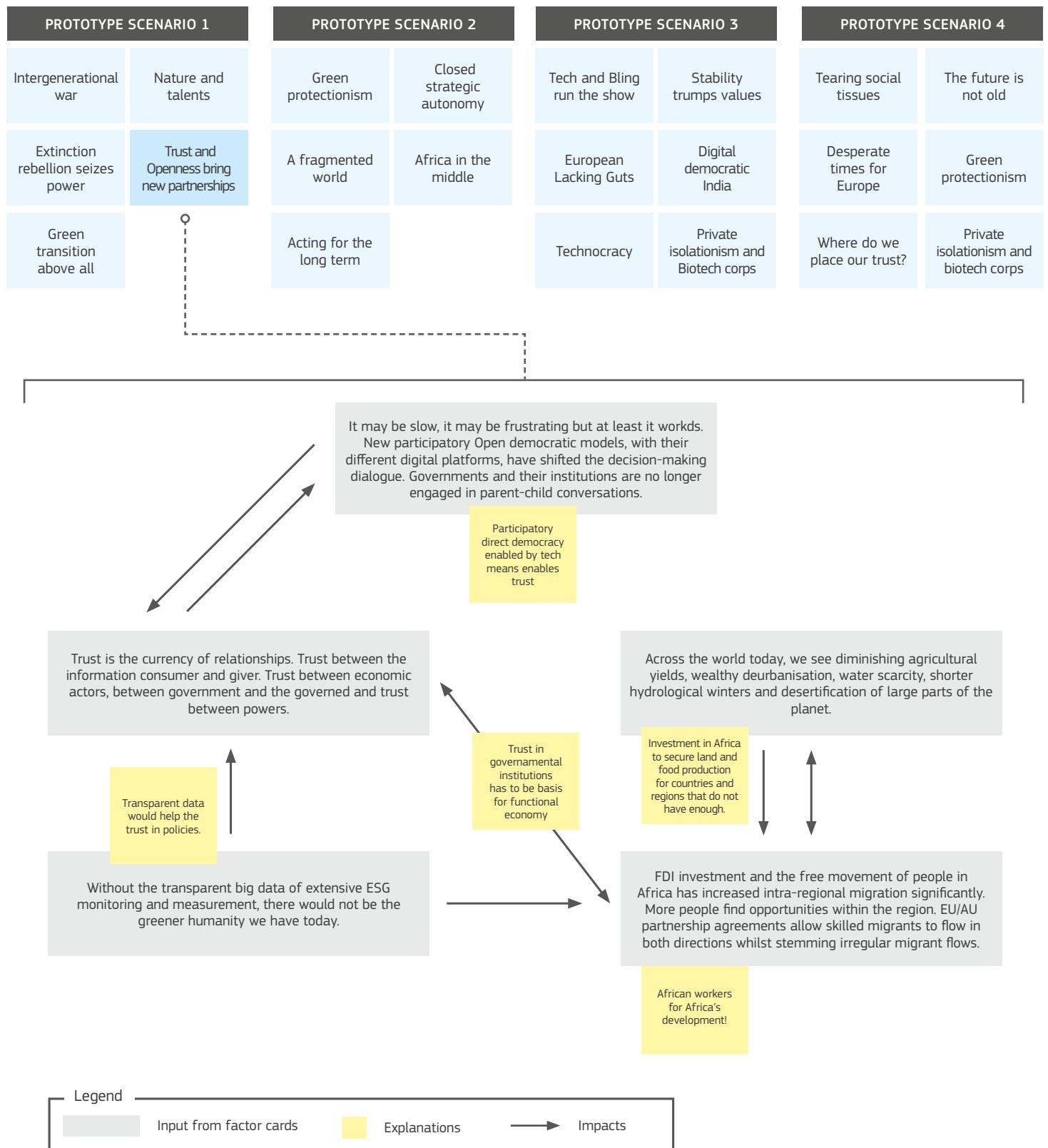
In parallel, the main drivers of change shared across the micro narratives were identified. They formed the core of four distinctive and internally coherent scenarios and were complemented by supplementary drivers of change. The drivers were formulated as questions, which are provided in the introduction to Section 3. For each driver of change, each scenario depicted a different development up to 2040. The working group was closely involved in the iterative process of scenario building.



Step 4: Validation

After the first draft was complete, the Joint Research Centre further refined the scenarios. Two expert workshops aimed to validate the scenarios, check their plausibility, ensure their robustness, and investigate their implications. In addition, the scenarios were enriched and validated through interviews with experts from relevant fields. More than 100 internal and external experts were involved in the participatory process to develop and validate the reference foresight scenarios.

Figure 4: Micro narratives and prototype scenarios



2. Issues that will influence the EU's standing in 2040

Research was conducted on the seven identified areas⁴, guided by the following research question: *How could developments in each area impact the standing of the EU in 2040?* In each area, the main ideas, key assumptions, and key trends were identified, followed by major unknowns.

Geopolitics

Significant geopolitical shifts will continue impacting strategic dependencies and the quest for Open Strategic Autonomy in the future (Cagnin et al., 2021). The uncertain evolution of conflicts between countries and regions and military powers might determine which of the parties will have a leading role (Bergmann et al., 2021). This includes a constant increase in cyber and hybrid threats. However, geopolitical influence is asserted not only through weapons, but also through trade. Trade diversification and partnerships will be key in the future, including access to critical raw materials (Carrara et al., 2023; Bobba et al., 2020). Access to state-of-the-art technologies and innovations will also be of vital importance for both hard and soft power (Schmidt, 2023).

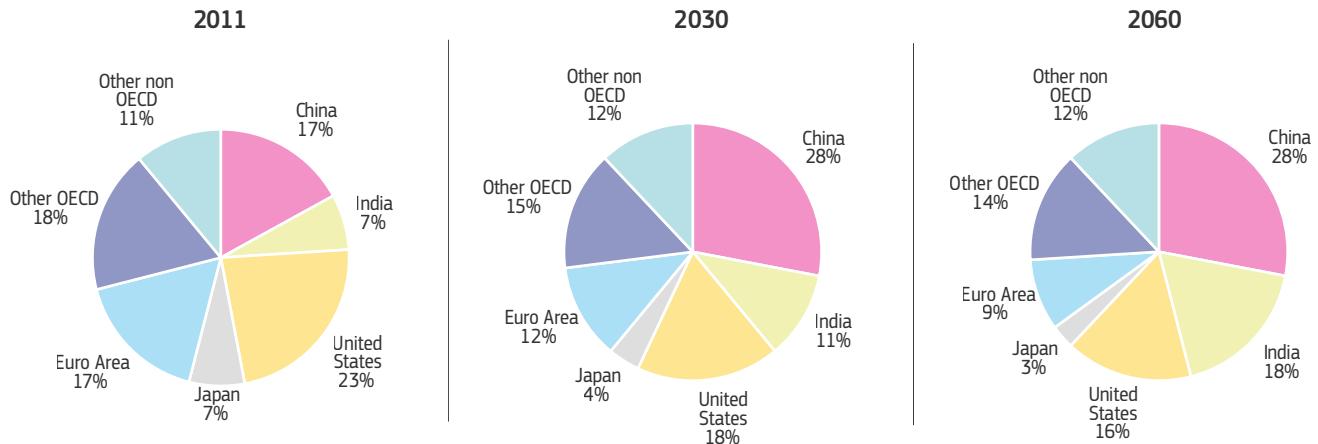
Another trend is the shift in geopolitical weight to the southeast, which could continue to 2040, driven by demographic developments (JRC Megatrends Hub, 2022). China has already become a technological leader in some digital and green technology segments. If the present trends continue, by 2050 Asia will be the centre of the global economy, providing more than 50% of the global economic output (see Figure 5), largely driven by China and India.

Major unknowns

- Who will dominate the geopolitical landscape in the future?
- Will the EU be able to shape strategic alliances to increase its global weight?
- How will military alliances and spending unfold by 2040?
- What are the key scarce resources in 2040?
- How will the EU ensure security in a world of increasing hybrid threats?

⁴ Some of the references have been updated for this report.

Figure 5: Projected GDP shares



Source: OECD, 2012

Technology

New technological developments will shape the way we live in the future. Automation, artificial intelligence, and machine learning continue to increase algorithmic capabilities to complement, enhance, and even replace tasks performed by humans (see Figure 6) to improve our lives (World Economic Forum, 2021). The growing convergence of biology, engineering, computation, and other sciences can not only lead to breakthroughs in the health sector but also raise new ethical concerns (European Parliament Research Service, 2022). One implication of this development is that access to, use, and control of data has become increasingly crucial. In this context, digital technologies might negatively affect democracies around the world, leading to an increase in so-called surveillance capitalism (Pew Research Centre, 2021; Zuboff, 2019).

A new space race has developed in which government and commercial players aim to capture novel strategic and economic territories. Maintaining a sustainable presence in space is no longer aligned only with geopolitics, but with profitable ventures in communications, Earth observations, and manufacturing (Fiott, 2021).

Cyberspace has become the site of a turf war between states and other actors, with expanding threats to individuals and institutions (European Centre of Excellence for Countering Hybrid Threats, 2021). To respond effectively to attacks and threats, countries have tried to address vulnerabilities and increase their cyber resiliency and security.

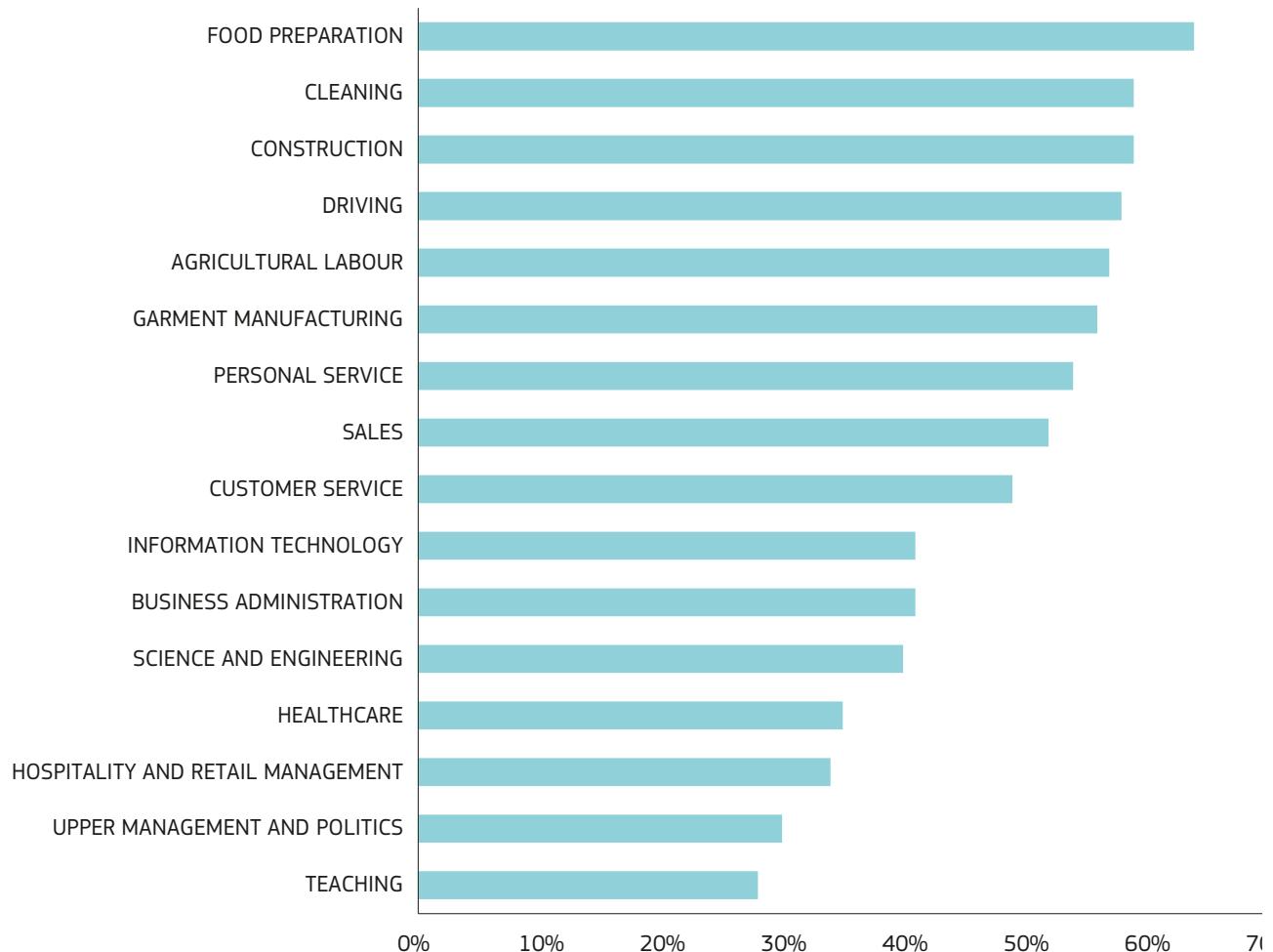
Major unknowns

- Which green technologies can accelerate climate mitigation and adaptation?
- Will research and development be driven by political priorities or economics?
- How will frontier technologies (e.g. the Internet of Things, or quantum computing) impact us?
- What are the effects of automation on society?

Environmental sustainability

Humans cause climate change, ecosystem degradation, and biodiversity loss, all of which impact human health and well-being. On average, global warming has already surpassed 1 °C, compared with the pre-industrial period (World Meteorological Organisation, 2022). This is the reason that the parties to the Paris Agreement

Figure 6: Automation risk by job type



Source: World Economic Forum, 2019

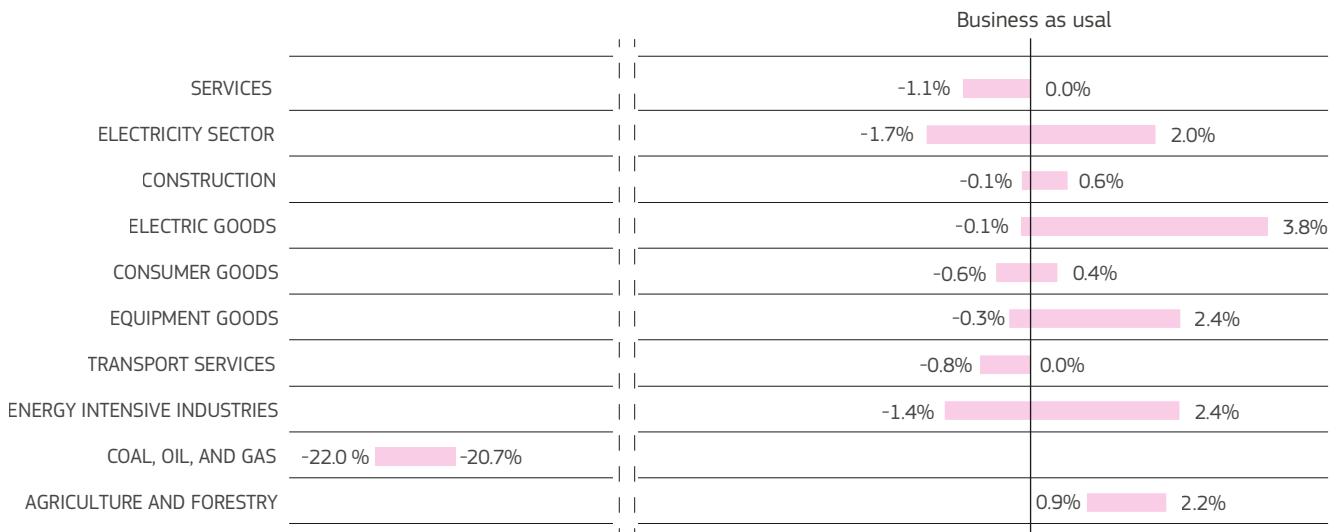
have agreed that bold actions to mitigate global warming and adapt to climate change are needed. According to the United Nations Framework Convention on Climate Change (2023), the goal should be to limit climate change to 1.5 °C.

The goal of the EU, which is to become climate-neutral by 2050, entails substantial changes in the ways we live. All consumption and production systems are in transition, particularly energy, industrial production, mobility, housing, and food production (European Commission, 2018).

Developments such as increasing circularity can decrease the need for material imports, while several green technologies require scarce resources (e.g. rare earth elements), thus creating new dependencies (European Investment Bank, 2020; European Commission, 2017).

However, the green transition has created winners and losers. On one hand, jobs and business opportunities will increase in green sectors, and new technology leaders will emerge (Asikainen et al., 2021). On the other hand, polluting and fossil

Figure 7: Future potential effects of the climate transition on sectoral employment



Source: European Commission, 2020b

Note: Business as usual = achieving the existing 2030 targets (as at September 2020) for greenhouse gas emissions, renewable energy shares, and energy efficiency

fuel-dependent sectors will contract, and carbon-intensive industries will have to transform (see Figure 7).

Major unknowns

- Will climate action be a global or fragmented effort?
- What will be the impact of climate migration?
- What will be the rate of global warming?
- Will there be continued support in civil society for climate action?

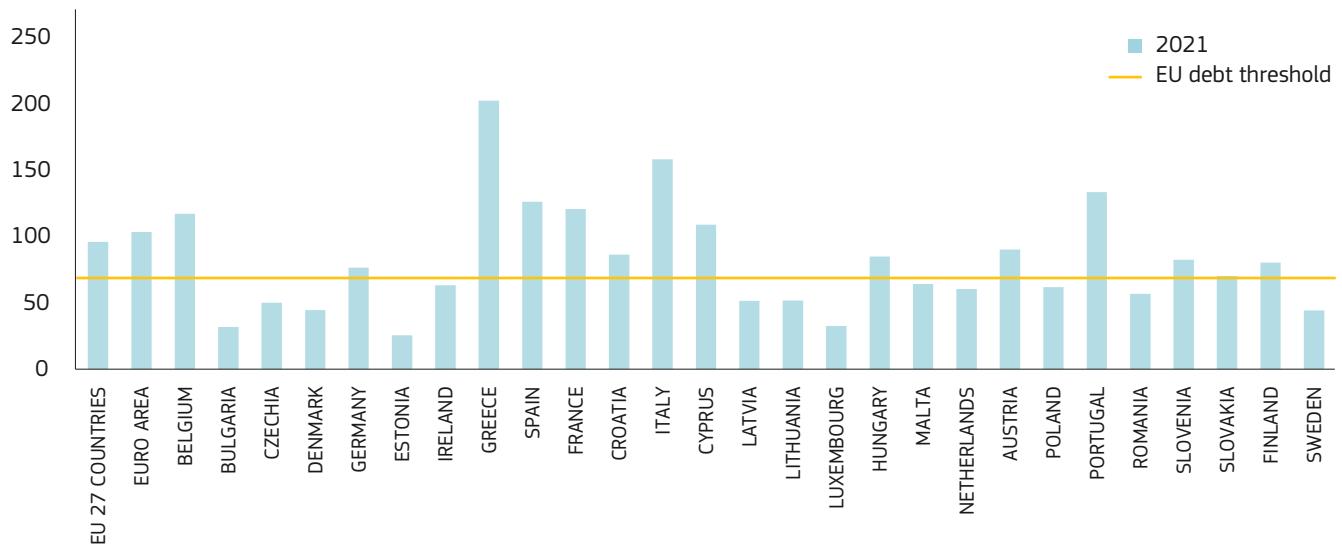
Economy

Several current developments have threatened globalisation. These developments include the ambitions of several countries to become

autonomous, the use of natural resources as a geopolitical instrument, an increasing number of populist nationalist governments, and systemic failures of highly interdependent global supply chains (Moise et al., 2021).

Global trade will remain an important pillar of the EU economy, but it will undergo some changes. There will be an increase in the trade of services, digital technologies, and green technologies. Regarding digital technologies, the importance of productivity will increase, and labour cost reductions will be emphasised (European Central Bank, 2021). Furthermore, there will be an increasing focus on circular economic approaches, which could reduce dependency on primary raw materials (European Commission, 2020c).

Figure 8: General government debt in 2021



Source: Eurostat, 2022

Another development has been the high debt levels of many Member States of the EU (see Figure 8) (Eurostat, 2022) due to the COVID-19 pandemic and the Russian invasion of Ukraine, which triggered the need for governments to support citizens and companies while increasing inflation and slowing down economic growth.

Major unknowns

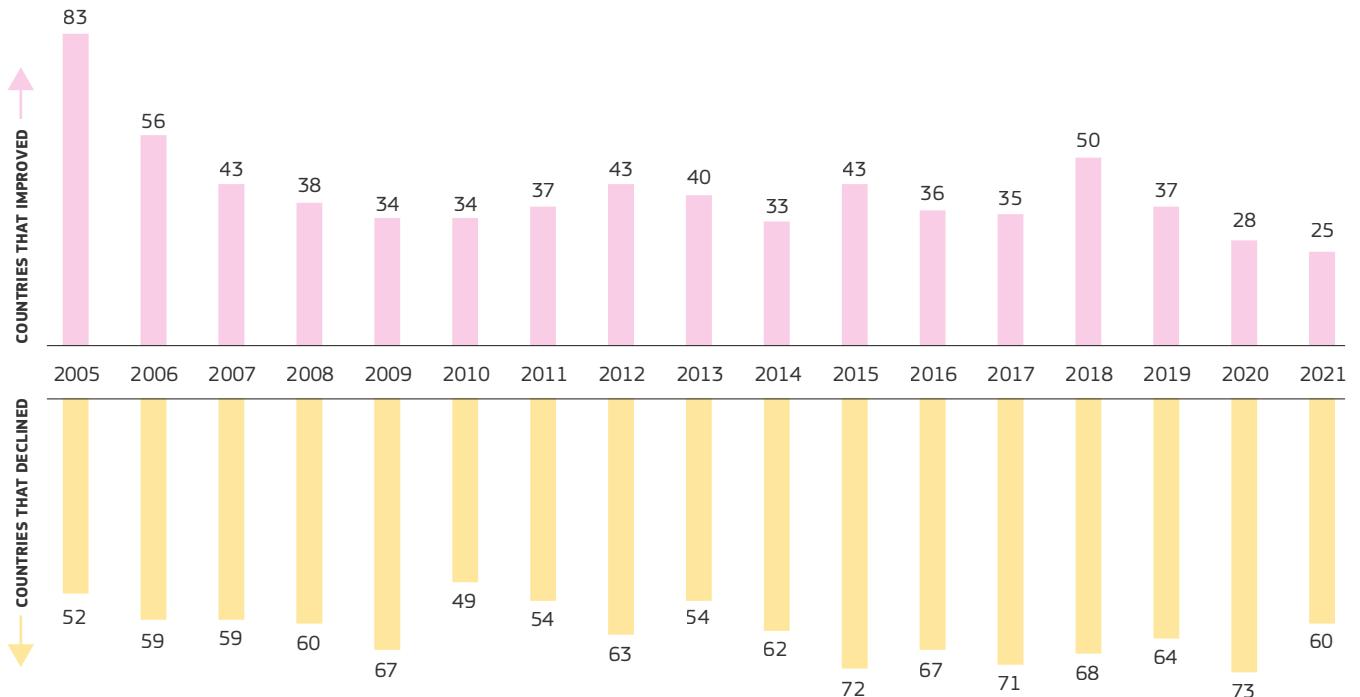
- Will Asia economically focus inward or become even more expansive in other markets?
- What will the economic role of Africa be in the future?
- Will the GDP, as an indicator of development, be replaced by other measures of well-being?
- Will the concepts of de-growth and sufficiency in consumption become mainstream?
- Will high debt levels impact the EU's ability to act?

Global social values

Some recent societal trends across the world are increasing inequalities, declining fundamental rights, multidimensional poverty, slow and uneven social progress, and severe polarization, damaging institutions essential to democracy (Cagin et al., 2021). According to Freedom House (2022), a decline in global freedom has been observed for 16 years (see Figure 9), with civil liberties and political rights at risk of erosion. Digital mass surveillance has also posed challenges to basic human rights (Office of the High Commissioner for Human Rights, 2022).

- Europe's political landscape has undergone the biggest transformation since the end of the Cold War. A positive trend is that governments have become more open and participatory (Vesnic-Alujevic and Scapolo, 2019). This indicates a shift from a closed bureaucratic

Figure 9: Comparison of the number of countries that have improved or declined in democracy since 2005



Source: Freedom House, 2022

relationship with citizens to an open relationship, in which information is available to and accessible by citizens. Open data have led to increased transparency, accountability, and participation. Across Europe, there is also a trend towards more participatory models of public governance, which include the co-creation of policies with citizens (Farrell et al., 2019).

Major unknowns

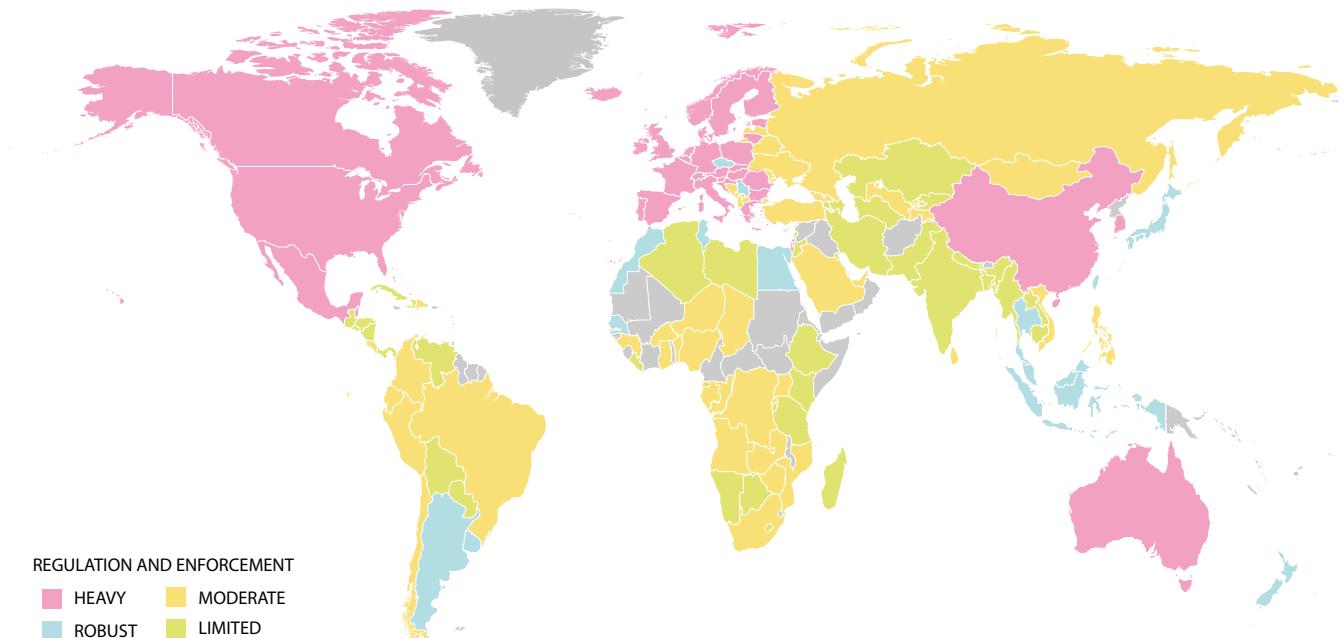
- How will new digital technologies impact democracy?
- Will there be a shift to more open government processes?
- Will polarisation continue to grow?
- Will the empowerment of civil society be possible in a potentially shrinking civic space?

Regulatory environment

The development of multilateral norms and standards by Western countries has been increasingly challenged. Global regulation seems to be largely fragmented and regional. Moreover, even more complex global challenges in the future will require multilateral rule-setting (European External Action Service, 2021). The increasing competition requires the identification of areas that require standardisation. For example, the US, China, and the EU have sought a first mover advantage in digital technology standard setting, to shape the global digital economy (Beattie, 2019).

There has been a trend towards the governance and regulation of digital technologies that are considered critical factors in minimizing digital opportunities while reducing challenges. The digital transition has led to new opportunities

Figure 10: Data protection laws across the world



Source: DLA Piper, 2023

for boosting innovative regulatory responses and initiatives. Digital platforms and data control are emerging forms of power, and new approaches to digital markets are being developed (see Figure 10). The notion that technology may be used for the general “good” is gaining legitimacy through the embedding of social and ethical values, via standards for data protection, and environmental regulations.

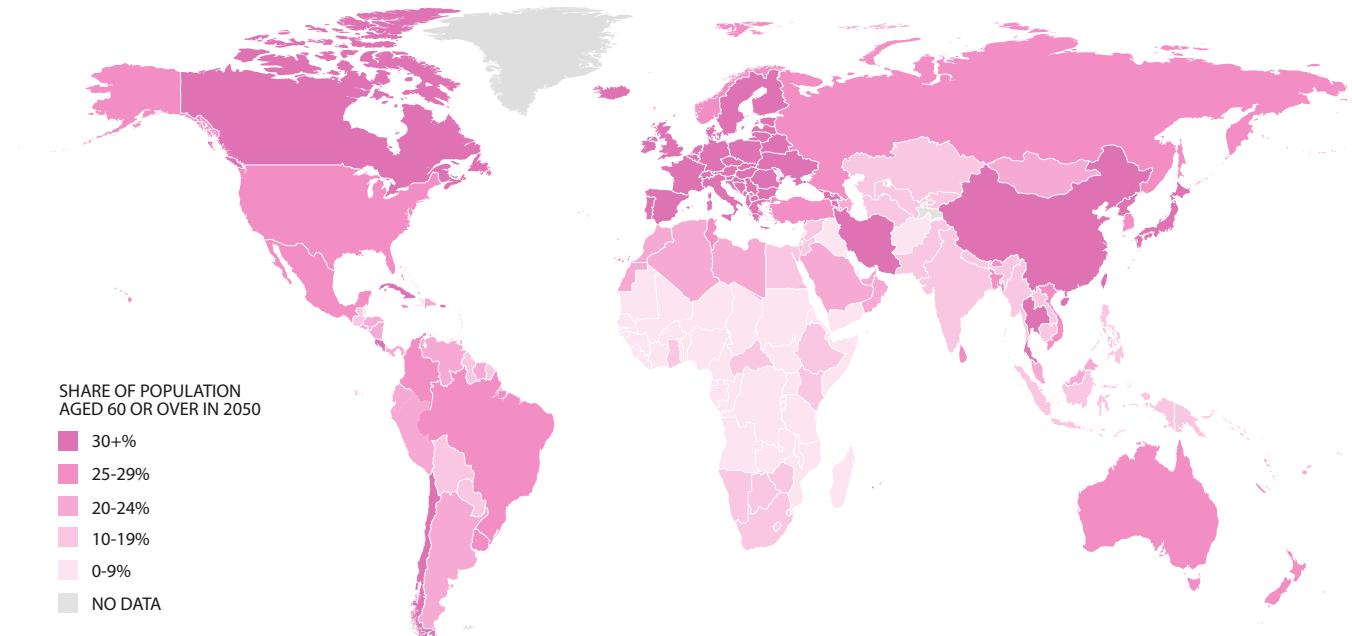
The global regulation and governance of space will be key in the future. However, space is currently a contested territory. The five UN space treaties created between 1967 and 1979 have been considered outdated. The importance of this issue has been indicated not only by the existence of 72 national space agencies but also by the increasing competition of public, private, and non-traditional actors (Goguicvili et al., 2021).

Multilateral environmental regulations will also continue to play an important role in achieving the UN’s Sustainable Development Goals (United Nations Environment Programme, 2016). As a climate champion, the EU is at the centre and therefore can play a significant role in promoting ambitious environmental action in international forums.

Major unknowns

- Will global regulation become more aligned or fragmented?
- Will the global regulatory environment be driven by governments or corporations?
- Who will win the geopolitical battle for standards?
- How will governance of digital technologies develop, and who will be the main actors?

Figure 11: Ageing populations worldwide



Source: Global AgeWatch Index 2015, 2015

Demographics

Population growth on Earth has led to climate change and increased pressure on the environment. However, it is estimated that Europe's share of the global population will shrink in the future, which could impact its position in the world (European Commission, 2023).

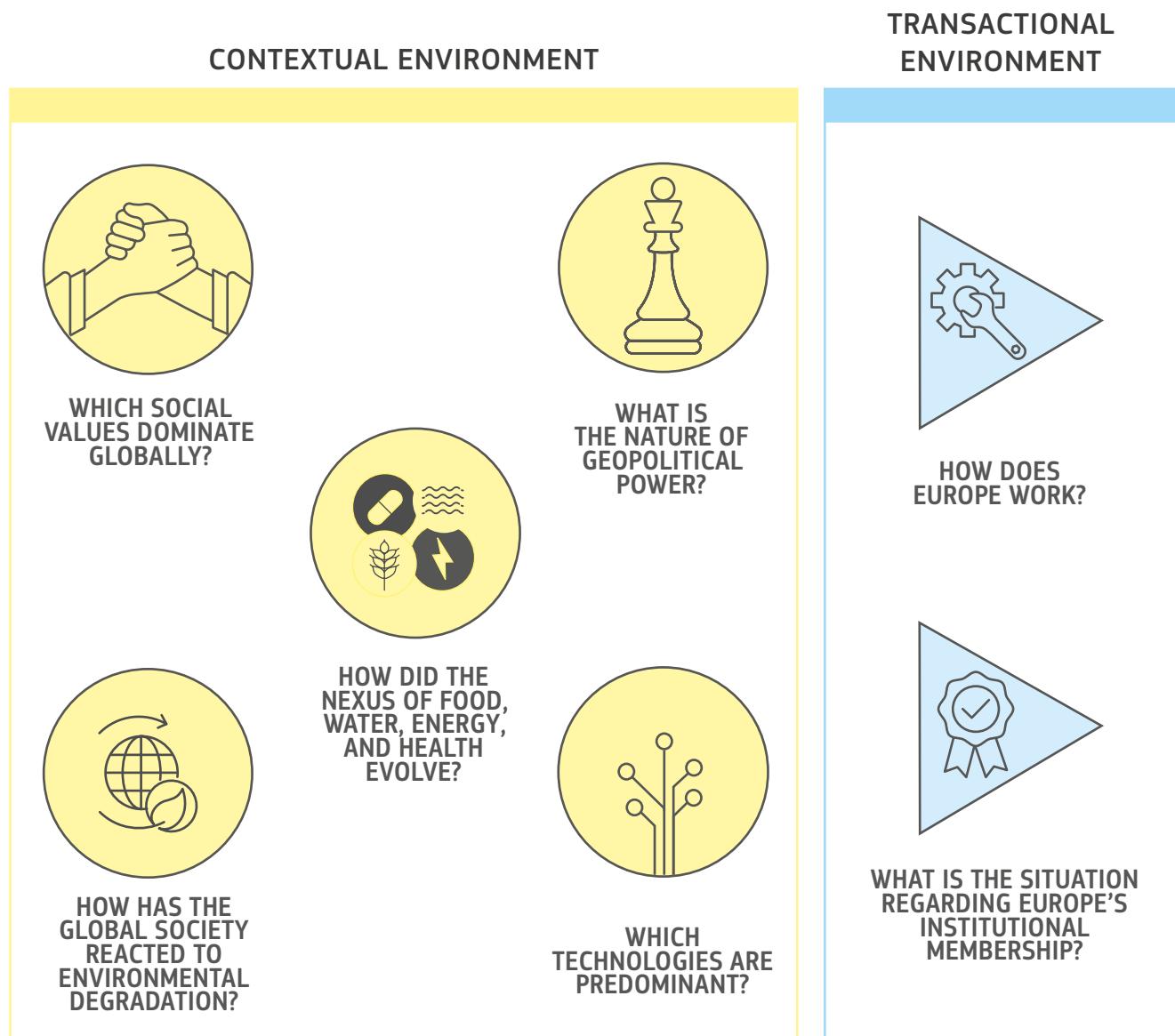
Ageing societies (see Figure 11) and shrinking labour forces will have consequences for economic growth, labour markets, the sustainability of social security systems (e.g. pension systems), and demands for and provision of goods and services, such as health and elderly care and housing (Sigg, 2005). The EU's population continues to decrease, including its working-age population. In the future, the regions with the largest share of working-age populations will be Asia and Africa (Our World in Data, 2022).

Major unknowns

- What and how strong will countries' policy responses be in relation to ageing populations?
- How will social cohesion within the EU be sustained when demographic landscapes differ greatly and economic growth is uneven?
- To which regions will the most highly skilled labour ('talent') migrate in the future?
- Will there be a deeper divide between generations?

3. Reference scenarios

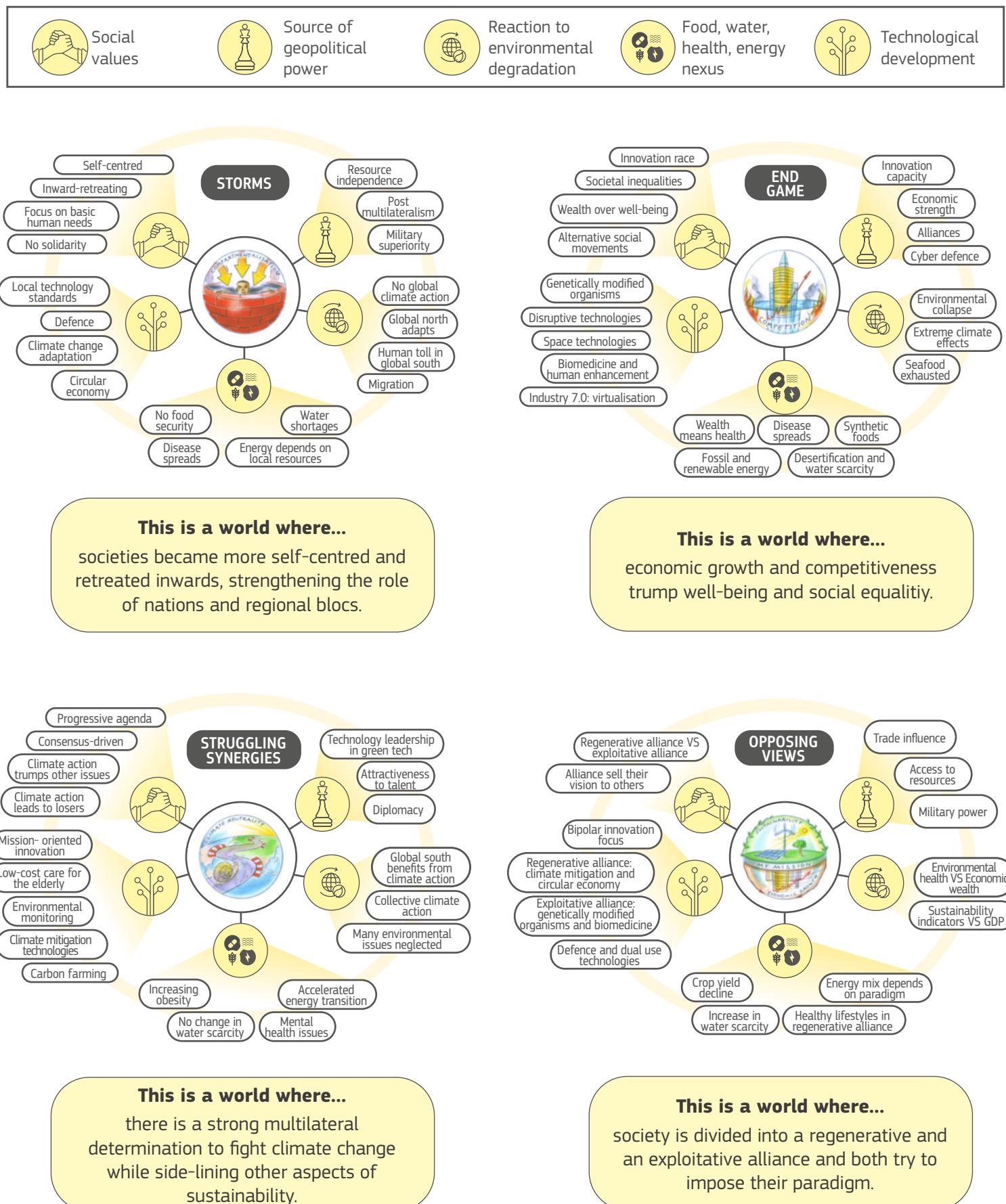
Figure 12: Key drivers



This section provides detailed descriptions of the reference scenarios. As discussed in Section 1, four scenarios were built from 20 micro narratives. Key drivers were identified in the micro narratives. They were expressed as questions regarding the contextual and transactional environment of the EU. Five key drivers addressed the contextual environment, referring to issues on

which EU decision makers only have little or no direct influence. Two key drivers addressed the transactional environment, referring to issues that EU decision makers can directly influence (see Figure 12).

Figure 13: Overview of the reference scenarios



Each scenario is introduced with an 'op-ed'⁵ of the future, setting the scene for in-depth explanations of the answers to the key questions regarding the contextual and transactional environments. In addition, major events that would need to take place until 2040 for each scenario are listed, as well as early signals in the present that could potentially lead to one of the scenarios (Figures 14-17). Figure 13 provides an overview of the main contextual characteristics of each scenario. A detailed table comparing these characteristics across the scenarios is provided in the Appendix 2 (page 62).



⁵ An op-ed is a newspaper column representing strong opinion of its author, usually opposite the page of the editorial

STORMS

Protect what you can!



Global co-operation has collapsed. But was it ever real? Were we not always so insular, so distrusting of the 'other'? Isn't each region, each nation protecting its own way of life? Independence from outsiders is the modern credo that we see reflected in our mid-21st century society. Energy depends on what's available—fossils, wind, or sun. Global tech companies, their oppressive power long broken by jealous countries, have morphed into a multiplicity of local circular platforms and standards. We like our leaders to be strong, provided they look after us.

We live in a world of continuous deprivation. Weakened food supply chains, growing water scarcity, and spreading diseases prevail. Yet,

rather than working together to save this planet, we have retreated into our selfish selves, instead focusing inwardly on survival and adaptation. Basic human instinct? Maybe. But still a choice. We choose to blame others rather than act unilaterally. We chose to do less than we could when others suffered. We choose to prioritise today over tomorrow.

The EU is an ageing winner but has to frame its hollow victories to protect its past successes. A collective empire jealously guards its citizens' way of life. All the while, humankind retreats into boarded-up refuges, seeking some form of resilience by the environment it has so thoroughly destroyed.

Over here, on the old continent, we invested heavily in our strategic autonomy. We elected those who would prioritise our comfortable privileges—pensions, healthcare, and wasteful luxuries. And if that meant excluding youth from political power, then it was simple—the majority rules. True, we were pushed into replacing NATO because the US had its own dilemmas, but that worked out well for us in the end.

The truth is, we are comfortable here. We are much less impacted by climate change than are those in other regions. The choice of food is not what it was, but at least we have something to eat on our tables. Our children should be grateful for that.

Contextual environment

Which social values are globally predominant?

Societies became more self-centred and retreated inwards, strengthening the role of nations and regional blocs. These blocs ruthlessly used their military strength, innovative capacity, and access to raw materials to gain an advantage over others. Citizens feel a lack of solidarity within societies, where the focus is often on basic human needs, such as housing, energy, and water. Social equality and the protection of minorities are at the end of the queue of priorities.

The effects of climate change took another toll on social values. Northern regions were less affected by extreme weather events, and they tried to increase their resilience to environmental degradation. They also tried to protect their way of life by closing their eyes to the hardships of the regions suffering the most. Refugees were not accepted, and humanitarian support for those regions ceased.

These developments led to the emergence of regional ‘islands’ that now sought to increase their resilience in an increasingly hostile world without strong global cooperation.

What is the nature of geopolitical power?

This world is characterised by hostility and scarcity. The strong bully the weak, and regions that have access to resources and can protect them use this advantage to extract what they need from others. Foreign investment in wealthier countries focuses

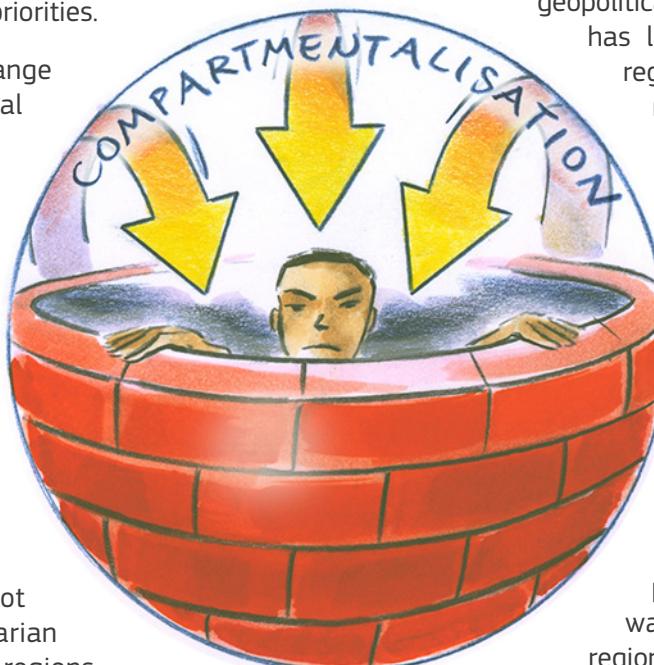
on securing access to raw materials and talent, whereas humanitarian aid has steadily decreased. In some cases, the supply of critical raw materials is enforced by military means.

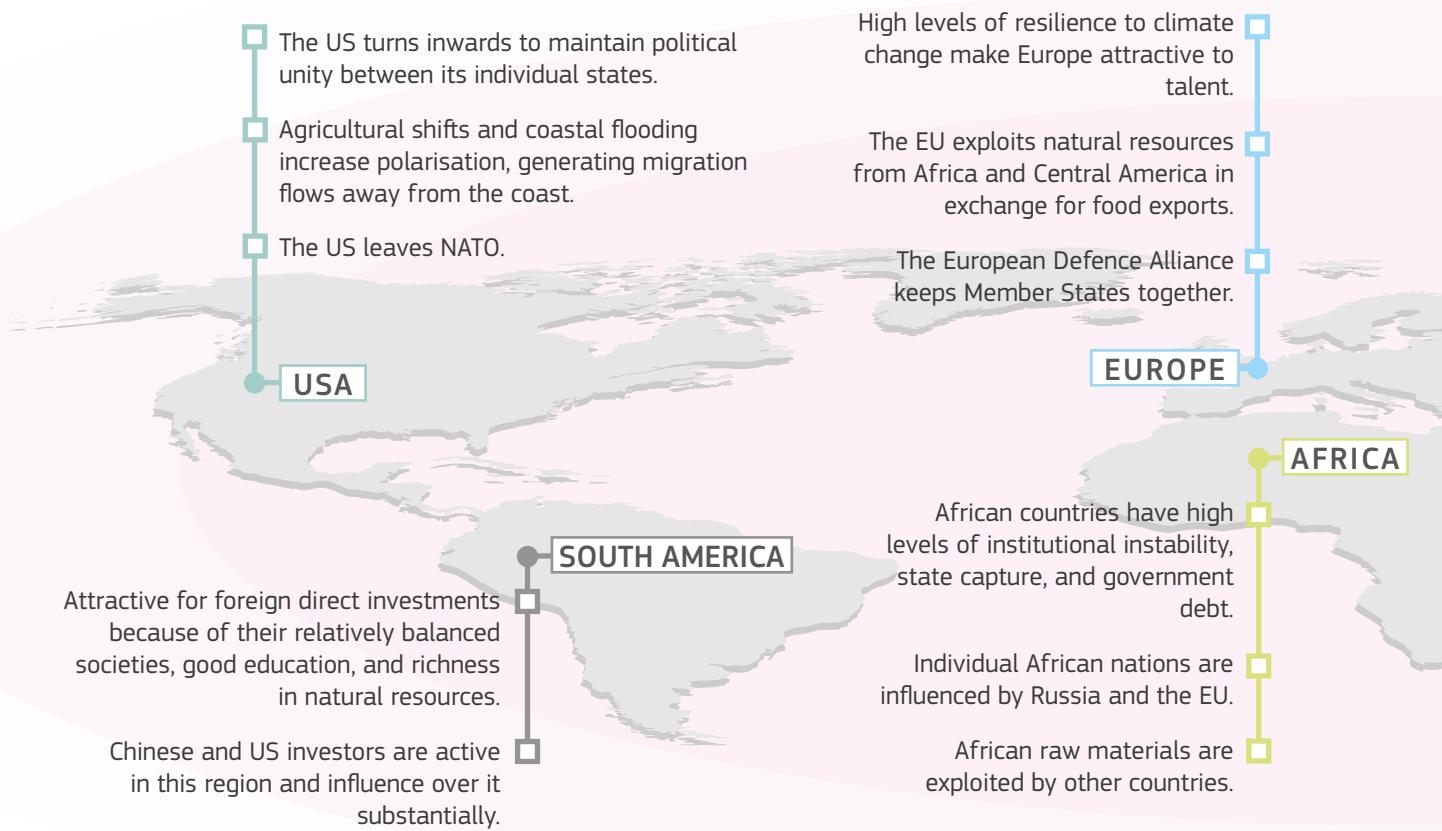
Geopolitical blocs strive to become less dependent on other regions to decrease their exposure to supply chain disruptions. They implement circular economy measures to reduce import dependencies and high import duties on commodities to protect local production. Multilateralism has become almost non-existent, except for regional blocs that focus on self-sufficiency. This increasing geopolitical compartmentalisation has led to a diversification of regulatory standards. The resulting decrease in global trade has created downward pressure on the GDP.

Military strength has become an important factor in securing influence and security. Geopolitical blocs ensure that they have the military means to protect themselves from potential aggression. Local wars often arise, especially in regions lacking water and food, such as sub-Saharan Africa and the Middle East. Cyberattacks (e.g. hacking and phishing) have become a predominant dimension of geopolitical conflict among wealthier countries. In particular, state-led industrial espionage has increased substantially because collaboration through science partnerships across regions has decreased.

How has global society reacted to environmental degradation?

Because of the collapse of multilateralism, a globally coordinated approach to climate mitigation





and environmental protection is impossible. The reduced global efforts to mitigate climate change will lead to a temperature increase of 3°C by the end of the century, compared with pre-industrial levels. This development has led to stark increases in extreme climate events, which have affected the inhabitability of many regions.

The negative impacts of climate change have had fewer effects on countries in the Northern Hemisphere, as they have been able to invest in climate change adaptation. In contrast, regions close to the equator and in South and Southeast Asia were more severely hit. In addition, they did not have the funds to implement climate change adaptation measures. This has led to increased human casualties and global inequalities. Another outcome of this development is the increased pressure to migrate for people who used to live in regions that are no longer habitable.

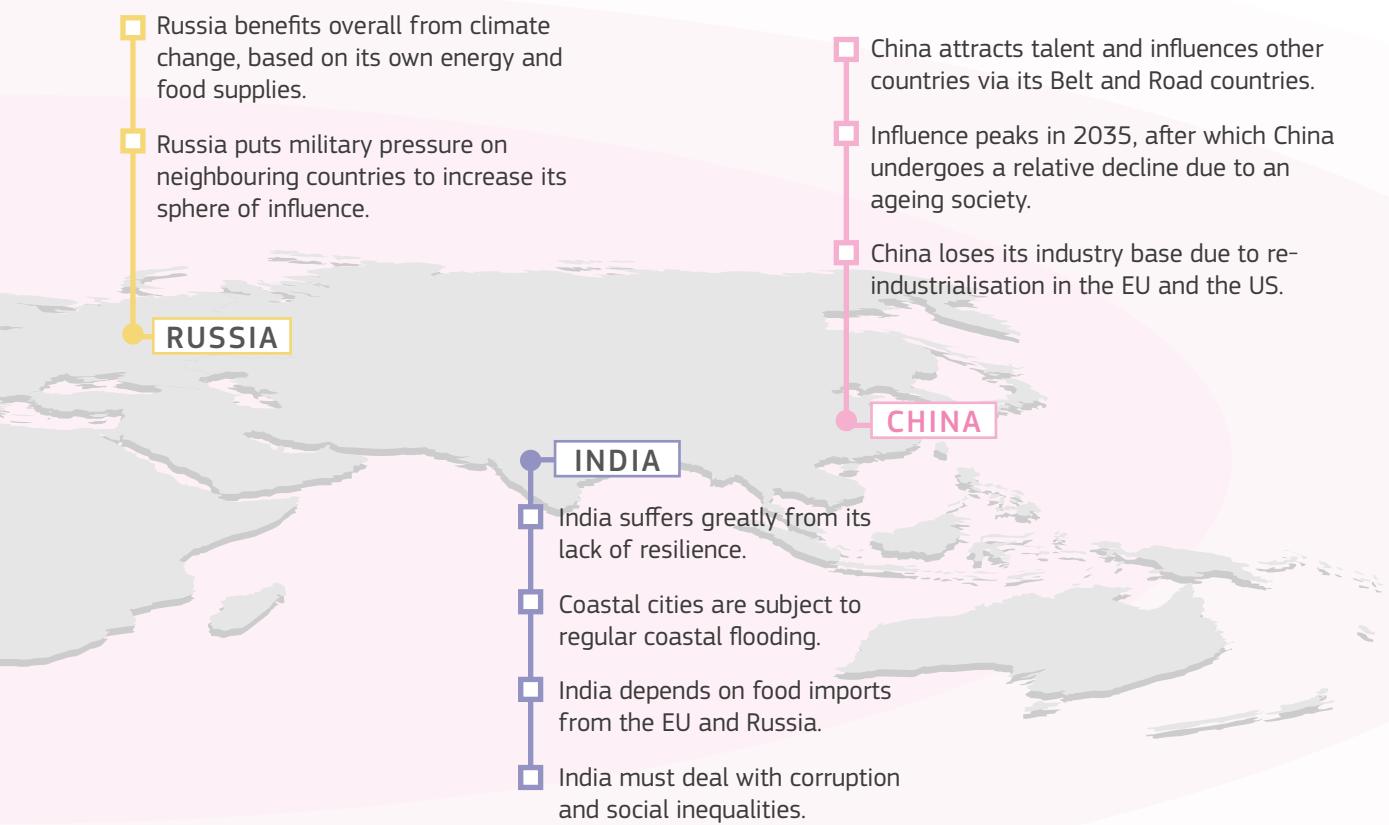
Some regions invested in reducing local pollution and biodiversity loss with the aim of avoiding the

destruction of food chains, which would increase their dependency on food imports. However, without the support of wealthier regions, these efforts could not be made in poorer regions, which led to accelerated biodiversity loss and reduced access to food.

How has the nexus of food, water, energy, and health evolved?

Increases in global temperatures and extreme weather events disrupted food and water supplies in the most highly affected regions, particularly the in Southern Hemisphere and equatorial areas. The resulting food and water shortages increased their prices, and the number of mal- and undernourished people among the global population increased substantially.

The goal of nations to be energy independent overrode the need to reduce greenhouse gas emissions. Therefore, each country's or bloc's energy supply is based on the cheapest available domestic resources. Countries or blocs with



growing populations and growing energy demands have built new fossil fuel-based and nuclear power plants. Others who had been dependent on energy imports tried to switch to renewables as much as possible.

Global warming has stimulated the propagation of insects (e.g. mosquitos) that spread new and old diseases in the EU (e.g. zika, West Nile, dengue fever, and Lyme disease). The spread of communicable diseases, such as transboundary health threats and pandemics caused by pathogenic viruses, has led to the control of medical care and vaccine supplies by some countries and blocs.

Which technologies are predominant?

The innovation landscape is fragmented, and exchanges between scientists across geopolitical blocs are limited. This development has slowed global innovation rates, as research is isolated and markets have shrunk. The global technology ecosystem has gradually become fragmented into a multiplicity of local platforms and standards.

The World Wide Web (WWW) no longer exists. Instead, a ‘splinternet’ is driven by protectionist policies and censorship, with divisions between Chinese, North American, European, and Russian-led internets. Digital business has become increasingly tightly regulated. Major global players must pay taxes in the state or region in which they operate. Local players have emerged, and the digital business market has become increasingly fragmented.

Innovative development focuses on technologies that can protect life, reduce dependencies, and protect citizens’ well-being. Large investments have been made in the development of medical and material technologies. Another research priority is adaptation to climate change. In particular, rich regions that can afford large investments in their resilience have led to this research field. Military research has increased because countries and regions use military power more often to impose their will on weaker partners.



Countries prioritise research areas that are relevant to themselves. For example, medical innovation in wealthier parts of the world neglects diseases that spread in poorer regions, but not in their own territories. This development has increased the risk of pandemics that originate in poorer regions that have no capacity or resources to develop treatments.

Transactional environment

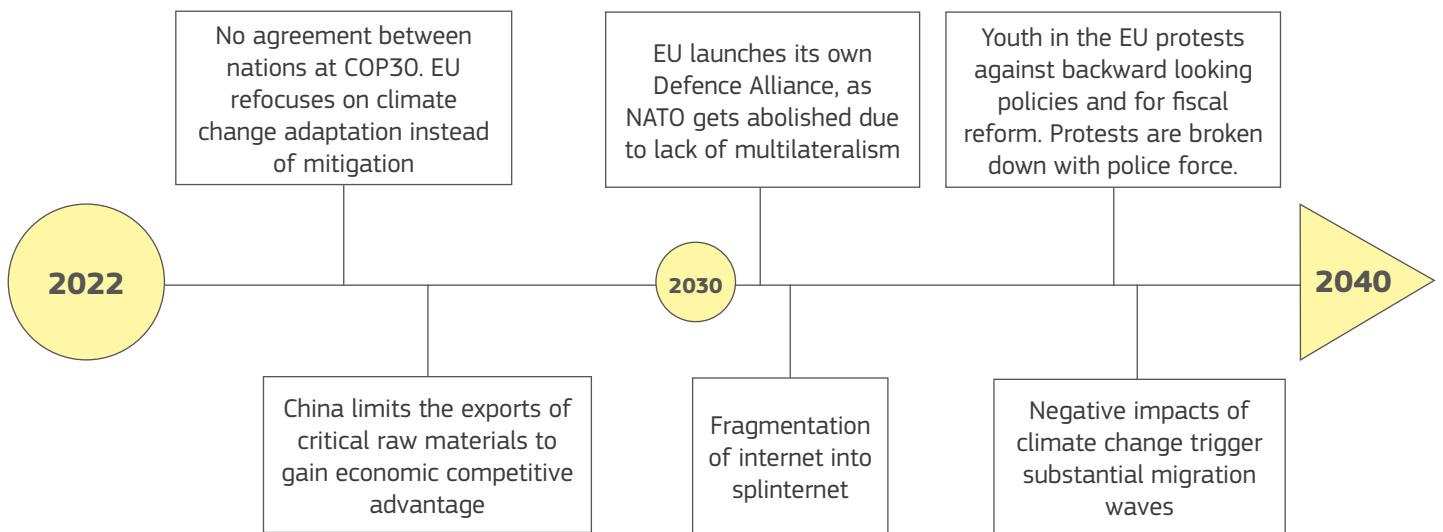
How does Europe function?

The EU Member States remain functioning democracies. In an ageing society, catering to the opinions of the elderly means winning elections. The public expects governments to ensure their security, and a large share of the public budget is spent on defence and climate change adaptation. Other budgetary priorities are welfare systems (e.g. pensions, and healthcare) and ensuring the independence of critical goods imports. The slowdown in global economic growth triggered increased tax rates in the EU.

Young people are excluded from political power and political life in general, as policymakers do not pay attention to issues that they deem important. The conservative society in the EU and the disconnect between the government and its citizens have led to internal tensions among societal groups. Youth have become increasingly frustrated because politicians prioritised the opinions of the elderly. This frustration has caused the formation of extreme political groups and movements that organise occasional attacks on public infrastructures to disrupt the social order.

Migrants have restricted access to welfare systems. After decades of petitioning, they still do not have voting rights. This treatment has caused migrants to organise large protests to fight for their rights. However, instead of negotiating with them, strong and centralised national governments have reacted by imposing sophisticated surveillance and strict enforcement of law and order.

Figure 14: Major events that took place until 2040



EXAMPLES FROM THE PRESENT THAT INDICATE THE DEVELOPMENTS THAT COULD LEAD TOWARDS THIS SCENARIO

- Glocalisation of supply chains (e.g. the boost of domestic semiconductor production in the EU).
- Lockdowns in the EU during COVID-19 favoured protecting the aged.
- China is trying to fragment global internet space, and Russia is creating a cyrillic-based Internet.
- The US Inflation Reduction Act aims to develop mainly domestic energy production.
- China threatens to reduce solar panel exports to the EU.

What is the situation regarding Europe's institutional memberships?

The EU's focus on preserving its geopolitical status led to increasing its influence as a geopolitical bloc. Some Western Balkan countries have joined the EU although their citizens are still subject to strict controls of their movements, including their ability to work in older Member States.

The enlarged EU now focusses on economic issues, while social and environmental issues are left to its member states. The growing number of Member

States has led to a fundamental change in the way the EU functions: decisions are no longer taken by consensus but by qualified majorities.

The EU has negotiated new free trade agreements with closely cooperating countries. On one hand, these free trade agreements broaden its sphere of influence in the Middle East. On the other hand, they are vehicles for the EU to ensure that non-EU members are allies and to influence them by setting regulatory standards.

END GAME

Après moi, le déluge



Instant wealth is prioritised over long-term well-being. But how did we get here? Why did human ingenuity and technology not turn the situation around? The answer must lie in our deep human attachment to wealth. We crave it, even if it requires us to exploit each other and the planet on which we live. Escaping this trap would require individuals, corporations, and their nation states to cease this exploitation collectively. But how? Who polices it? Why now? These questions did not want to be answered.

We ignore uncomfortable truths, allowing private interests to dominate public policy by reframing proposals into the so-called win-win models where the GDP is the only mandatory winner. In short, exploitative economics remains

king, polluters avoid consequences, and social capital is low. Our global financial institutions are intact and function well. Hyper-winning businesses are still being created. Global trade has boomed in recent decades. Material standards have risen for many despite the collapse of natural ecosystems.

Step by step, Big Tech has digitally managed to insert itself into an ever-broadening sphere of human activity by dominating public decision-making. Wealth has shifted away from the physical to the virtual world, mainly because nation states are weakened and they are no longer able collectively to impose an effective, or fair, taxation model. Old Europe has been dragged along. The Eurozone rationale predominates, and pension and healthcare reform

has closed the government deficits.

Conflict is never far away. Rogue terrorists exploit disinformation to underpin cyberwars. For now, the US and the United Arab Emirates dominate the space race, with Europe following. China's (forced) devolution of power to the regions has been driven by demographics, debt, and enhanced global competition.

Scientists tell us that in the collapsed ecosystem, temperatures will rise by 4 °C within 60 years. The essence of our economic model is that damages to common goods, such as the environment, must be paid by society at large, not the polluter. We may live on a dying Earth, but at least some of us are wealthy.

Contextual environment

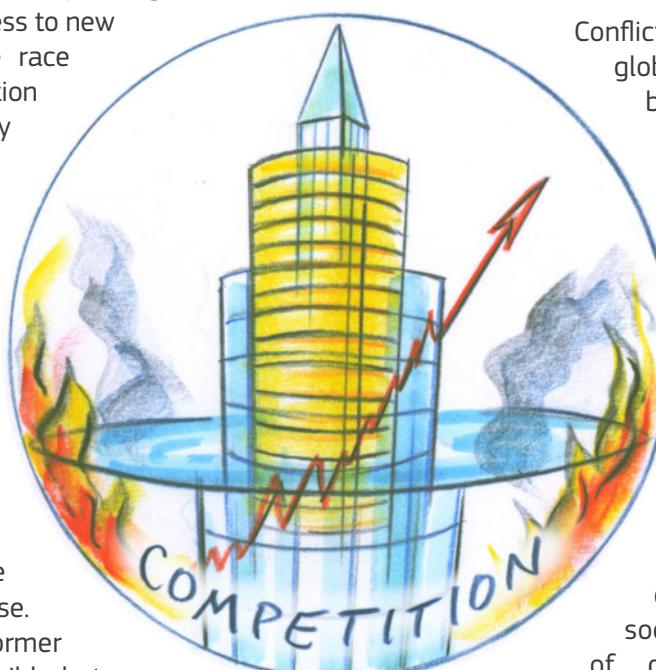
Which social values are globally predominant?

Economic growth trumps well-being. International competition for companies and jobs has increased the influence of businesses over policy makers. Former welfare states have retreated to the core task of providing security. Authoritarian powers and the rise of populism have led to decreased protection of the environment and human rights.

Innovation is considered a means of achieving competitive advantages, mainly through higher efficiency and access to new types of resources. The race for leadership in innovation is further fuelled by the need to deal with an increasingly hostile planet and depleting resources. Automation has increased in all areas of life and work, which has led to massive job losses.

A powerful elite steers economies and prioritises wealth, while social inequalities increase. The majority of the former middle class forms a flexible but vulnerable lower-class workforce that is geographically dispersed around the world as 'gig' workers, resulting in widespread social tension and dissatisfaction.

Alternative self-governing communities have increased, where like-minded people live sustainably "off the grid", sharing high levels of solidarity and resources away from polluted cities. However, although these small communities lack common interests, they could unite and grow into a larger social movement that could influence policymaking.

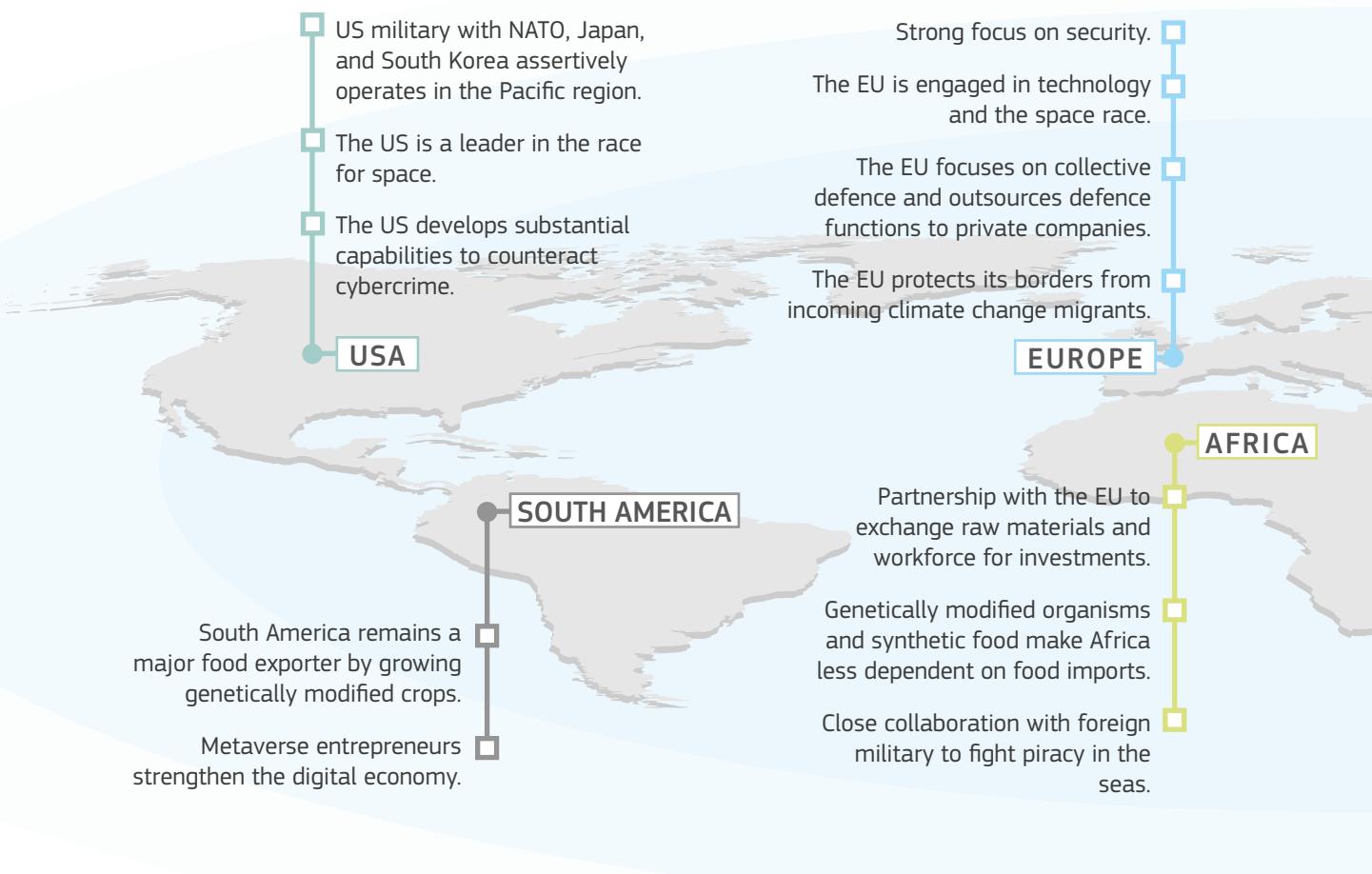


What is the nature of geopolitical power?

Trade has expanded globally in the past two decades, driven by ever-increasing consumers' demands for goods. Geopolitical power is largely based on economic strength. Location-specific competitiveness and advantages shape the power of the state. The innovation capacity of regions is crucial for increasing influence in emerging economic fields, such as space exploration or human enhancement. Low-level regulatory intervention by the state, reliable economic conditions, financing power, and labour availability are key for the growth of business.

Conflict and cyber-conflict occur globally and are conducted by rogue states or terrorist organisations. Cyber-defence capabilities and dual-use technologies are crucial for ensuring the integrity of the state and maintaining infrastructures critical for people and for the industry. These conflicts have also had an increasing impact on the civilian world. Vulnerable societies are often victims of cyberattacks on critical infrastructures because they cannot invest in backup systems.

Opportunistic global alliances driven by self-interest have emerged. The development of an African Continental free trade area has increased foreign investments and trade with Africa, which are attracted by new opportunities offered by a stronger regulatory framework. In the same period, Africa's working-age population has increased, which has led to demographic dividends (i.e. a high proportion of a working population in the total population), expansion of regional economies, and a further reduction in poverty.



How has global society reacted to environmental degradation?

The environment continues to be heavily exploited by humankind. There is a collapse of natural ecosystems on land and in the sea. Polluters still manage to avoid paying a price for damaging the environment. Global efforts to establish carbon pricing have failed because it is assumed that it would negatively affect economic growth. Emissions lead to global warming by 4 °C by 2100 compared with pre-industrial levels. Harsh and costly impacts of extreme weather events and environmental degradation have become more frequent.

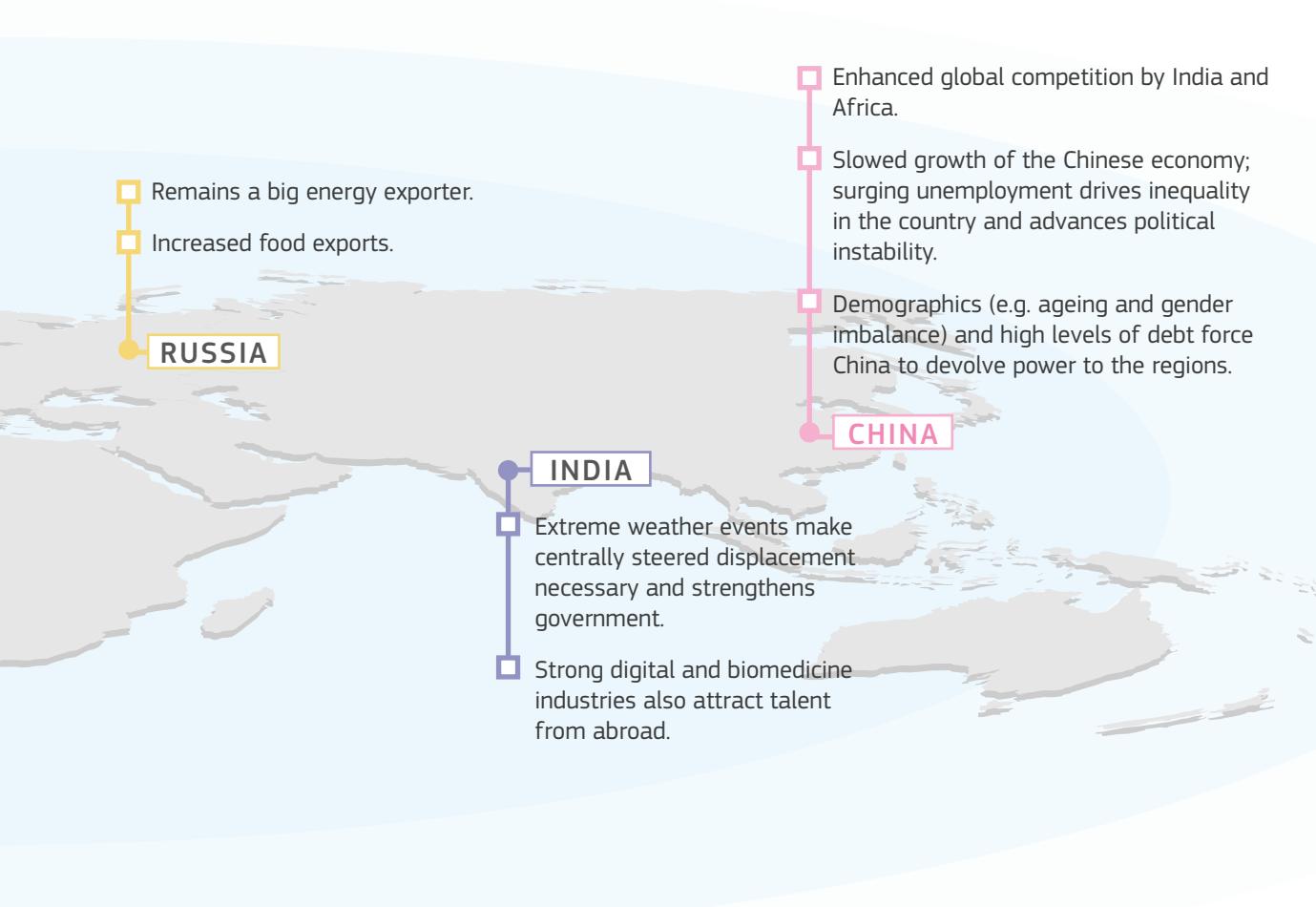
Those who rely on natural ecosystems, such as fishing communities or people living on the coast, are under pressure to change their sources of income and places of living. They face a deep crisis and forced migration. Due to the rise in sea levels and desertification, the amount of liveable and

usable land has decreased, especially in countries in Africa and the Southern Hemisphere.

Europe and other continents have failed to achieve the UN Sustainable Development Goals in 2030. However, Europe has continued to present its overall agenda as environmentally friendly, and it might be the first continent to become carbon neutral, possibly by 2060.

How has the nexus of food, water, energy, and health evolved?

Climate change has negatively affected crop and livestock farming, which is partly due to desertification, and seafood production because of rising temperatures and water scarcity. This has impacted the autonomy of local food supply chains, and the limited quantities of meat and fish available are very expensive. Genetically modified organisms are widespread because they are the



only crops that are able to produce high yields while resisting extreme weather conditions and new pests. Synthetic meat and dairy products also play a huge role in nutrition. This has partly reduced the requirements for land, water, and energy, as well as the threat of potential human diseases. The scarcity of clean water in the Middle East and Africa triggered a global migration wave from 2030–2040. This scarcity was caused by a reduction in water resources and increasing pollution combined with an increase in the demand for water.

The energy transition has slowed down because of the increased prices and scarcity of raw materials. The energy system is driven by fossil-fuels and renewables in an energy-source mix. The mobility sector is still fossil fuel heavy, except for cars and trains, 100% of which are electric.

Climate change has also profoundly affected humans and their health. However, health technologies flourish and contribute to finding solutions to new health issues, but they are available only to the wealthy in the global world population.

Which technologies are predominant?

Private investment in research and development has led to high innovation rates, with the aim of maintaining corporate power and fuelling GDP growth. Technology breakthroughs combined with soft regulatory approaches have increased, and their use has expanded and empowered tech companies. Investment is channelled towards Industry 7.0, which is based on virtualisation. It is a continuation of increased collaboration between humans and smart systems through the use of collaborative robots (Industry 5.0) and computer-aided antifragile manufacturing (Industry 6.0).



Harsh environmental conditions have driven innovation in synthetic food technologies to substitute natural food sources that are no longer viable. To survive, the world now needs the mass production of synthetic food. Human enhancement by sensors and artificial body parts has equipped the military and the wealthy with the resilience to live long lives despite environmental perils.

Geological surveys have shown that the moon contains three crucial resources: water, helium-3, and rare earth metals. EU space companies are investing in moon-mining projects by 2045. With the help of improved technologies for space travel, the EU has joined the race led by the US and the United Arab Emirates.

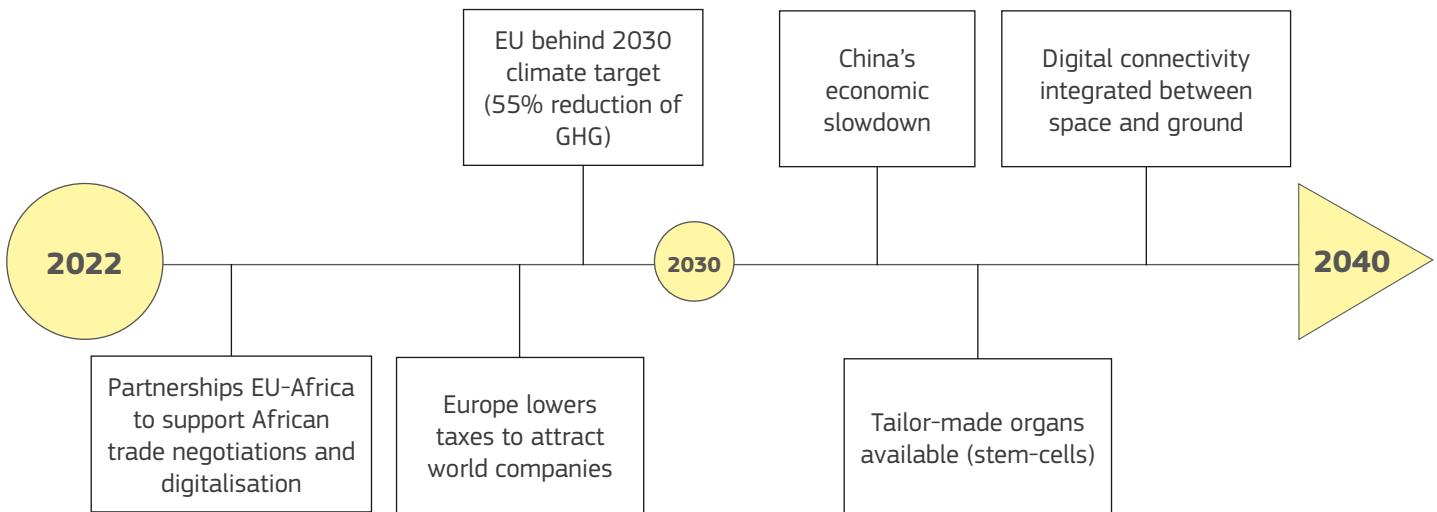
Transactional environment

How does Europe function?

The EU Member States collaborate to harvest the benefits of a single market. Low levels of personal and corporate taxation attract private companies to operate in Europe. Because of the low-tax environment, material standards rise, but economic power is in the hands of private interests that weaken political institutions on all levels. Reskilling programmes are offered by private companies in Europe and elsewhere to help the labour force meet new work requirements, including the augmentation of bodies and brains to stay competitive.

In this multi-tiered Europe, the EU has various layers. Diverging social and cultural contexts and forces often drive EU Member States towards nationalism. However, the EU is united in border control. Public-private partnerships have helped Europe become and stay strong in the area of security and cybersecurity, which has led to the development of a strong private military contract industry.

Figure 15: Major events that took place until 2040



EXAMPLES FROM THE PRESENT THAT INDICATE THE DEVELOPMENTS THAT COULD LEAD TOWARDS THIS SCENARIO

- QAnon conspiracies played a role in the storming of the White House on 6 January 2021.
- Two-tier Europe is promoted by some Member States.
- France announced a 25% increase in government spending on space for its national agency as well as the European Space Agency.
- COP27 results indicate a lack of ambition to phase out fossil fuels.

What is the situation regarding Europe's institutional memberships?

Political decision-making at the EU level is difficult in a multi-tiered Europe, where most countries prioritise their own national interests. The inability to reach unanimous decisions has also led to an impasse regarding the revision of EU treaties (e.g. lack of new areas that can be decided by majority voting).

Dissatisfied with the norms and requirements of EU membership, two EU Member States left the EU in the 2020s. The accession process has also become burdensome. After the accession of two newly formed independent countries in 2030, a

further enlargement process was halted, and a two-phase membership was established, which consists of an outer tier and an inner tier.

A new community of countries associated with the EU was established in 2033. This community includes the EU and a dozen neighbouring countries. It coordinates and agrees on actions and directions jointly in the areas of energy, transport, and infrastructure investments.

STRUGGLING SYNERGIES

Imperfect consensus



We live in a world of relative economic prosperity and multilateralism. Slowly, somehow, we jointly zigzag and navigate our way towards climate neutrality. Will our desires defeat our values? Can we stay aligned? Will we comply?

The world has inched forward in creating a more enduring planet. True, especially in Europe, we have acted faster when self-interest has been aligned with a better quality of life, such as in the energy sector. However, progress has been made. Yet, all around us, we see that this is an imperfect consensus. Our oceans and food supply chains need attention. Mental health is a major concern.

Construction, urbanisation, and technology have all helped emerging economies, as expected. The US is a pillar in the global debate, especially because of its competent, albeit aggressive, corporations. China, with its soft power and infrastructure network of allied nations, especially in Africa, is a global green leader. India's low-cost digital technology is omnipresent.

Europe is part of the global agenda. However, we have been slow and careful in all multilateral discussions, rules, and standards. There have been endless volumes of expert reports and a heavy compliance regime. Anger in a lonely civil society has been amplified by a

conspiracy culture in which experts are considered the root of all evil, and some ancient fights on acquired social rights are resurrected.

The EU is now attractive to Eastern countries free of Russian influence, but elsewhere? The truth is, we are struggling, stagnating. Our new, veto-rich, semi-federal model is only just settling in, and EU membership has diminished. NATO defends us, and we enjoy the privilege, but there are costs.

We started this journey as moral leaders, and we might end it as ageing followers. Have we done enough? No. Will we be able to do what is still required? Maybe.

Contextual environment

Which social values are globally predominant?

There is a strong multilateral determination to fight climate change. In a consensus-driven approach to working across countries and regions, the common denominator is that climate change is the greatest threat to the survival of humanity. Therefore, other environmental, economic, and social aspects of sustainability are sidelined. Biodiversity, degrading soils, and water scarcity are still major issues that remain unaddressed.

Social inequalities have increased between those benefitting from the climate transition and those who have lost jobs in carbon-intensive industries. Citizens increasingly struggle to find a balance between global values and their personal desires at the crux of consumption and sustainability.

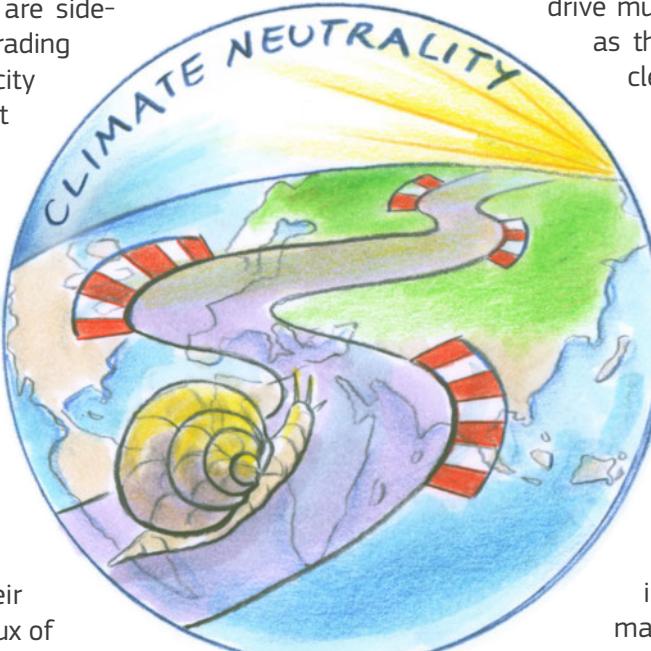
In public discourse, there has been a surge in brand-related ethical shopping. Indexes of individual health, social support, work-life balance, and life satisfaction have declined in the last decade. Loneliness is now reported as the most urgent urban pandemic.

The youngest generation to achieve power blames senior citizens for the ecological disasters of the past decades. A large proportion of the elderly population in the EU, the US, and China is perceived to be a burden on healthcare and welfare systems. Complex industrial systems of algorithmically led assisted living deliver the cost-efficient care that was previously provided by families. Pension reforms triggered by high levels of indebtedness and spending on climate action have pushed other

pressing social issues into the background.

What is the nature of geopolitical power?

Multilateralism has greatly increased in significance. The ability of regions to pursue their own interests largely depends on their diplomatic capacity. The common goal of climate neutrality has forged an all-encompassing community of cooperating countries and regions. Countries and regions that have the capacity and experience to drive multilateral discussions, such as the EU and the US, have a clear advantage in steering the climate transition to benefit their domestic economies.

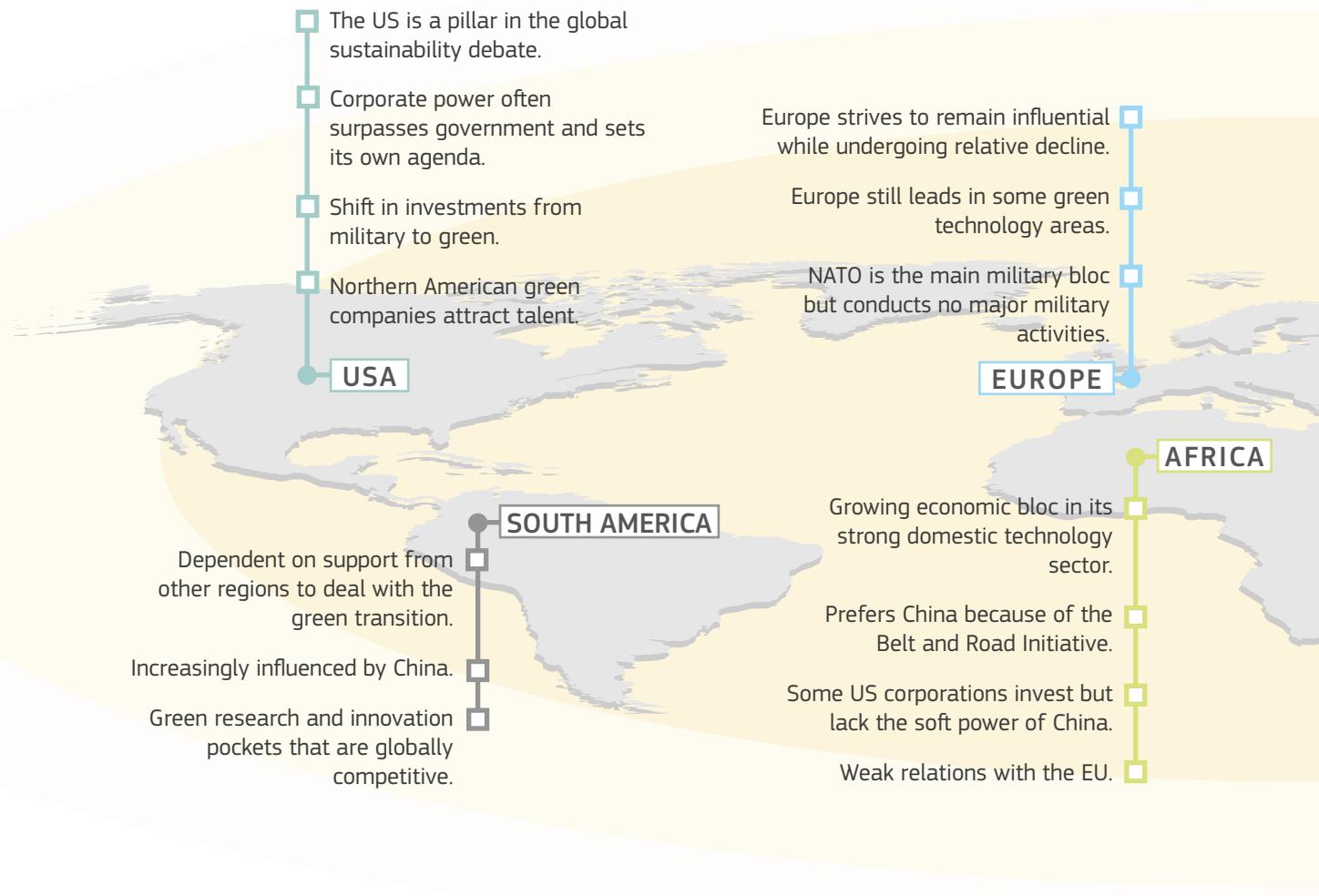


Technology leadership in low- or zero-carbon technologies is another determinant of success. Countries that invested early in these technologies, such as China and the US, have created a competitive advantage in substantially growing markets and drive the climate transition.

Competition for talent has increased. US corporations monitor vibrant European and African innovation hubs to poach highly qualified workers and scan emergent skill profiles. The EU has tried to counter this trend through public investments in research and innovation support systems. However, its businesses and industries are incapable of retaining their best people, who have begun to engage with US and Chinese corporations.

How has global society reacted to environmental degradation?

In the 2020s, the increase in climate change-related extreme weather events united global society in the push for climate neutrality. A group of front-running countries and regions led by example and reduced their greenhouse



gas emissions by 75 % by 2035, compared with 1990. Public and private actors aligned to meet the pledges of the Paris Agreement. They inspired large parts of global society to co-create a world in which global warming is limited to 1.5 °C. However, the unidimensional quest to limit climate change left countless other sustainability challenges unaddressed.

Some regions in the Southern Hemisphere have benefited from climate change mitigation. Investment programmes related to climate action have helped their emerging economies to grow. North Africa and South America are increasing economic blocs with globally competitive green research and innovation pockets.

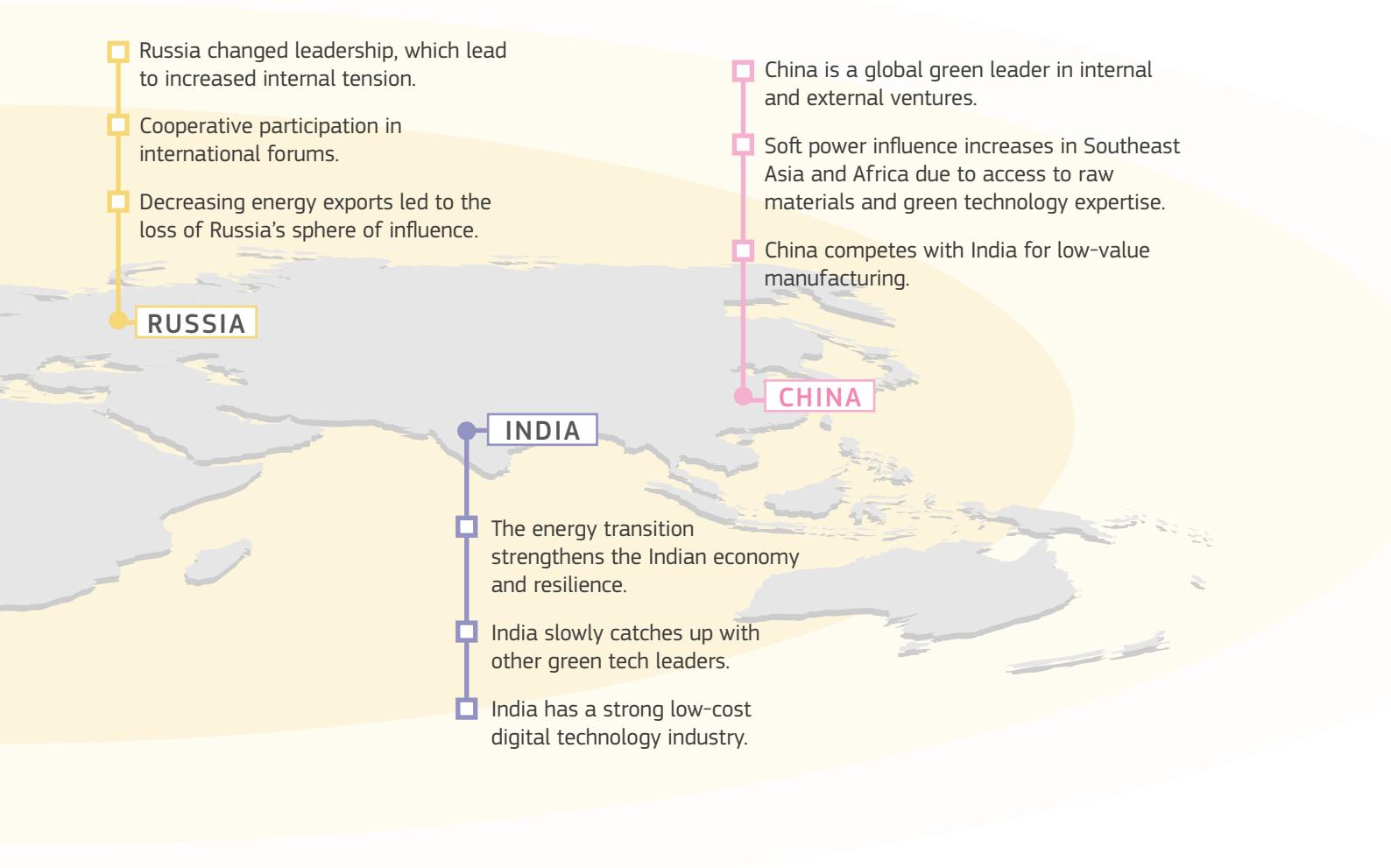
In contrast, the impact of climate action has been substantial in regions with economies that rely on fossil fuels. Fossil fuel-based industries collapsed, leading to economic turmoil in places such as the Arabian Peninsula. Aid packages were

recently discussed at the UN to boost this region but were immediately vetoed by both US and EU representatives.

How has the nexus of food, water, energy, and health evolved?

Food production has been stable globally, supported by digital technologies, such as artificial intelligence, in boosting crop yields and digital twinning in farming. It also relies on the continued heavy use of climate-neutral fertilisers and pesticides, which has had a negative impact on biodiversity; the extinction of species continues at a high rate. The negotiation of international agreements on water and food management is complicated because of competing regional interests and technocratic structures.

The energy transition was a success. Fossil fuels were phased out in the 2030s in all sectors, including long-distance travel. Nevertheless,



this success could not be transferred to other areas of sustainability because of difficulties in building international consensus.

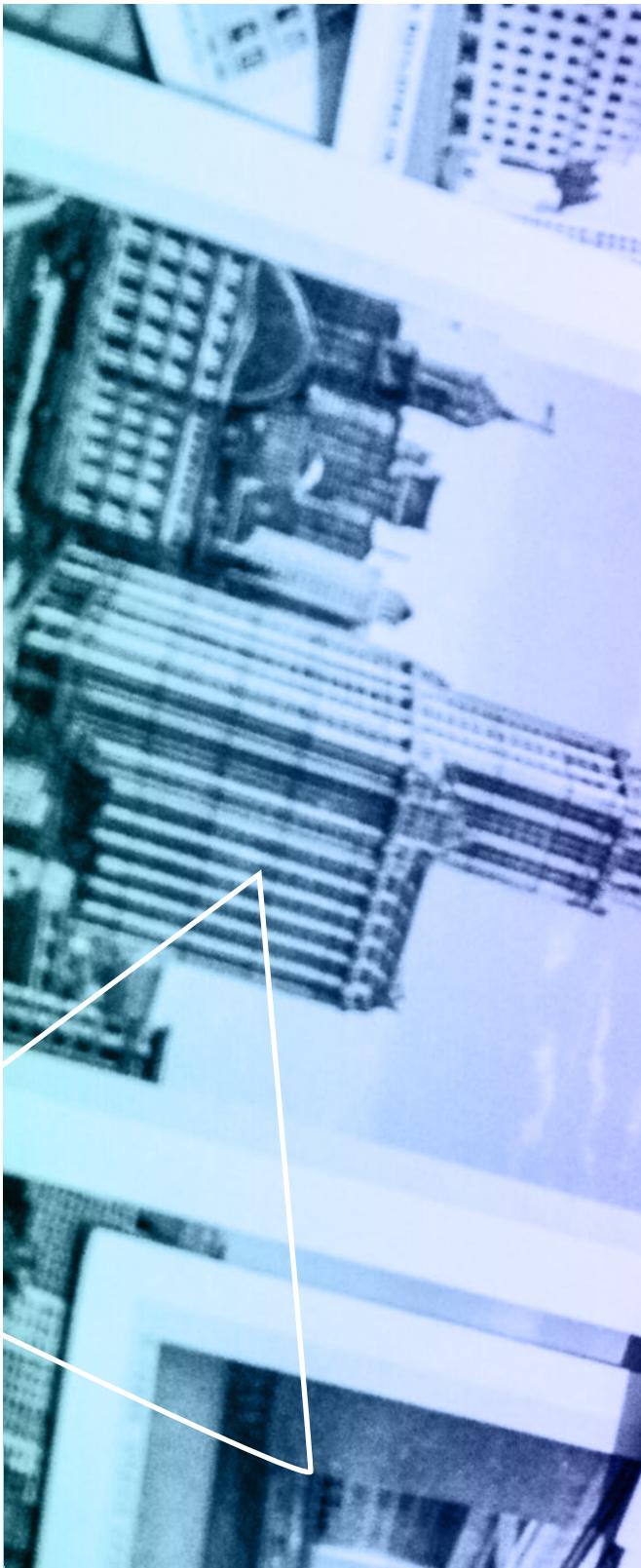
There has been progress in health-related matters, especially in poorer regions. Nevertheless, less priority is given to several issues, such as obesity and poor mental health, and their negative impacts have increased, mainly in the Northern Hemisphere.

Which technologies are predominant?

Innovation is mainly mission-oriented, creating solutions to societal challenges based on public values. A new multilateral agreement was reached under the United Nations Framework Convention on Climate Change (UNFCCC) to support zero-carbon technologies. This agreement aims to foster breakthrough innovation as well as financial support for poorer regions to implement zero-carbon technologies.

A global greenhouse gas emission trading system has been another main driver of the implementation of zero-carbon technologies, such as renewable power generation technologies. This trading system also remunerates for negative greenhouse gas emissions, which has triggered the development of carbon farming technologies. These technologies are now an important pillar of the economy, particularly in countries with high renewable power generation resources. Another area of interest is monitoring systems for greenhouse gas emissions, which has gained importance because of new multilateral agreements.

The young political elite also advocates innovations that reduce the costs of caring for the elderly. Areas of innovation are care robots and complex industrial systems of algorithmically led assisted living that replace humans in delivering care.



The latest trends in the private sector are AI-conscious systems that ensure that companies' targets are met without affecting profit maximisation.

Transactional environment

How does Europe function?

The EU's governance has become extremely complex because of its slow-moving bureaucracy and increasing governmental weight. A growing number of veto rights of the European Commission, Parliament, and Council have resulted in unsolvable bottlenecks. There is high resistance regarding the overhaul of legacy structures and the termination of overlapping programmes.

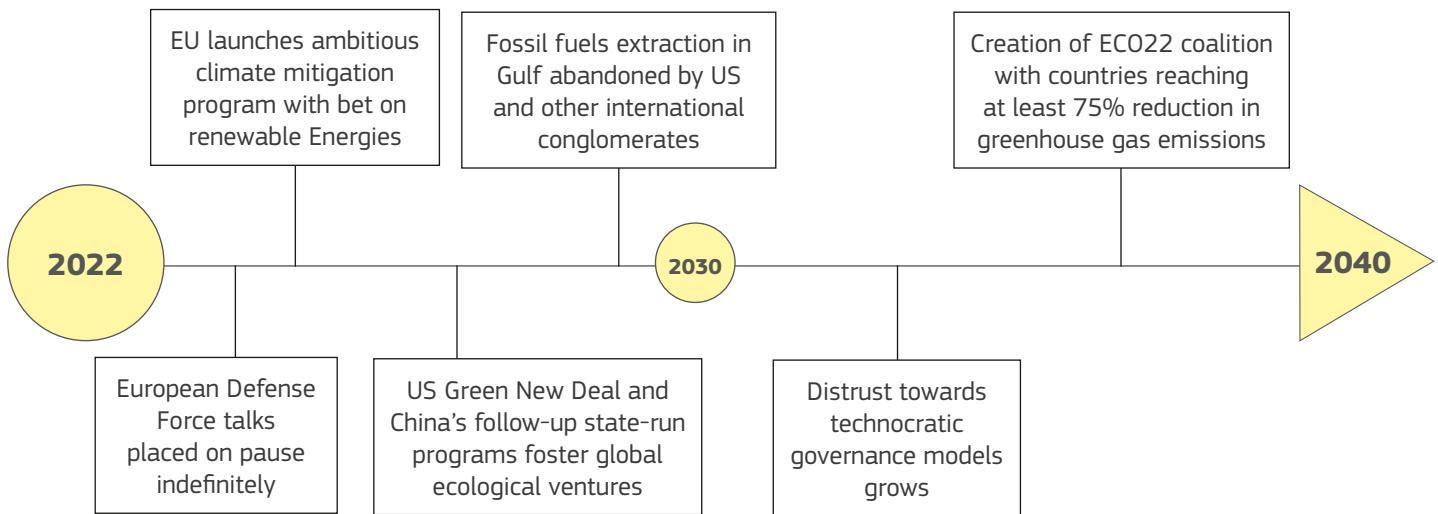
The EU has embraced a semi-federal model following new political alignments after the 2034 elections. The European Parliament integrated the Committee of the Regions and the European Economic and Social Committee into a separate chamber. Although voter turnout was the lowest recorded, the 2039 election also saw the first direct election of the Commission's president.

Citizens' support for policies that continue to advocate climate action is still high in many countries, and the EU plays a strong role in regulating and monitoring emissions. However, technocratic governance models, their corporate consultants, and endless expert reports are distrusted. In reaction, new ecological belief systems have emerged from older and middle-aged citizens. These new schools of thought have shifted them away from science and reinforced ideological conspiracies to unprecedented extremes.

What is the situation regarding Europe's institutional memberships?

The increasing roles of global multilateralism and political bottom-up movements have been detrimental to the EU's influence. Two South Mediterranean countries left in the 2020s. The Eurozone currently has 16 members after the

Figure 16: Major events that took place until 2040



EXAMPLES FROM THE PRESENT THAT INDICATE THE DEVELOPMENTS THAT COULD LEAD TOWARDS THIS SCENARIO

- Renewable energy has expanded globally.
- President Biden won the US election, partly in support of his green agenda.
- The US rejoined the Paris Agreement.
- Global corporations shifted to stakeholder economics, where businesses are encouraged to create value for all stakeholders and put humans and environment first.
- Electric cars tripled their market share from 2019 to 2021.

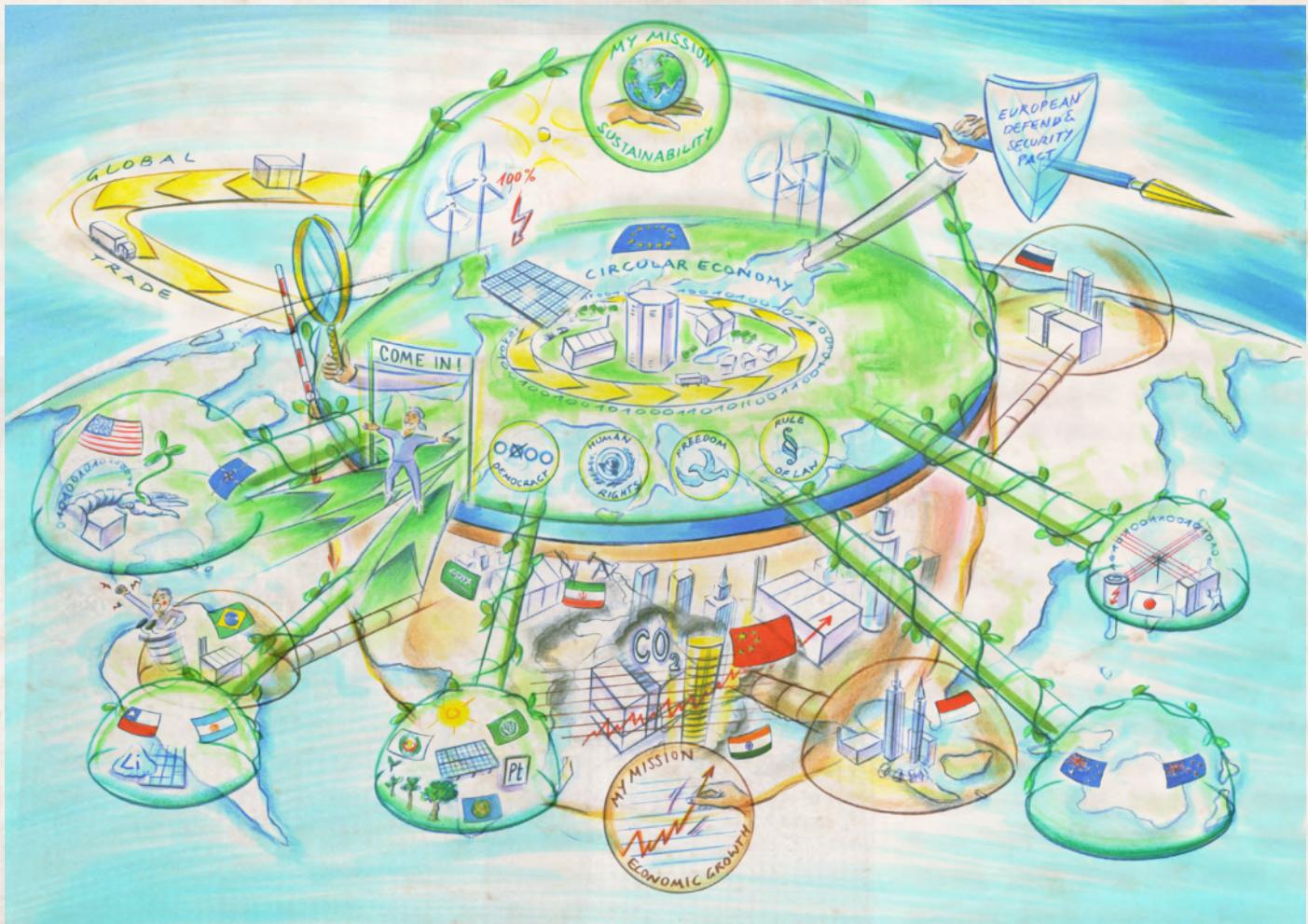
recent loss of these two Member States, and two other southern countries have failed to comply with strict fiscal reforms.

The European Economic Area expanded the internal market and the EU Customs Union. Membership grants limited political representation and wider access to EU funding. It includes all former European Free Trade Association countries, former EU Member States, and all Western Balkan countries. The majority of the countries that were

part of the former Soviet Republic, excluding Russia, joined the European Economic Area as a bloc in the 2030s and were thus closely aligned with the EU.

OPPOSING VIEWS

A bipolar world



You need a lot of energy and courage to follow your principles. There is the constant doubt: Are we right? Would global alignment not be better? Was there, is there room for compromise? How can we persuade or co-opt others?

We Europeans have a deep sense of passing on a better world to future generations. But can we? Will the promised long-term gain ever materialise? Together with an alliance of like-minded countries, we have co-created a world in which everything is carefully measured to deliver sustainability in the most effective ways.

Our deep-seated sense of purpose has permeated our political discourse and every element of

society. We are led by political and business leaders and cheered on by technological successes and cleaner cities. We are proud when the world's best and brightest beat a way to our shores to further our sustainability values. We feel secure in our new role as a net energy exporter and our leaps in a circular economy. At the same time, many people and economic agents attack this isolated green push and are frustrated that their counterparts in Brazil, India, Russia, and China focus solely on their economies.

Confronted with this divided world, we have sought allies. An important partnership is with the US. Japan is a solid Asian pillar. Chile and Argentina are our friends

in South America, and we can rely on Australia and New Zealand in the Southern Hemisphere. However, we are also exploring new partnerships with a handful of North African states, with which we have formed a solar energy hub.

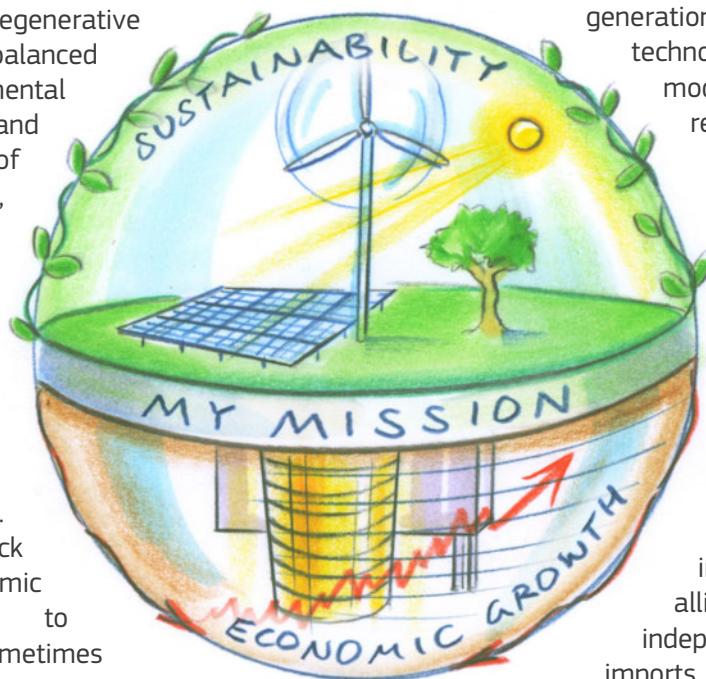
Trade with non-like-minded partner countries is pragmatic rather than protectionist. The focus is on finding substitute technologies or exchanging clean technology for imports. Despite a certain isolation and a few mistakes along the way, our ideas seem to work. We are poorer than others. We are frequently criticised on all sides. But there can be no going back.

Contextual environment

Which social values are globally predominant?

A green enlightened and Eurocentric elite leads the interests of future generations in a progressive global bloc called the 'regenerative alliance'. Social equality and environmental sustainability are the top priorities in the regenerative alliance. These priorities are assumed to be tightly intertwined with the values of democracy, human rights, freedom, and the rule of law. The focus on holistic sustainability in the regenerative alliance ensures a balanced approach to environmental and social protection and leads to the recovery of natural ecosystems, but it also means that resources are allocated according to many different priorities. Moreover, the mitigation of greenhouse gas emissions is not proceeding quickly. Another drawback is unstable economic development due to stagnating and sometimes contracting GDP.

In contrast, an 'exploitative alliance' includes Brazil, Russia, India, and China, which follows a different approach. Economics and efficiency are prioritised without an emphasis on sustainability goals. In exploitative alliance countries, the lack of investment in circularity has resulted in continued high resource consumption that cannot be satisfied by local sources. Diplomatic and military conflicts are common between countries and regions in competition for access to resources. The environment is still deteriorating in these parts of the planet, which has negative consequences for habitat conservation and human health.



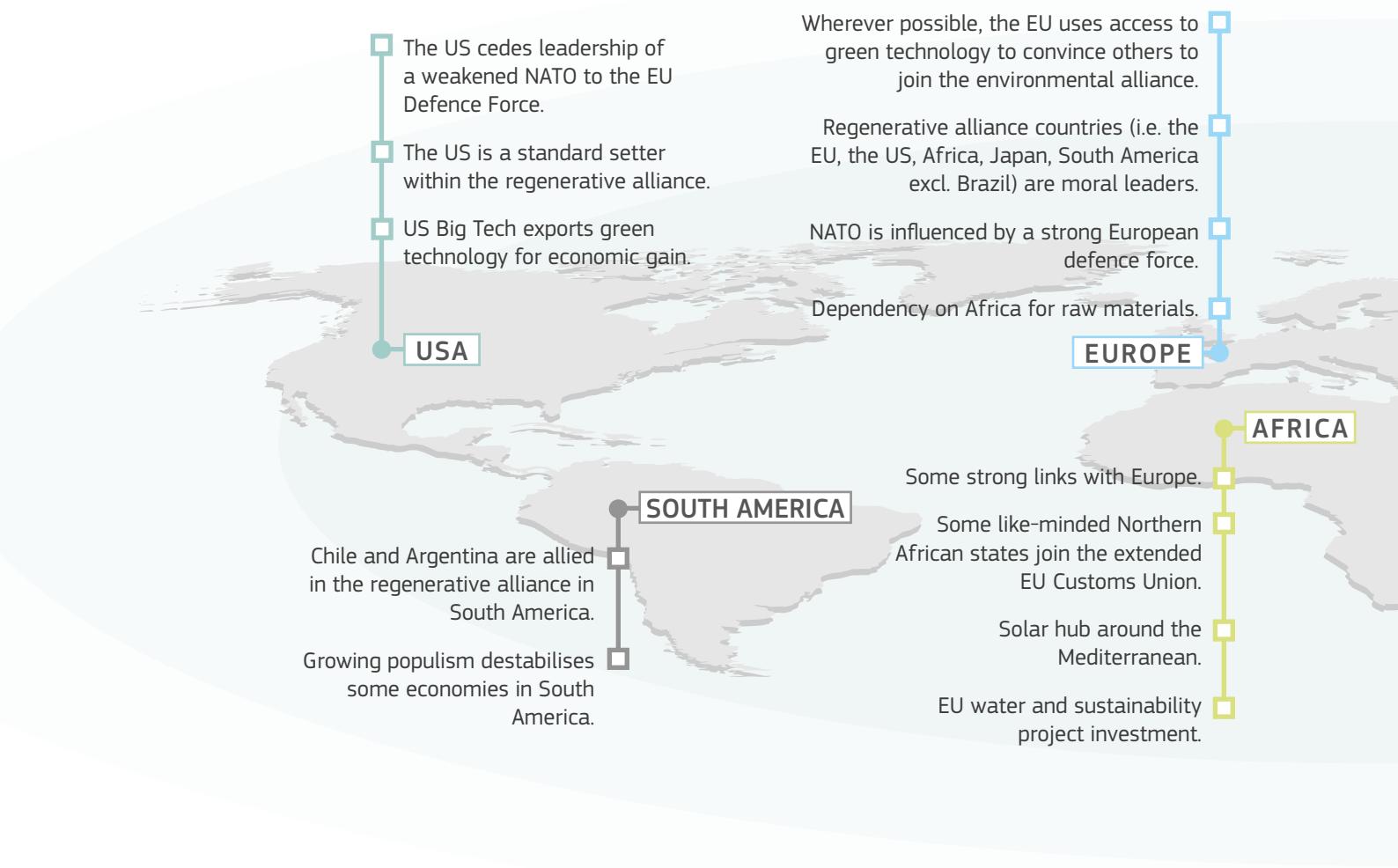
Both the regenerative and the exploitative alliances endeavour to promote their models to neutral countries and regions to increase their geopolitical influence.

What is the nature of geopolitical power?

Selective trade practices and bilateral agreements are used as both payback and leverage tactics. Regenerative alliance countries export their green technologies in return for pledges to increase environmental protection efforts. Exploitative alliance countries export next-generation resource exploitation technology and genetically modified crops to secure a reliable yield in return for the natural resources needed to sustain their domestic economies. In particular, the two blocs seek the favour of neutral countries in South-East Asia, Africa, and Central and South America.

Access to natural resources is still important, as neither alliance is completely independent of resource imports. The attractiveness of their models to citizens also constitutes a competitive advantage. When neutral countries join an alliance, their geopolitical weight increases. Another advantage is the opportunity to attract talent from other regions, which helps accelerate innovation cycles.

Serious tension exists between nations, which affects some neutral countries and regions. Regenerative alliance countries have high military capabilities and offer protection to neutral countries in return for sustainability pledges. This comprehensive security model goes beyond the traditional military approach to include human, economic and environmental relief, support, and aid.



How has global society reacted to environmental degradation?

Countries in the regenerative alliance prioritise environmental and social concerns over economic sustainability and advocate for a transformation towards a new collective resilience. The 'De-Growth!' movement exerts a major influence on policy makers. Environmental and happiness indicators have become key performance indicators of governance. The EU leads by example in this bloc and is situated on the most promising path to become the first carbon-neutral region. Local environmental ecosystems are recovering, and soil health and productivity have greatly improved. The EU exports green technologies to enable other regions to achieve similar environmental targets.

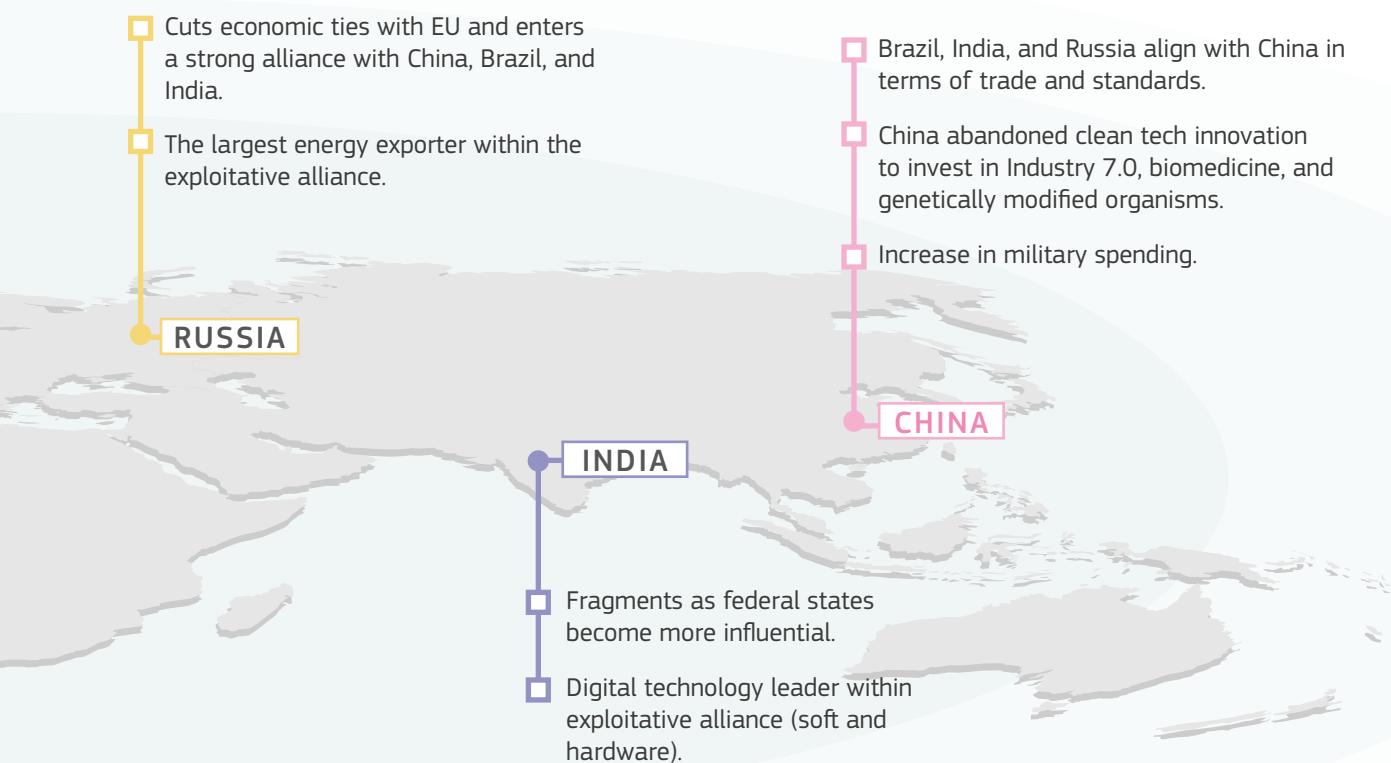
Countries in the exploitative alliance prioritise the building of economic wealth through an individualistic path. They still apply sustainability standards for production and consumption. However, environmental standards are applied only

to a level that is economically desirable, mainly to improve efficiency and reduce costs. Industry and business players favour voluntary commitments that are prone to greenwashing practices. Furthermore, their focus on growth is accompanied by the increased use of natural resources, and global resource competition is increasing.

Local pollution levels in the regenerative alliance countries have substantially decreased, whereas they have remained high in exploitative alliance countries. Consequently, because exploitative alliance countries decarbonise only when it is economically opportune, global warming continues, and an increase of 2 °C by the end of the century is predicted, compared with pre-industrial levels.

How has the nexus of food, water, energy, and health evolved?

Countries in the regenerative alliance have profited from increased soil health and changing consumption patterns. In particular, meat



consumption has decreased, and vegetarian and vegan lifestyles have become mainstream. As a result, food production capacities in the regenerative alliance have increased. The share of organic food production has increased without the need to depend on food imports. In contrast, countries outside the regenerative alliance must cope with lower food production rates, as water scarcity has increased globally.

The EU is the furthest ahead in the energy transition. It relies almost exclusively on renewable energy. The required overcapacity of power generation in a 100% renewable energy system has enabled the EU to export energy. Other regions have also invested in renewable power generation, profiting from cheap renewable power generation technologies exported from regenerative alliance countries. However, they must sometimes rely on fossil fuels.

In the regenerative alliance, health levels have increased because of decreased air pollution due

to power generation, industry, and mobility. All of these changes have contributed to a reduction in obesity and the acceptance of a healthy lifestyle.

Which technologies are predominant?

In a world with frequent conflicts between countries and regions, defence technologies are highly prioritised to protect self-interests. However, innovation is no longer globally connected, but heavily dependent on the agendas of regions, leading to lower innovation rates and the need for substantial public research and innovation programmes. Because dual-use technologies for cybersecurity, communication, navigation, and surveillance systems are often prioritised, technological development in the defence industry can be a catalyst for other innovation areas.

In the regenerative alliance, modern information and communication equipment, the Internet of Things, and Artificial Intelligence have enabled breakthrough innovations that benefit the circular



economy. High technological standards are driven by their sustainability quests. The regenerative alliance also invests in regenerative agriculture, which includes a variety of sustainable agriculture techniques that enable sustainable food systems.

Countries in the exploitative alliance aim for technological development at profit maximisation. This often means low technology standards and poor production conditions. Furthermore, new mining practices, including the exploitation of submarine natural resources, are key areas of interest. To counteract declining food production yields, research on genetically modified crops in the agriculture sector is a key priority.

Transactional environment

How does Europe function?

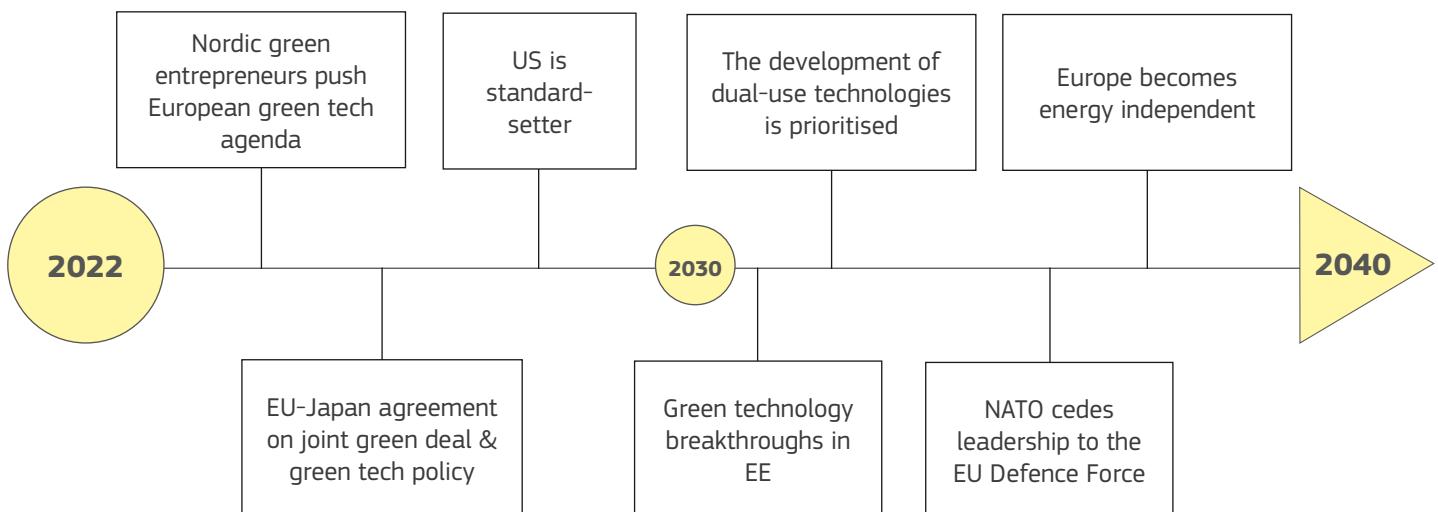
The EU is a stable alliance that promotes its values and views of the optimal way of life. It has used the green transition as the compass for its institutional model at all government levels, which has been widely supported by its citizens.

With partners in the US, EU policymakers have set green sustainability standards for the regenerative alliance. They decide to support funding for twin green and digital innovations, and they protect the Union from strong external pressures. These efforts are supported by the private sector and a growing ecosystem of green entrepreneurs.

In the regenerative alliance, the competitive geopolitical environment has created a need for autonomy, security, and independence. Confronted with the need to protect the environment, economic growth in the EU has slowed, but the economy has become circular.

Revenues from trade have declined, but Europe heavily taxes both businesses and individuals. These tax revenues are used to finance a substantial EU resilience fund that supports social equality across the EU. Whether the EU admits it or not, this fund has led to an internal societal debate on which socio-economic paradigm is the most effective.

Figure 17: Major events that took place until 2040



EXAMPLES FROM THE PRESENT THAT INDICATE THE DEVELOPMENTS THAT COULD LEAD TOWARDS THIS SCENARIO

- EU Member States upgraded green commitments.
- Solar panel sales substantially increased throughout the EU.
- Coal renaissance is advocated at Conference of the Parties (COP) 27.
- China, the world's biggest greenhouse gas emitter, is extending its emissions until 2030 to avoid limiting its economic growth projections.

What is the situation regarding Europe's institutional memberships?

The EU has expanded with new Member States from East, West, and South-East Europe. It has also established close partnerships with some Northern African countries that have aligned with the EU to form a renewable energy hub.

The EU is on an expansionist path. Any country or region in the world that shares Europe's sustainability values can join the European

Economic Area. Access no longer depends on territoriality but on supporting the green vision.

The role of cities and regions inside the EU has increased. The EU Member States' green capitals and ambitious municipalities take the lead in advocating for a greater number of ambitious sustainability packages and wider agreements with other international counterparts.

4. Use of reference scenarios

Foresight scenarios can be used in many ways. Foresight scenarios are particularly useful in developing policies in areas that expect turbulent developments with high degrees of uncertainty and problems that are novel and ambiguous. Thus, the use of foresight scenarios is warranted when decision-makers must deal with complex challenges over an extended time horizon.

Stress testing of policies

Reference scenarios can be used to stress test policies and assess their robustness and readiness for the future. Stress testing, or the wind-tunnelling of future strategies and policy options, can be undertaken in a few workshops, the exact number depending on the complexity of the policy options and the specific policy area. This approach was tested for an EU policy initiative where it showed which policy options were robust across different conditions and which policy options needed to be adapted to perform well under certain future conditions.

Stress-testing consists of a quantitative part, in which the participants evaluate a proposal as

positive, neutral, or negative, and a qualitative part, in which the participants discuss their views and consider an option's robustness. Figure 18 shows the initial assessment of six policy options across four scenarios. As it can be seen on Figure 18, this foresight exercise brought quite a distinct picture of the robustness of different policy options across four scenarios. Policy options that perform well in the majority of scenarios are assumed to be robust. In Figure 18, this is Option 2. Other options might need to be adapted to work well under a range of possible future conditions. Recommendations on how a policy option could be improved are also discussed with participants.

Overall assessment across 4 scenarios:

- Option 1: not robust enough;
- Option 2: robust;
- Option 3: relatively robust;
- Option 4: relatively robust;
- Option 5: perceived as negative;
- Option 6: perceived as negative.

Figure 18: Summary of stress testing of policy options in future scenarios, June 2022

	OPTION 1	OPTION 2	OPTION 3	OPTION 4	OPTION 5	OPTION 6
STORMS	Slightly positive	Slightly positive	Slightly positive	Positive	Positive	Negative
ENDGAME	Slightly negative	Positive	Neutral	Neutral	Very negative	Very negative
STRUGGLING SYMERGIES	Slightly negative	Positive	Positive	Slightly positive	Negative	Slightly negative
OPPOSING VIEWS	Neutral	Positive	Positive	Slightly positive	Negative	Negative

STRESS TESTING IN EUROPEAN UNION POLICYMAKING

In 2002, the European Commission implemented the Better Regulation Agenda to ensure transparent policy development (European Commission, 2021). The key instruments of Better Regulation are impact assessments that are conducted before a policy is proposed. These assessments are used to determine the environmental, economic, and social impacts of a potential policy. To ensure that policies are future-ready, the updated Better Regulation toolbox (2021) includes foresight as a method for evaluating policy proposals (e.g. by using foresight scenarios or megatrends).⁶ The scenarios presented in this report can serve as a future framework for policy proposals, not only at the EU level, but also at other levels of governance.

⁶ More information about the use of megatrends in impact assessments can be found at https://knowledge4policy.ec.europa.eu/foresight/megatrends-engagement-tools_en

Exploring future uncertainties

The reference scenarios explored in this study can be used to discuss the implications of future uncertainties for a particular policy field, which can help policymakers decide on the best strategy.

The scenarios can be used to explore future uncertainties in a half-day workshop, preferably in person. Workshop participants can be policymakers, stakeholders from a specific background, and multi-stakeholder groups that include different perspectives. This approach was tested several months ago in a specific policy field. At the beginning of the workshop, the participants were divided into four subgroups. Each group focused on one of the four scenarios and its implications for solving different policy problems. In a plenary session, the participants then exchanged insights gained from the exercise.

Developing futures literacy

Reference scenarios can be used in creative foresight exercises, such as serious games. Through them participants can develop futures literacy, discuss future policy designs, or gain new perspectives on the future. This use was recently tested in a multi-stakeholder workshop on the digital transformation of public administration (Figure 19).

Figure 19: The use of reference scenarios in the FuturGov game, January 2023⁷



The game contributed to expanding the participants' views on alternative futures and elaborating on potential challenges and opportunities.



⁷ https://knowledge4policy.ec.europa.eu/foresight/topic/futurgov-game_en

5. Conclusions

Scenarios help to “to align strategic action across an organisation on its journey into the future” (Voros, 2001). The generation of new insights gained through scenarios can contribute to the creation of effective strategies. Moreover, because they are built to probe diverse uncertainties, exploratory scenarios, such as the four described in this report, are considered a useful tool in strategic decision-making because they force its users apply system thinking (Schoemaker, 1995). The scenarios presented in this report support policymaking in several ways.

The first function of the reference scenarios is to gain an understanding of how a problem or area of interest can develop over time and change in unexpected ways. This type of analysis generates a better understanding of the influential factors that shape an area, including those that might not be considered in topic-specific analyses. Reference scenarios facilitate the understanding of uncertainties and ambiguities relevant to an area.

The second function of the reference scenarios is to generate strategic insights for policymaking. They enable reflections about the implications in terms of challenges and opportunities that might

emerge in the future. Hence, reference scenarios allow for the innovation and ideation of policy instruments, programmes, and options in response to future issues.

The third function of the reference scenarios is their use to stress test a set of policy options, programmes, or strategies. Here, future alternative worlds are used as framework conditions under which policy options can be stress-tested. These tests are applied to assess the robustness of a policy option in diverse contexts of uncertain futures (van der Heijden et al, 2002; Strelkovskii et al, 2020).

The reference scenarios presented in this report widen the perspective on global developments and interrelationships that may not be included in narrow topic-centred analyses. The participatory process of building these scenarios facilitated learning that allowed the participants to gain a holistic understanding of a topic. The scenarios are purposefully broad in nature, so when a specific need arises, the scenarios can be further adapted and differentiated. The reference scenarios thus provide for a versatile tool that can support EU policymaking and make it more future-ready.

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Appendices

Appendix 1: Assumptions used in the scenario building process

What assumptions are we making about the future standing of the EU in 2040 that perhaps should be challenged by the scenarios? What biases might we have?						
The EU is perceived as a reliable, stable and fair partner.	Europe's border remains respected	The EU remains a key global market	Institutional bias towards believing in win-win solutions when trade-offs may be unavoidable	The EU is still there in 20 years	Euro is around in 20 years	Growth can be sustainable in a finite economic system
EU is able to build required alliances and partnerships whilst maintaining its underlying values.	Innovation remains main fundament of EU economy and society	No major climate disaster in Europe	Society remains highly dependent on raw materials and energy	2050 climate goals need to be met	Growth can be sustainable in a finite economic system	EU can continue externalising the consequences of its economic and political decisions
EU remains dependent on the US for its security	EU will generate power (wealth, diplomatic, military) to pay for its objectives (environmental, autonomy, values...)	Democracy and human rights remain relevant	Europe has tools to respond effectively to crisis in EU neighbourhood	Food security is challenged for Europeans	EU will have to develop its own defence force.	EU remains
There are institutions of global economic governance in 20 years	Nationalism remains strong.	Global institutions remain weakened.	The EU is not able to respond timely to challenges.	Environmental and pandemic crises will likely change the geopolitical situation we have today.	EU remains a regulatory superpower.	An enlarged EU has not adopted yet more agile decision-making procedures in a number of policy areas, leading to blockage
Quality of life depends on good health	Supply chains remain organised globally	Foreign political systems remain stable	EU neighborhood stabilizes	African countries foreign policy will balance between China and the EU	It will be possible to reinforce the resilience of critical supply chains (such as pharma) even in a globalized world	No more Brexit-type operations
China remains one country	There will (still) be a common narrative citizens believe in that will provide the needed support for paying for the costs of action	China's geopolitical power still growing	Natural resources (land and sea based, water) remain sufficient to ensure Europe's food security.	Europeans deserve prosperity	Income inequality leads to instability	The EU will remain a space power
Military budgets used for greater goods than (artificial) sense of security	Multilateralism remains a global force.	EU will be able to manage increased risks/disasters/impacts connected to climate change	There is no major war involving Europe	In tech regulation, Europe strikes the right balance between industrial competitiveness and protection of EU citizens	The rule of law is credible in the EU	Digital society has a rights based and fair fundament

Source: Cagnin et al., 2021

Appendix 2: Comparison of contextual factors across scenarios

	Storms	End game	Struggling synergies	Opposing views
Which social values are globally predominant?	<p>Self-centred, inward-retreating societies.</p> <p>Lack of solidarity in society at the cost of minorities.</p> <p>Focus on basic human needs.</p>	<p>Wealth is prioritised over well-being.</p> <p>Acceptance of societal inequalities and wealth gaps.</p> <p>Race for leadership in Innovation.</p> <p>Alternative social movements arise.</p>	<p>Achieve transition to green sustainability; other areas not so important.</p> <p>Find multilateral consensus.</p> <p>Progressive agenda is led by the young political elite.</p> <p>Rift between those who benefited from climate mitigation and those who did not.</p>	<p>Parts of the world (regenerative alliance) focus on sustainability and societal equality.</p> <p>Other parts (exploitative alliance) prioritise economic growth.</p> <p>Both camps try to sell their models of living.</p>
What is the nature of geopolitical power?	<p>Multilateralism no longer exists.</p> <p>Resource independence</p> <p>Size of a geopolitical bloc (internal market, sphere of influence)</p> <p>Military superiority</p>	<p>Economic strength</p> <p>Alliances</p> <p>Cyber defence</p> <p>Innovation capacity (space, human enhancement)</p>	<p>Diplomacy</p> <p>Leadership in low- and zero-carbon technologies</p> <p>Attractiveness to talent</p>	<p>Projection of values and standards</p> <p>Trade influence</p> <p>Access to resources (raw materials)</p> <p>Military power</p>
How has the global society reacted to environmental degradation?	<p>Climate change trajectory 2100: 3°C.</p> <p>No global consensus on climate action.</p> <p>Less-impacted northern countries adapt and reduce vulnerability.</p> <p>High human costs in other regions, causing migration pressure.</p>	<p>Climate change trajectory 2100: 4°C.</p> <p>Collapse of natural ecosystems (e.g., seafood exhausted).</p> <p>Extreme effects of climate change are frequent and costly.</p>	<p>Climate change trajectory 2100: 1.5°C.</p> <p>The world is collectively engaged in actively co-creating a more sustainable society.</p> <p>Global South benefited from climate mitigation and led to the growth of emerging economies.</p>	<p>Climate change trajectory 2100: 2.5°C.</p> <p>In the regenerative alliance, the GDP is replaced by sustainability indicators. The EU and like-minded nations prioritise ecosystem health.</p> <p>The exploitative alliance prioritises economic wealth.</p>
How has the nexus of food, water, energy, and health evolved?	<p>Regions affected differently by water shortages.</p> <p>Food security problems across the world.</p> <p>Energy depends on the regional availability of fuel (fossil, nuclear, and renewable).</p> <p>Disease spreads due to global warming and dysfunctional international communities.</p>	<p>Desertification and water scarcity across the planet.</p> <p>Synthetic food; seafood is exhausted.</p> <p>Energy is a fossil and renewable mix.</p> <p>Disease spreads due to global warming.</p> <p>Wealth means health.</p>	<p>Similar water situation as in the past 20 years.</p> <p>The global energy transition has accelerated.</p> <p>Negative impacts of obesity and poor mental health, particularly in Northern Hemisphere.</p>	<p>Water scarcity increases slightly.</p> <p>Crop yields decline.</p> <p>The energy mix depends on the respective alliance.</p> <p>Increased healthy lifestyles widely accepted in regenerative alliances.</p>

	Storms	End game	Struggling synergies	Opposing views
Which technologies are predominant?	<p>Reduction in dependencies (circular economy, new materials).</p> <p>Splinternet</p> <p>Climate adaptation</p> <p>Defence</p> <p>Diversity of national standards and limitations of export opportunities between blocs.</p>	<p>New disruptive technology is stimulated.</p> <p>Biomedicine and human enhancement.</p> <p>Space technologies</p> <p>Industry 7.0: Virtualisation</p> <p>Synthetic foods and GMOs.</p>	<p>More mission-oriented innovation.</p> <p>Climate mitigation technologies</p> <p>Environmental monitoring</p> <p>Carbon farming (in a global market)</p> <p>Low-cost care for the elderly.</p>	<p>Defence / dual-use technologies</p> <p>The direction of innovation is different between regenerative and exploitative alliances.</p> <p>Regenerative alliance: climate mitigation, circular economy.</p> <p>Exploitative alliance: genetically modified organisms and biomedicine.</p>
How does Europe function?	<p>EU Member States are functioning democracies.</p> <p>Conservative elderly dominate the political agenda.</p> <p>Youth disillusioned and retreated from politics.</p> <p>Internal tensions between different societal groups.</p>	<p>Private corporations dominate, weakened public institutions.</p> <p>Low levels of personal and corporate taxation.</p> <p>EU is united in protecting its borders.</p> <p>Multi-tier Europe, collaboration on projects that follow shared ambitions.</p>	<p>The EU is a slow moving bureaucracy.</p> <p>Regional representatives form a separate chamber in the European Parliament.</p> <p>Governments regulate and monitoring environmental performance.</p> <p>Parts of society feel left out by experts, and believe in conspiracies.</p>	<p>Green transition has become compass for European Union policymaking.</p> <p>Governments are heavily investing in research and development and state-owned technology providers.</p> <p>Governments are responsible for societal equality and redistribution of wealth.</p>
What is the situation regarding Europe's institutional memberships?	<p>EU expansion in the Balkans.</p> <p>This expansion is initially contingent on strict controls of movement.</p> <p>Decisions are taken by majority.</p>	<p>Some countries enter, some exit the EU.</p> <p>Two-phase membership leads to an inner and outer circle of Member States.</p> <p>New community of associated countries align on energy, transport, and infrastructure.</p>	<p>EU becomes looser union as multilateral institutions gain importance.</p> <p>Two South Mediterranean countries left the EU.</p> <p>The European Economic Area expanded.</p>	<p>Some North African countries align with the EU through a southern energy hub.</p> <p>European Economic Area is open to countries that align with the regenerative alliance.</p>

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