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Transformative resilience: the key to governing Europe's sustainability transitions in the polycrisis

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Introduction

The EU's long-term transition to environmental, social and economic sustainability runs alongside several large-scale crises. Amidst the 'triple crisis' of climate change, biodiversity loss and the impact of environmental pollution on human health (UNEP, 2020), we also face crises in the political, economic and social spheres, including the wars in Ukraine and the Middle East, the 'slowbalisation' of the global economy and trade (European Parliament, 2020) and growing societal fragmentation over values and identities. This complex global condition, often called the polycrisis, influences the EU's sustainability strategies and policies ([1]). The effects of the polycrisis test the EU's ability to steer and govern its sustainability transitions and to maintain its ability to stay on track towards its sustainability goals and deliver on ambitious objectives and targets. In other words, the resilience of the EU's transitions to sustainability is directly affected by the scale and severity of the polycrisis.

The extent to which the polycrisis impacts the making and implementing of the EU's sustainability policies will depend on their capacity to remain truly transformative — while also 'bouncing back' from shocks and potentially anticipating them. How can the EU improve the capacity of its policies to anticipate, adapt to or absorb shocks whilst retaining their transformative intent? How can European policymakers ensure that the polycrisis does not lead to slowing down, diverting or cancelling sustainability transitions?

This report addresses these questions by looking closely at the conceptual framework of transformative resilience. *Transformative resilience* is an emerging concept at the interface of socio-ecological thinking, institutional theory and innovation studies. It is a promising framing for understanding and assessing different aspects of governance, ranging from the absorption of impacts of risks to anticipating a crisis. Furthermore, transformative resilience can help consider the capacity for innovation and transformation during and after a shock. Therefore, this report focuses on the relevance and potential of transformative resilience thinking for policy. It unpacks this concept as a set of different capacities essential to successful governance of transitions under the pressures of the polycrisis.

This report also aims to explore transformative resilience for selected policy areas of the EU's sustainability transitions: (1) the energy transition towards decarbonising the economy, (2) the shift towards a circular economy and (3) the area of just transition. Ultimately, the aim is to propose innovations and interventions to strengthen sustainability within and across these thematic areas in transition governance.

It is important to note that the report does not aim to present a complete set of actions and solutions for establishing or improving transformative resilience in the EU's policymaking across all relevant systems and policy domains. The report explores novel ideas about transformative resilience by focusing on the three areas described above. It includes ideas for governance innovations that may help enable resilient and transformative transitions in these areas. In addition, the report suggests combining dashboard-based assessment approaches with foresight-based participatory strategic dialogues.

([1]) On the concept of 'polycrisis', see Kate Whiting and HyoJin Park's article, 'This is why 'polycrisis' is a useful way of looking at the world right now', published in the *World Economic Forum*: https://www.weforum.org/agenda/2023/03/polycrisis-adam-tooze-historian-explains.

Approach

This report relies on participatory and strategic foresight into the shocks and uncertainties of the EU's transitions to sustainability. It integrates different strands of thinking about resilience into a more holistic 'lens' for the foresight exercise. There is an intrinsic link between resilience, sustainability transitions under the stress of the shocks and uncertainty of the future. Foresight is a method particularly suited to anticipating uncertainties yet mapping opportunities that the future may bring.

To prepare this report, the approach combined desk research and Futures Dialogues — participatory foresight workshops — on resilience for sustainability. Three Futures Dialogues were conducted between May 2022 and April 2023. These workshops involved a diverse group of experts and stakeholders, including the members of the European Environment Agency's (EEA) Scientific Committee and the European Environment Information and Observation Network (Eionet), staff of the European Commission and other EU institutions (European Council, European Parliament, EU agencies, Committee of the Regions and Economic and Social Affairs Committee) as well as experts from the Organisation for Economic Co-operation and Development (OECD), and academia.

The report consists of four chapters:

- Chapter 1 explains why transformative resilience is critical to the governance of Europe's sustainability transitions.
- Chapter 2 lays the conceptual groundwork by reviewing the literature on resilience across different theoretical strands (economic and environmental policy, sustainability transitions studies, innovation studies and institutional theory).
- Based on this review, Chapter 3 conceptualises transformative resilience integral to governing transitions amidst shocks and crises.
- Chapter 4 discusses several transformative resilience capacities, specifically in the governance of the energy transition, the transition towards a circular economy and the just transition.

This report concludes by taking account of existing challenges for governance innovation at the EU level and proposes the next steps to enhance the transformative resilience of sustainability transitions. Background information on the project that provided input for this report can be found in Annex 1.

Key messages

- Transformative resilience should be central to the EU's sustainability transition policies during the polycrisis.
- The EU's policies for sustainability transitions need to combine capacities to anticipate, absorb and adapt to a shock while retaining their high transformative intent.
- Interventions are needed to build resilience, accelerating transformation in the core areas of energy transition, circular economy and the just transition.
- Promoting foresight and participatory governance is essential to ensuring effective governance under the pressure of the polycrisis.
- Regionally and locally grounded capacities for transformative resilience can make the EU's sustainability transitions more effective.

1 Why transformative resilience?

1.1 Resilience as a compass for EU policymaking

With the acceleration of climatic and environmental shocks such as extreme weather events, biodiversity loss and pollution, and other shocks like the COVID-19 pandemic, the ongoing war in Ukraine and the conflict in the Middle East, 'resilience' has quickly become a policy buzzword. The EU is often criticised for not being resilient enough or praised for 'bouncing back' in the face of one crisis or another. But what does resilience mean beyond the headlines?

In recent years, a more elaborate and applied approach to resilience has emerged, as a strategic 'compass' for EU policymaking. The European Commission's Joint Research Centre (JRC) has developed a conceptual framework of resilience in the aftermath of the 2008 financial crisis and, most recently, the COVID-19 crisis. As Manca et al. (2017) state, 'the final goal of resilience is functional to societal and individual well-being, and the main contributors to resilience are individuals, with all of their interactions, social ties and power structures'. According to the JRC's framework, a 'resilient society' aims to sustain individual and societal well-being across generations. At the centre of the JRC model for resilience is the 'engine', consisting of the socio-economic, political and environmental systems.

This report builds on the JRC's understanding of resilience, in that society 'should be resilient in a sustainable manner'. However, the logic traced in this report is slightly different: it focuses on the resilience of sustainability transitions as policies. The primary concern is whether the EU's transitions to sustainability can remain on track despite the shocks of immediate urgency and magnitude of a military conflict at Europe's borders, for example, or a global pandemic. Can Europe respond to these shocks while at the same time accelerating transformation towards sustainability in the areas of these policies?

A vision of deep and systemic transformation is already reflected in some of the European Green Deal's (EGD) policies, as explained in more detail in Chapter 3. However, given the high level of uncertainty regarding the plethora of crises and risks, further improvement is needed for resilience to become a true 'compass' for the EU's transitions. Therefore, resilience in this report is recast as the capacity of transitions to remain agile and generate transformative change towards desired outcomes (e.g. carbon neutrality and circularity of the economy, and societal justice and fairness).

The main argument in this report is that the transformative dimension of resilience should be front and centre of the EU's policy agenda for accelerating sustainability transitions in the short and long term.

1.2 Sustainability transitions in the age of polycrisis

Europe is engaging in major transformations towards a climate- and environment-friendly economic model. The cornerstones are:

- climate neutrality by 2050 with the clean energy transition;
- nature preservation and restoration;
- the switch from a linear to a circular mode of extraction, including recycling resources and managing waste;
- ensuring a socially just model for these transitions across all EU countries and regions.

At the same time, the global and European context for these transitions is the polycrisis. Its political, economic and social impacts are intertwined, likely long term, and will influence the EU's transitions to sustainability. The multiple local effects of disasters and negative events within systems lead to cascading negative impacts across different systems, such as energy or food. This is undoubtedly a challenge for governing transformations to sustainability, such as decarbonisation or transition to a circular economy. What adds to this complexity is the multitude of drivers of change that underpin and 'feed' the polycrisis through countless feedback loops. In its assessment of these 'drivers of change', the EEA has concluded that 'the future of Europe's environment and sustainability is likely to be highly influenced by developments of societal, technological, economic, environmental and geopolitical natures, as well as changes in values and lifestyles. These drivers differ in origin, nature, likelihood, significance, geographical scale and timescale. Although some are well established and well-known, others have just emerged, and their effects have not yet unfolded or are still unknown' (EEA, 2019).

To respond to the polycrisis and maintain its transition to sustainability, the EU needs to be holistically resilient. Instead of responding to a particular shock, it needs to develop a set of capacities to act and govern in an era of simultaneous, dynamic and interconnected multiple crises. Anticipation and transformation are two important dimensions connected to this more holistic understanding of resilience.

At the same time, the way different sustainability transitions are organised policy-wise and intertwined presents its own challenge. According to the EEA's latest monitoring report on the implementation of the Eighth Environment Action Programme (EEA, 2023a), many of the EU's environmental objectives are unlikely to be achieved by 2030 without a policy change. At the same time, European residents are increasingly concerned about the state of the climate and environment (for example, access to potable water, loss of biodiversity and pollution). There is a need to shift attention from a reactive response to climate change and other emerging shocks to transformative and innovative approaches to sustainability transitions, as they are also key to strengthening economic and social resilience. This implies continuous improvement in the governance of sustainability transitions while tackling the polycrisis, because its effects on sustainability transitions may vary. Multiple crises may compound and lead to postponing previous efforts to achieve sustainability goals for a lengthy period, continuing previous efforts as before (i.e. that they are already insufficient to achieve climate neutrality by 2050), or raising ambitions in pursuit of transformation. One would not want to leave responding to this positive or negative implication of a shock to chance.

Importantly, the polycrisis creates pressure to act short-term — leaving aside long-term policy visions and far-flung targets. The nexus approach from systems thinking can help resolve this dilemma. It points out that the causes of the polycrisis are closely linked to the risks of interwoven global production and consumption systems (e.g. for mobility and food), in particular, their sustainable energy supply and resource consumption. Both the polycrisis and increasing systemic risks require comprehensive, well-coordinated systemic transformations towards sustainability. A Europe that has sustainably transformed its subsystems is also more resilient to future disasters, shocks and crises resulting from them.

This is a major political challenge for the EU because of its complex, interconnected production and consumption systems. It requires the coordination of measures at all policy levels and must integrate different system characteristics and national and regional contexts and requirements. In short, innovative policy approaches to transformative resilience are timely, as the EU faces challenges in implementing and accelerating the sustainability transition.

1.3 Challenges of implementation, transition and transformation

The EGD and its policies cover different time scales (from short to long term) and policy levels. Delivering across policy areas on these multiple scales and levels is an obvious challenge, even without the added urgency and uncertainty of the polycrisis. As a policy framework, the EGD offers opportunities to leverage synergies between the systems in transition and to see the crisis as an opportunity to accelerate the transition instead of slowing it down. Yet realising this transformative potential of the EGD through actual policy implementation remains a challenge.

With the energy transition, the shift towards renewable energy sources such as solar energy and wind power is a political priority throughout Europe. Some Member States are increasing their nuclear energy capacities, while others are dismantling and decommissioning their nuclear infrastructure. The large rise in energy prices spurred by the gas and oil shortages resulting from Russia's war of aggression against Ukraine, combined with inflation, and the drive to radically reduce dependence on energy from Russia accelerated the energy transition towards renewable sources. But the shocks from the war also heightened the risks of dependence on strategic raw materials, supply chains and technologies needed for the green transition (Tagliapietra, 2023). Other challenges include the risks of perpetuating the use of fossil fuels as a consequence of diversifying liquefied natural gas (LNG) imports. Large-scale wind and solar plants imply land use and impacts on landscapes, leading to social contestation, especially in rural areas, and less investment in energy efficiency than in renewable energy.

Particular concerns relate to trends in the transport sector, slow emissions reductions in agriculture and slow progress in increasing the capacities of carbon sinks. Despite progress on green finance, substantial additional investments are needed to finance the green transition, demanding another EUR 520 billion of public and private finance until 2030 to bridge the investment gap (EEA, 2023c).

Regarding the circular economy, more needs to be done to shift from a linear to a circular model of production and consumption, and to bring these principles into the mainstream across different sectors. The EU aims to double its use of recycled material, in terms of its share of the total amount of material used by the economy, between 2020 and 2030. While EU production has become more resource efficient, the EU is far from meeting this objective, with the current rate of recycled raw material in the EU being 12%. Although since 2010, the material footprint

has remained relatively stable and was 6.1 billion tonnes in 2020, this level of consumption is not sustainable and is higher than the global average (EEA, 2024a). EU material consumption remains very high while waste generation continues to increase.

At the same time, stepping up the transition to circularity has the potential to make the EU more resilient through securing jobs and local production, enhanced recycling and the development of new efficient and alternative technologies to reduce the use of single source materials (Brozou, 2022). Resilience is also intrinsically linked to circularity because to achieve a secure, sustainable supply of critical raw materials for the green transition, a high degree of such resources must be kept in the economic cycle.

Lastly, there is also much work ahead to make the just transition effective and transformative (EEA, 2022; EEA, 2024b). The current interpretation of the just transition is largely operationalised in terms of the distributional justice of the costs of transition, for example employment in sectors that need to be phased out, the maintenance of jobs and livelihoods, reskilling and upskilling, and levelling out climate ambitions between sectors and Member States. At the same time, delivering a truly just transition requires addressing equity and equality across other dimensions of justice, such as procedural, recognitional and restorative justice. As experts point out, sustainability transitions can be considered as 'just' when these processes of transformative change 'improve the quality of life of current and future generations, both human and non-human, within ecological boundaries while eliminating injustices that are triggered or exacerbated by unsustainability and its underlying causes' (Avelino et al., 2023, EEA 2024d).

The polycrisis has revealed the limitations of the approach to the just transition in the current EGD by exposing the stark inequalities between different regions and social groups, in terms of their exposure to the impacts of disasters and the distribution of benefits and various compensatory measures. For example, regions dependent on steel production, like eastern Germany, are worse hit by energy supply crises. Meanwhile, countries like Poland, which have seen relatively high emigration in recent decades, must manage unprecedented mass immigration (largely due to refugees from neighbouring Ukraine). These risks, including environmental and climate-related ones, call for responses that are fair and just as much as transformative.

Overall, it is apparent that the challenges of implementation of sustainability transitions (exemplified by the EGD) are deeply intertwined with resilience. While risks and crises bring a lot of unknows, they also bring opportunities to leverage the idea that resilience can be gained not simply by adaptation to a crisis but by employing a range of policies that would steer and accelerate economic and societal transformation.

1.4 Looking ahead

The EU made an important strategic step towards resilience during the COVID-19 crisis. By securing substantial funding for the energy, circular economy, biodiversity and climate agenda — including a 37% expenditure target for climate action (mostly energy transition) under the Recovery and Resilience Facility (RRF), rising to EUR 250 billion out of a total budget of EUR 672.5 billion (in 2020 prices) — the EU anchored the intent of the EGD within its response to the crisis. Nevertheless, implementation on the ground seems to be less straightforward. For instance,

while the European Commission's Recovery and Resilience Scoreboard estimates climate expenditure to be about 40% of the RRF, the GreenTracker ([2]) takes a more nuanced look: about 30% of funds are set to contribute to the green transition. In many cases, the 'green' impact of the funds depends on their actual use on the ground. In the meantime, as a quick 'bouncing back' response to the war in Ukraine, a temporary return to coal took place in Europe, increasing EU power sector emissions (EEA, 2023b). Another implication of a reactive resilience measure of replacing Russian gas with LNG is investments in infrastructures that may not be 'future-proof', such as regasification stations.

Looking to the future, the EU's responses to crises need matching goals across policy areas. Moreover, there needs to be a steady flow of financing and political will to reconfirm this commitment to transformation at any new manifestation of the polycrisis. According to the European Commission's estimates, annual investments must increase by around EUR 520 billion this decade (2021-2030) to deliver on the EGD objectives. This huge increase — more than 50% compared to the historical energy investment trend — is meant to support EU efforts to ensure the security of energy supply, create jobs, lower energy bills of households and industry, and improve air quality and human health. Financing is part of the answer and adds to reforms and policy innovations at the regional and Member State level.

In the changing landscape of priorities and responses to crises, other interpretations of resilience may come to the foreground. In the past, the EU considered resilience in the wake of the global financial crisis of 2007-2009, focusing on fiscal stability and bouncing back to pre-crisis growth. That resilience logic resulted in the Stability and Growth Pact instrument, which governed the EU's macroeconomic policies until it was suspended to give way to the RRF. However, that post-2009 understanding of resilience (applied to the EU's fiscal governance and austerity) was a product of a different logic and only loosely, if at all, connected to environmental and social sustainability. Arguably, it led to underinvestment in vital parts of the public sector, making them less resilient to unexpected shocks, as shown during the early weeks of the COVID-19 pandemic and the severe health crisis in Europe.

It remains to be seen what approach the EU will choose to increase resilience in the years to come, whether it will be transformative enough to accelerate the sustainability transitions at the same time, and how much the EU will succeed in implementing sustainability policy measures at the Member State and regional levels.

([2]) https://www.greentracker.io

2 Conceptual background and understandings of resilience

This chapter provides an overview of how several understandings of resilience emerged at the interface of several different disciplines. As the previous chapter argued, in times of polycrisis, the capacity of systems and policies to absorb shocks only to 'bounce back' to pre-crisis status is not enough. The following section outlines how to define transformative resilience as a key quality among different capacities essential o transition governance.

2.1 Resilience and governance capacities

Effectively governing systemic change requires policies that provide the necessary responses to shocks and crises without neglecting the long-term transformative objectives. Every policy taken in response to a shock must be assessed on whether it accelerates or impedes transformation. Against this background, we would like to understand resilience as a decisive quality of governance capacities for both crisis management and sustainability transformations. It is therefore about governance capacities to maintain central system functions in the event of shocks and to secure long-term functionalities through sustainability transformations. In other words, system transitions are resilient if they can cope with a shock so successfully that they can also accelerate the transformation. The concept of resilience in sustainability transitions can be found in various approaches to environmental research and policy and in regional policy.

Most definitions of resilience in policymaking use the terms 'ability' and 'capacity' of different types of stakeholders and roles interchangeably. Furthermore, definitions of resilience as a capacity of policymaking have changed over time, from resilience defined as persistence and capacity to bounce back from a shock and return to equilibrium to resilience defined more recently as prevention, anticipation, adaptation and, importantly, transformation (Manyena et al., 2019). Similarly, knowledge about governance capacity is fragmented and inconsistent (van Popering-Verkerk et al., 2022).

There is a substantial gap between what resilience research suggests and how these insights are implemented into governance practice (Reyers et al., 2022). As a result, this report suggests defining resilience as a capacity of governance of transitions.

Governance capacity is 'the potential of actors to coordinate their actions and the deployment of resources in the pursuit of collective issues' (van Popering-Verkerk et al., 2022). In addition, policymaking in the context of transformations can be defined as the collection of structures, processes and capabilities of policy administrations needed to design, implement and update their policy instruments (EC, 2023b).

The literature on governance capacities for resilience distinguishes between three kinds of capacities: absorptive, adaptive and transformative capacities. Successfully coping with major changes means being able to resist change (absorptive capacity) or flexibly adapting to change, thereby incrementally changing the system itself (adaptive capacity) (Manca et al., 2017).

A more comprehensive and distinctive conceptual framing of resilience distinguishes between preventive, anticipative, absorptive, adaptive and transformative capacities

(Manyena et al., 2019). While anticipative and preventive capacities come into play before a destabilising event, absorptive, adaptive and transformative capacities apply afterwards. Only the transformative capacities bear the potential to bounce forward in sustainability transitions instead of bouncing back to the former stable but unsustainable conditions (Asadzadeh et al., 2023). Capacities such as the availability of resources, organisation and learning are key inputs or processes to realising the five resilience capacities (Manyena et al., 2019). Such supporting capacities to drive transformative resilience have been analysed for inter-organisational projects (Iao-Jörgensen, 2023), cities (Asadzadeh et al., 2023) or regions.

The concept of resilient governance at the community level unveils another key element of capacities for transformation. Here, resilience is defined as 'the community's ability to engage in collective action, and to solve collective problems and improve or maintain community well-being', not only through leveraging local community assets and resources but also by collaboration and mutual learning with other communities (Manyena et al., 2019). Key dimensions for a resilient community include local knowledge and community networks, based on efficient communication and infrastructure and resources for reconstruction, preparation and dealing with uncertainties (Patel et al., 2017). Similarly, others argue for 'more support for broad and deep networks, multiple competing alternatives, interactions between multiple technologies and systems, and broad engagement with stakeholders' to advance sustainability transformations despite uncertainties and crises (Schwaag Serger et al., 2023).

To sum up, successful governance in today's polycrisis era demands absorptive and adaptive resilience capacities alongside transformative, preventive, anticipatory, collaborative and participatory capacities.

2.2 Transformative resilience of sustainability transitions

Thinking about resilience in terms of transformation — rather than mere adaptation — can be traced back to socio-ecological research from the early 1990s (Walker et al., 2002; Asadzadeh et al., 2022). This line of thinking has emerged in the context of addressing the impacts and risks of global climate change, and is defined as a combination of reactive and proactive responses (Vermeulen et al., 2018). Socio-ecological research points out that adaptation to climate and environmental change 'often focuses on accommodating change, rather than contesting it and creating alternatives' (O'Brien, 2012). This emphasises the link between resilience and transformation, the latter often triggered by crises (O'Brien, 2012).

Furthermore, linking transformation and adaptation requires specific steps, such as re-evaluation and innovation in the relations between people and nature (restructuring how people interact with nature) and shifting towards sustainability (both environmental and social) (Fedele et al., 2019). With regards to key systems and related policies, some principles of more relevance would be the 'energy efficiency first' principle, the principles of circularity of the economy and the principles of justice and fairness in sustainability transitions.

These changes should be system-wide and occur at multiple scales (spatial, governance and sectoral). This transformation-driven approach to responding to risks (Folke et al., 2010) comes very close to the understanding of transformative resilience of sustainability transitions explored in this report.

However, in socio-ecological thinking, 'transformative' refers to the outcome of a process, i.e. it has only been assessed after the outcomes have materialised. In

this report, 'transformative' refers to features of a process that lead to a long-term structural change as a desired outcome (Vermeulen et al., 2018). The concept of transformative resilience captures the deliberate pursuit of sustainability transitions in times of shocks, crises or stress. As outlined above, it can be defined as the ability of key stakeholders of systems in transition to handle major changes successfully.

A key insight from the literature review is that the concept of transformative resilience considers shocks and crises as windows of opportunity to create new transformative paths towards sustainability and accelerate sustainability transitions. At the same time, systems undergoing transitions must maintain their functionality for the transition to be successful (Marchese et al., 2018).

Recent literature points out how shocks and disruptive developments have posed severe risks to implementation of the EGD's sustainability policies. These risks involve change, both in a negative and a positive sense, by creating opportunities for transformation (Trippl et al., 2023). Yet, to date, there have been few practical recommendations for strengthening the transformative element in crisis response. Meanwhile, much thinking is devoted to adaptation as the central approach to resilience (Roth et al., 2021).

3 Relevance of transformative resilience to governance of sustainability transitions

This chapter presents the conceptual framework of transformative resilience as a set of interrelated governance capacities for sustainability transitions. The governance capacities relating to the transformative resilience of real-world sustainability transitions are distinguished and then assigned to the phases of the policy cycle.

3.1 Integrating transformative resilience and governance capacities

The ambition of increasing resilience capacities in governance does not imply a single masterplan on how to act in the event of any possible shocks and disruptions. The focus is on developing a wide range of approaches that combine the capacity to adapt to a shock and continue the transition towards sustainability, or even use the transition as a means to overcome the impact of a shock (Roth et al., 2021). When shocks and crises occur in a system undergoing transition, for example a destructive pests outbreak on a fruit farm, which is switching to an organic model, three policy responses and resulting pathways can be imagined:

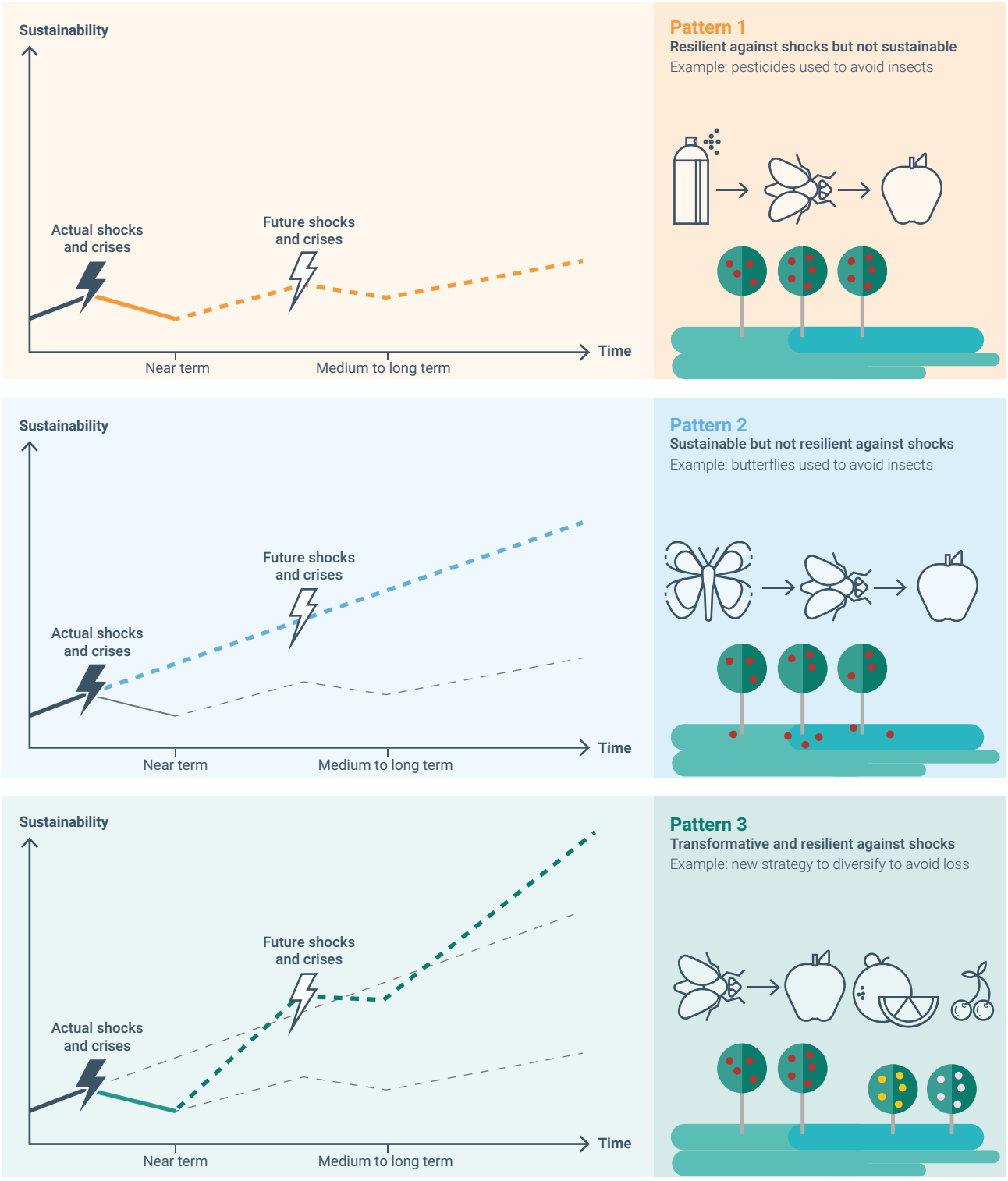
1. The response focuses on resilience as an adaptation to a shock, not on the goals of sustainability transition. In our example, this would mean pausing the transition to a different agricultural model and resorting to pesticides to curb the outbreak.

2. The response focuses on achieving the goals of transition, not on resilience. The farm switches to non-pesticide farming but the crops remain vulnerable to pest outbreaks.

3. The response aligns the long-term goals of transition with the short-term needs of resilience by taking shocks as an opportunity for systemic transformation, which is both resilient and sustainable. The farm undergoes a systemic transformation including changing the crop itself (e.g. from a mono-crop to a polyculture).

These three pathways are displayed in Figure 3.1 and explained along ideal-type patterns of transition dynamics.

Figure 3.1 **The resilience pathways**



Source: EEA based on Erdmann et al. (forthcoming).

For the case of the EGD's objectives, long-term sustainability goals are set and underpinned by action plans in different areas to help Europe become the first climate-neutral continent by 2050. As argued elsewhere in this report, without anticipating shocks and crises, this intended pathway cannot be considered fully resilient over the long term. The resilience of the EU's sustainability transitions against the shocks and disruptions of recent years has been tested and varies considerably (EC, 2023b).

For example, as a response to the shock of the war in Ukraine, EU governments adapted to the new situation by rapidly reducing imports of Russian fossil fuels, increasing imports of LNG from elsewhere, increasing fossil fuel subsidies and sometimes by investing in coal.

The rapid implementation of energy security measures has kept Europe energy resilient, but at the same time it has disrupted the transition to sustainability. The originally intended path of climate transition has been revised. Looking into the future, this could result in slowing down the **actual sustainability transition** in favour of a narrow approach to resilience akin to Pattern 1 in Figure 3.1 (when pesticides are used continuously as the main reaction to curtail pests in a garden).

From here, policymakers may decide to postpone targets or allow temporary exemptions to avoid dealing with the economic and social implications of transitions and the shock simultaneously. Prioritising short-term responses to a shock over long-term transformation towards sustainability to address the impact of shocks and crises on the economy may create undesirable lock-ins that compromise the environmental and societal dimensions of sustainability transitions.

This is expressed in reduced progress towards sustainability. For example, annual carbon reductions are below the desired level as prescribed by original transition plans. This pathway is characterised by absorptive and adaptive measures with the short-term priority of resilience over sustainability, leading to a **slowdown of the EU's sustainability transitions** in the long term.

The absorption and incremental adaptation measures will continue for a while and resilience will slowly recover after the shock. Meanwhile, inadequate functionalities and the associated system destabilisation are once again coming to the fore in governance. This opens new opportunities for the sustainability transformation that is still urgently needed in the face of ongoing climate change and environmental degradation, either by strengthening ongoing transformations or by creating new and innovative transition opportunities.

In this transformative and resilient pathway, the systemic shock serves as a window of opportunity to **accelerate sustainability transitions**, as indicated in Pattern 3 of Figure 3.1 (where a garden is transformed into a diverse and sustainable ecosystem). In this case, the EU would have used the system transitions towards sustainability in response to a shock effectively, increasing its resilience against shocks and crises at the same time. For example, a rapid phase-out of carbon-intensive energy supply and strict implementation of the circular economy could make the EU less vulnerable to future shocks, as high investment in renewable energy and decarbonisation could strengthen regions, increase competitiveness and preserve jobs.

In the near term, both the adoptive and adaptive pathway of a slowdown and the transformative pathway of an acceleration of system transitions will bring progress toward sustainability. While the adoptive and adaptive pathway underperforms in relation to the intended annual carbon reduction rates, the transformative pathway strives to exceed the targets. The latter would achieve the long-term sustainability goals by compensating for previous underperformance (near-term recovery).

Likely, **future shocks and intensified crises will further stress-test resilience and sustainability**. These include, for example, a possible escalation of geopolitical and economic tensions between China and the United States in the south-east Pacific or an erosion of social cohesion within the EU fuelled by disinformation campaigns and anti-democratic tendencies. In such cases, the adoptive and adaptive pathway would face a deviation from recovery, once again leading away from sustainability progress. At the mid-to-long-term turning point, in the logic of this pathway, further measures would be put in place that reinforce adoption and adaption. Progress towards sustainability would resume, but at rates even slower than in the previous recovery phase.

In contrast, if transformative resilience policies are set, the next crisis would be absorbed more quickly, with a smaller deviation from sustainability progress than in preceding periods. Here, system restructuring has not only accounted for sustainability progress but also for improved resilience. The transformative path could continue compensating for underperformance in preceding years.

This implies that the adoptive and adaptive pathway fails to meet long-term sustainability goals, such as a zero-carbon Europe. In contrast, the transformative pathway could achieve or even exceed the long-term sustainability goals and compensate for today's lower-than-expected decarbonisation rates in the final years running up to 2050.

3.2 Governance capacities required for transformative resilience

The identified gap between transformative resilience requirements and the actual governance practices (Trippl et al., 2023) calls for governance innovations at all levels to fulfil the potential to improve decision-making (Davidson et al., 2016).

As discussed in Chapter 2, the following governance capacities (Manyena et al., 2019) are conducive to transformative resilience.

- **Anticipative capacities** aim towards early warning, impact assessment and strategy development (e.g. preparation for gradual major changes, shocks and crises). They include: (1) horizon scanning to identify plausible current and future events (e.g. shocks), trends (e.g. leading to stress) and issues (e.g. emerging crises), (2) anticipatory impact assessments of major changes, and (3) participatory development of shared visions of the future that allow for integrating resilience into sustainability transitions.

- **Preventive capacities** aim to avoid, reduce the probability of and mitigate the impact of adverse events. Transformative resilience processes are designed to establish these preventive capacities step by step.

- **Absorptive capacities** aim to create robust, resistant systems in which some elements can serve as a backup in times of crisis. Both the necessities and the flaws of coping strategies need consideration. While establishing transformative resilience capacities, absorptive capacities need to be defined for governance components that must be maintained in any case (e.g. communication infrastructure).

- **Adaptive capacities** aim to adapt systems to major changes. Systems that are desirable in terms of long-term sustainability transitions and that can be reconfigured incrementally in times of shocks and crises must be defined and addressed. Arrangements for transformative adaptation need establishing that account for institutional renewal in transformative resilience strategy and planning processes (e.g. inclusion of outsider positions).

- **Transformative capacities** aim to reorient systems by building upon real-world contexts and anticipatory capacities. They may modify the root causes of risk, prompting structural change and progress towards goals in the face of adverse events. From a systemic perspective, the activation of transformative capacities introduces new variables into systems in transition, thereby creating new logics of balancing and reinforcing variable loops.

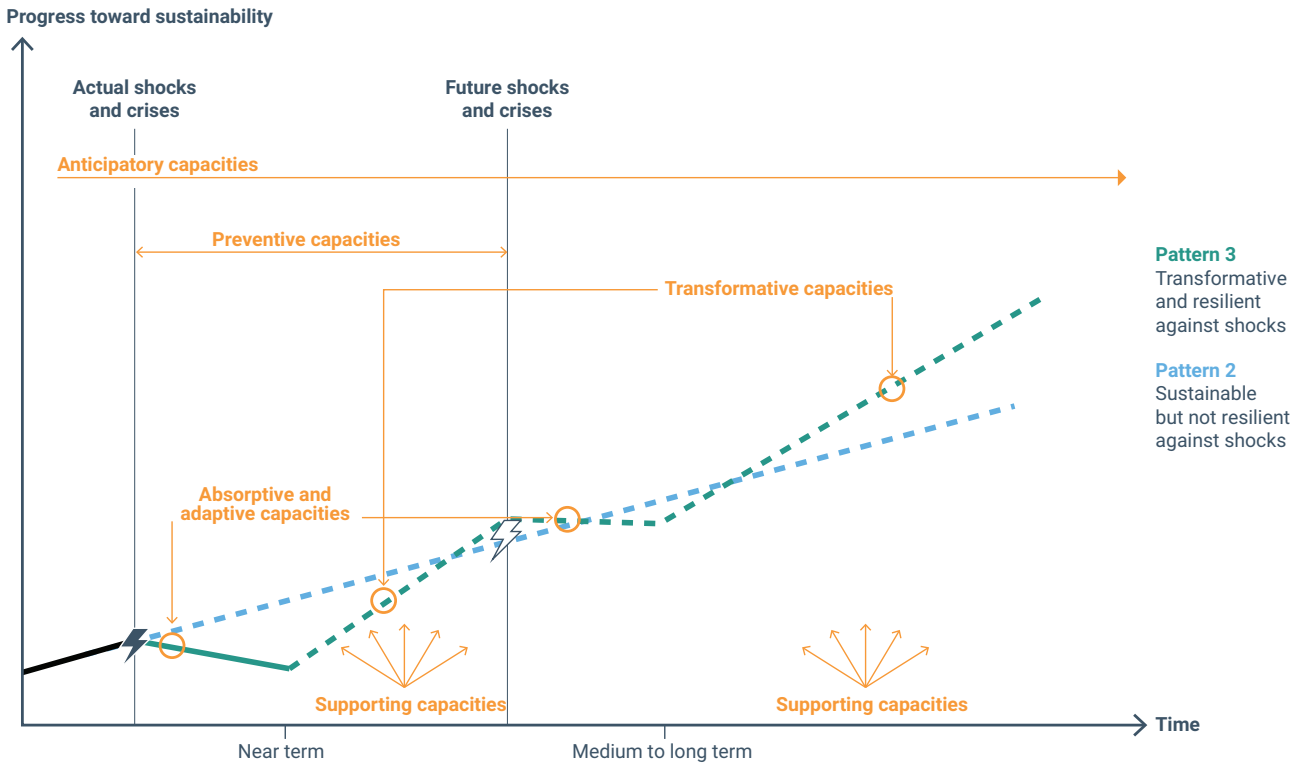
- **Supporting capacities,** such as resources, organisation and learning, support the establishment of the several other governance capacities. The reuse of existing assets (Trippl et al., 2023) and the leveraging of well-established 'stranded assets thinking' in some domains such as agriculture to support using transformative solutions for adaptation (Vermeulen et al., 2018) are examples of supporting resources. Transformative resilience requires flexibility and decentralisation, calling for capacities that re-organise governance through collaboration, inclusive participation, embedding of activities, orchestration and leadership (Asadzadeh et al., 2023, 2022; Trippl et al., 2023).

- **Innovation capacities** support creativity, agility and experimentation to identify and explore solutions that realise transformative resilience. In addition, supporting capacities must provide indicators to measure actual progress towards transformative resilience, such as required annual decarbonisation rates and the time to recover to full functionality of a system in the event of shocks. While anticipatory capacity refers to the ability to anticipate future challenges and opportunities, supporting capacity relates to the resources, systems and structures that enable stakeholders to achieve goals and adapt to change. It includes elements like technology, infrastructure and organisational processes. Transformative capacity involves the ability to drive and manage change.

- **Anticipatory capacity** informs supporting capacity by helping to identify the resources and systems needed to address future challenges. Supporting capacity, in turn, enables transformative capacity by providing the necessary infrastructure and tools for change. Transformative capacity, through its focus on innovation and adaptability, can enhance both anticipatory and supporting capacities. Overall, the interplay of anticipatory, supporting and transformative capacities is crucial for transition measures at all policy levels to navigate and thrive in a rapidly changing environment.

To this end, we conceive transformative capacities as part of other governance capacities for resilience. Therefore, in the next step, the capacities are also assigned to the different phases of the transformative resilience path, mapped against the originally intended transition plan (Figure 3.2).

Figure 3.2 **Capacities for transformative resilience**



Source: EEA based on Erdmann et al. (forthcoming).

Table 3.1 provides an overview of the various governance capacities for resilience. Comparing their objectives illustrates that because they each fulfil specific resilience-related governance functions, they stand alongside one other instead of replacing each other. The capacities of particular importance for resilience policy in sustainability transformations (as well as for system transformations in general) during polycrisis, according to their assignment to the three pathways of resilience (see Figure 3.1), are highlighted.

Table 3.1 **Overview of indicative governance capacities for transformative resilience**

	Governance capacities for resilience					
Types	Anticipative capacities	Preventive capacities	Absorptive capacities	Adaptive capacities	Transformative capacities	Supporting capacities
Goals	Strategic foresight and early warning system, strategy development and planning, impact assessment	Avoidance and reduction of risks, mitigation of impacts	Robustness, resistance and redundancy of system infrastructures and functionalities	Incremental reconfiguration or renewal of elements	Reorientation, reconfiguration or renewal of system	Resources, organisation and coordination, collaboration and learning, monitoring and evaluation

Source: EEA based on Erdmann et al. (forthcoming).

In pursuit of the EGD's long-term objectives, the suggested model of integrating transformative resilience into anticipatory governance should be embraced by current approaches. However, capacities for transformative resilience must be built in the short term to seize any transformative opportunities that appear during any shocks or crises between today and 2050.

4 Transformative resilience in practice: ideas for the EU's governance of transitions

After the theoretical concept of transformative resilience, this report focuses on the question of whether transformative resilience can be envisaged as part of the governance of sustainability transitions. As part of a strategic foresight project in cooperation with the European Topic Centre for Sustainability Transitions, the EEA has further explored the concept in terms of need, applicability in the EU context and its added value for policymaking of transitions in the context of the polycrisis. This took place through three participatory foresight workshops known as Futures Dialogues.

The first Futures Dialogue investigated the vulnerabilities of the EU and its Member States in the sustainability transformation to the shock of the COVID-19 pandemic and the war in Ukraine, with members of the EEA's Scientific Committee, foresight experts and representatives of EU institutions. The second dialogue focused on the concrete policy needs and capacities required at local, regional and national policy levels to increase transformative resilience based on three selected areas of political action. These are the areas of promoting the energy transition, the circular economy and the just transition, all of which are crucial to achieving the core goals of the EGD. The third and final dialogue focused on the policy innovations (e.g. processes, instruments and frameworks) needed to strengthen the transformative resilience of the EU's transitions in the same three areas.

4.1 Findings from the Futures Dialogues

An essential finding from the participatory foresight process was that sustainability transitions across the EU depend on the regional-level capacities to respond to a shock. These capacities vary between regions. The participants pointed out a specific territorial dimension of the EGD targets, as their achievement depends on territorial natural and human resources and infrastructures. The outcomes are in line with the 8th Cohesion Report (*Cohesion in Europe towards 2050*), which also highlights the potential of green transitions as a driver of EU growth and points to the need for accompanying policies at the regional level to avoid transition triggering new economic, social and territorial inequalities. Two dimensions of regional resilience can be distinguished (Boschma, 2023). Firstly, the ability of regions to cope with and dampen the negative effects of shocks, e.g. some regions depend heavily on fossil-fuel-based activities. Secondly, the ability of regions to exploit new opportunities that shocks can bring, e.g. boosting innovation and investments in renewable energy technologies or waste management. Regional capacities differ, as do geospatial and socio-economic landscapes, meaning that some regions have greater potential than others. Access to external knowledge is crucial for innovation, so strong capabilities to connect with other regions are important, e.g. co-inventor linkages to other regions with complementary capabilities (Balland and Boschma, 2021).

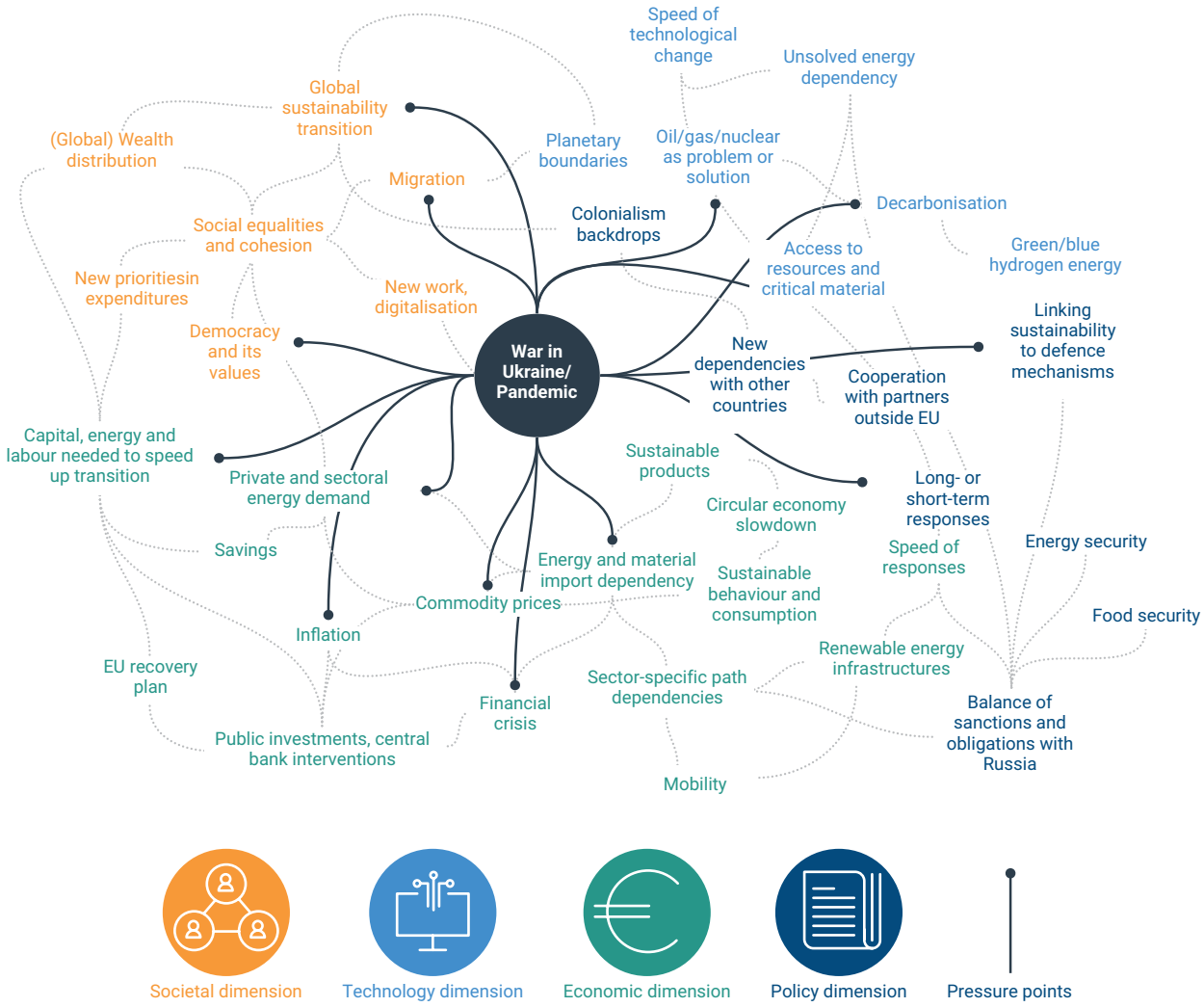
Income disparities across regions are more likely to be reinforced, not reduced, in regional diversification processes. As with the European institutions and national governments, subnational actors need to strike a balance between addressing perpetual systemic crises and steering the process of transformation towards sustainability. Thus, the resilience of subnational actors is a crucial test for European sustainability transitions. The challenge for local and regional policymakers is to turn climate and environmental challenges into opportunities for their communities.

In this regard, this report stresses that strengthening resilience and responsiveness to shocks is crucial for achieving territorial cohesion in Europe and securing its transformation towards sustainability.

Overall, the dialogues highlighted the importance of regional action to ensure transformative resilience in specific policy areas of the energy transition, circular economy and the just transition. It has become clear that the particular shock of the war in Ukraine deeply affected these policy areas (see Figure 4.1). Furthermore, as these policies are intertwined, the shocks have multiple feedback loops. The direct impacts of the war are a massively intensified energy crisis and a related economic and social crisis. Disruptions in these areas, especially their simultaneous occurrence, threaten prosperity and societal cohesion and inhibit the ability to prioritise environmental and climate goals.

It became clear that implementation of the EGD is not immune to shocks. Therefore, strengthening or setting up capacities for transformative resilience is essential for governing the EU's transitions through future shocks.

Figure 4.1 **Map of vulnerabilities and risks from recent major shocks (war in Ukraine and the COVID-19 pandemic)**



Source: Adapted from EEA and ETC ST, 2022.

4.2 Transformative capacities in three key policy areas

The purpose of this chapter is to demonstrate the need for more transformative resilience capacities in three selected key policy areas.

4.2.1 Energy transition and transformative resilience

The EU's long-term policy goals for the energy transition are a decarbonised energy system, adequate carbon capture and land use as a carbon sink, energy security, and energy access and availability for all. Despite recent efforts under the EGD, Member States still depend heavily on fossil fuels. The REPowerEU plan for affordable, secure and sustainable energy for Europe was one of the major EU responses to Russia's invasion of Ukraine, as dependence on oil and gas imports became an urgent security problem requiring immediate action. The fact that some EU Member States have decided on a partial return to coal energy to compensate for the supply gaps caused by sanctions is an understandable step to guarantee energy security for industries and households. However, it is a slowdown of the planned implementation of the energy transition. Therefore, REPowerEU includes diversifying energy supply chains to reduce Europe's dependence on Russia, energy savings to deal with short- and medium-term energy shortages, and greening Europe's industrial, chemical and construction sectors — for an accelerated transition to renewable energies despite short-term policy responses to the new geopolitical situation.

The measures under the action plan may mean using more fossil fuels in the short term, both to secure energy provision during the transition and to support faster adaptation of innovative energy technologies such as hydrogen or electrification of mobility. Some interim solutions may also affect land and water use, intensifying tensions between nature conservation and energy supply; for instance, soil pollution from fracking chemicals, air pollution from coal-fired power plants and biodiversity loss from wind and hydropower plants. Investments made in LNG to compensate for imports by pipelines are another example as they involve less efficiency in the energy system and risks of lock-in.

Furthermore, the embargos imposed to reduce dependence on fossil fuels impact global power dynamics between the United States, China, India and Russia, in terms of competition for availability and control of fossil fuels and rare earth elements needed for the digital and energy transitions. The expected scarcity of resources could increase investments in innovations (e.g. recycling waste into energy solutions) but also exacerbate environmental problems at the global level due to exploitation of natural resources and differing regulations to protect biodiversity.

Therefore, the link between sustainability and resilience becomes clear, not only regarding the choice of energy technologies and transport systems but also energy consumption. Rising energy prices are driving inflation and recession and putting a strain on industries and households. This is forcing governments to reprioritise public spending in the short term and accept compromises and trade-offs in long-term policy goals such as climate neutrality.

The economic crisis is inhibiting medium- and long-term investment decisions in industry. Rising energy costs and raw material prices are prompting companies to reorganise their production processes and supply chains. On the one hand, this can lead to increased costs and a decline in productivity. On the other hand, it can also be an impetus to invest in more efficient technologies, such as renovating buildings, installing heat pumps and further electrification of cars and vans.

Similarly, energy policy for households can also be described as relatively transformative. This is because the declaration of energy shortages and announcements of forthcoming price increases for electricity and heat were followed by unprecedented investment in, for example, home insulation and heat pumps. This has been supported and thus accelerated by massive investments, grants and loans as part of the economic stimulus programme and cohesion policy.

To ensure the transformative resilience of the EU with the help of — and for — the energy transition, the quickly introduced energy security measures as a political response to the crisis should be aligned with the EU's environmental objectives, particularly those under the broad vision of the Eighth Environment Action Programme (living well, within the limits of the planet). Furthermore, seen from a transformative resilience perspective, energy security considerations should lead to accelerating the energy transition rather than slowing it down. Only then will energy security efforts also have their long-term impact on the broader security goals of strategic autonomy and technological sovereignty.

In addition, close coordination of individual strategies and actions among Member States is necessary to mitigate the risks of specific national strategies and to exploit synergies — so that new partnerships can be agreed upon in a targeted manner. Broad policy mixes of carbon pricing, promotion of renewable energy investments, support for low-income households, regulations for access to critical materials and new strategic cooperation with other global regions are needed.

European investments to reduce dependence on Russian energy also have implications for clean energy investments in partner countries around the world. Consideration should also be given to providing sufficient financial support to new energy partners, such as for hydrogen.

Ideas for transformative resilient actions and policy innovations

- **Dynamic governance for net-zero niches with mapping across directorates-general** to protect and strengthen relevant niche innovations during the transition. This requires tools that apply beyond legislation and finance, such as strategic intelligence, agility, flexibility and space for experimentation.

- **Just transition and green energy** to recognise renewable energy as a public good, emphasise equitable access and highlight the economic viability of net-zero initiatives. This includes ensuring citizens' free and unrestricted access to green energy with a social agreement.

- **Comprehensive and consistent net-zero governance**, covering aspects like geoengineering, climate change adaptation and involvement of digital mega-companies.

- **Pan-European regional energy agreements**, established to limit dependencies on third countries and ensure flexibility and adaptability in the energy sector.

- **Recognising the need for a change in values** to promote sustainability-conscious behaviour and choices, e.g. encouraging sustainable consumption and production patterns, raising environmental awareness and promoting a sense of responsibility.

- **Steering the EU's global influence and managing demographic change** with active engagement in international climate negotiations, partnerships and cooperation to ensure the alignment of global efforts towards net zero emissions.

4.2.2 Transition to the circular economy and transformative resilience

The EU's strategy for the transition to a circular economy underpins the more recent 2023 proposals for the Net Zero Industry Act and the Critical Raw Materials Act. The goals of these policies are to make sustainable products, services and business models the norm and to adapt the idea of circularity of the economy to the new geopolitical circumstances. Overall, the aim is to change consumption patterns to promote the prevention of waste through reuse, the extension of product lifetimes and other waste prevention measures.

The economic performance of EU Member States and their geopolitical negotiating position are crucial factors for the transformation to a circular economy. The war on Europe's borders, with a strong impact on the supply chains of European industry, energy and consumer prices, is only part of the increasing threats to European security and competitiveness. European and global foresight studies identify further potential risks and crises that make strengthening resilience for the long term even more urgent.

Supply chain disruptions lead to disruptions in a wide array of products and therefore pose many risks. The insecure and unsustainable supply of critical raw materials is an economic and environmental risk. Identifying such materials in products and waste and efficient collection and treatment are key stages to achieve a more secure supply of critical raw materials. At the same time, the high level of uncertainty coupled with high costs is forcing industries to hold back on investment decisions. In addition, recycling research and development in Europe is highly competitive globally, so low investment budgets and land use regulations may inhibit the rapid development of new infrastructure.

The recession and inflation caused by turbulence in energy markets and supply chains are also increasing consumers' price awareness and saving behaviour. This can slow down the trend towards local and sustainable consumption if people have to pay more attention to price and, as a result, buy products of lower quality and shorter life span (for example, clothing). On the other hand, rising prices may accelerate trends towards sustainable consumption, for instance, in terms of buying recycled clothing. This is not to say that more sustainable options are always the more expensive ones — recession and inflation can slow down the trend towards sustainable consumption because people pay more attention to what seems most convenient, which is often influenced by marketing and subject to greenwashing. There is also the substantial issue of a lack of consumer awareness of the reasons behind higher prices for certain products, such as adequate pay and better quality, which leads to fewer purchases over time. The social and economic position of secondary resources compared to primary resources is therefore important.

Despite these challenges, it has become clear, not least with the supply chain disruptions during the COVID-19 crisis, that a circular economy based on recycling, reuse and reduction will make production and consumption more resilient. New waste separation and processing technologies and emerging new materials (e.g. bio-based plastics) and digital technologies are facilitating the shift away from fossil feedstocks, while at the same time infrastructures, partnerships and supply chains for more circular economies must be adapted or rebuilt. More intra-European supply chains and less material consumption can reduce the risk of dependence on raw materials from other countries.

It is important to note that the sustainability of bio-based products depends on various factors, including the specific feedstock, cultivation practices, processing methods and the product lifecycle. Additionally, continuous research and

development efforts are essential to identify where bio-based products can make the greatest contribution to sustainability.

Due to the strong regional specialisations of European industries, EU regions are affected differently by the shift to a circular economy. In some places, such as around the Baltic Sea or in eastern Germany, there are dramatic upheavals due to the energy transition and its impact on the steel sector. In other regions, new potential for innovative forms of urban mining or waste separation are emerging.

Also in this action area, policy coordination of emergency measures in response to the shock of the pandemic has increased resilience, e.g. with the European Commission's retail investment package, which has triggered new activities related to cities and regions. However, it is unclear at this stage whether, despite the smaller-scale improvements at the level of production and consumption patterns, industrial production is losing resilience at a higher level.

The question remains as to where the limited financial measures of the EU and its Member States should best be deployed to leverage regional diversity and strengthen cohesion. The exchange of knowledge, best practices and products is of enormous importance, not only within a region but also between similar regions across Europe. Other desirable actions include supporting a European recycling infrastructure by scaling up innovative technologies to an economically mature level to compete with primary resources, ensuring attractive and standardised conditions for recyclers including increasing the demand for such material, and strengthening the implementation and compliance of such conditions within the EU. In this regard, there is scope for actors such as the Committee of the Regions to play a significant role in the transformation to a circular economy.

Ideas for transformative resilient actions and policy innovations

- **European resource mapping and resource bank**, providing data and a comprehensive understanding of resource distribution, and enabling effective waste distribution, dismantling, disposal, valorisation and processing. By making this data accessible, policymakers, businesses and communities can effectively plan and implement resource management strategies, ultimately promoting the transition to a circular economy.

- **Financing and procurement standards for the circular and sharing economy** to foster the growth of sharing and collaborative economy platforms and new standards for 'product-to-service' business models. This can be achieved through funding initiatives, research and development programmes and cooperation with relevant stakeholders. These measures would need to be accompanied by suitable impact assessment because a lot of sharing, such as car-sharing and Airbnb-like models, have been noted to produce unintended impacts (e.g. more cars in cities due to lenient parking regulations, city cores with no available housing or very expensive housing).

- **Sustainable financing** by establishing a 'commons budget' specifically dedicated to circular economy initiatives, promoting sustainable practices and incentivising companies and organisations to adopt circular business models.

- **Promote circular economy innovation ecosystems** with awareness-raising and engagement activities within innovation ecosystems, such as promoting knowledge exchange (e.g. raising the relevance of perceiving waste as a precious source of material), organising workshops and events, and facilitating collaboration between stakeholders like researchers, entrepreneurs, policymakers and citizens.

- **Regional partnerships and territorial agreements** that focus on smart and circular restructuring. This includes collaboration between key stakeholders, including businesses, governments and research institutions, to identify opportunities to improve resource use, reduce waste and implement circular economy principles.

- **Governance and framework for the circular economy** to hold Member States accountable for their circular economy commitments, e.g. by setting clear targets, establishing reporting mechanisms and conducting regular evaluations to assess progress towards the circular economy goals.

4.2.3 Just and fair transitions to sustainability and transformative resilience

The level of socio-economic inequality and inequity at the onset of a crisis is an important determinant of overall system resilience (Haldon et al., 2020). EU actions and measures and the guiding principles of financial support in regional and social cohesion have had a leverage effect on inequalities and cornerstones of EU policy for decades. To tackle a just transition to a carbon-neutral circular economy where no person or place is left behind, the EU has established several instruments with varying scopes and focuses, ranging from very broad, such as the Recovery and Resilience Facility, to more specific, like the Social Climate Fund.

A just transition to a climate-neutral economy guarantees better and decent jobs, social protection, more training opportunities and greater job security for all workers affected by global warming and climate policies (Haldon et al., 2020). While planning is predominantly taking place at the national level, regions are largely responsible for implementation. In terms of resilience in crises, the better these conditions are met and different policy levels are coordinated the better a region is positioned — giving its actors more room to respond flexibly and appropriately to changing conditions.

The transition to a greener, low-carbon economy is one of the key policy objectives of the EU's cohesion policy to promote growth in the period 2021-2027, with the aim of developing all types of territories in a sustainable and integrated way. Both climate change and the economic consequences of the polycrisis will hit regions differently and they will be in different positions to respond appropriately with their own capacities. There is a risk that, under tightening economic and financial conditions, existing social inequalities will be exacerbated, with long-term implications for social and territorial cohesion.

If the economic consequences of war, in combination with inflation, demographic trends, declining competitiveness with the United States and China, and social polarisation in the wake of anti-democratic tendencies continue to worsen, the EU will essentially reach the limits of its economic model. This harbours the risk of weakening the willingness to participate in climate protection; for example, in the form of changes in behaviour or acceptance of measures that counter one's own short-term interests.

High inequality associated with growing poverty limits the effectiveness of climate protection measures (maybe even preventing their implementation) and could jeopardise democracy in the medium term.

For a just transition to be implemented fully and with a transformative outcome, it is necessary to extend support to the regions and people most affected by the economic consequences of the polycrisis and climate risks.

Ideas for transformative resilient actions and policy innovations

- **Tailored transition pathways developed collaboratively** by regional and local actors and stakeholders to address the specific needs and challenges of each region and across regions, e.g. support an ecosystem of cooperation between regions.

- **Multi-level governance structures** to break down political silos can lead to more consistent and synergistic policies that address the interlinked challenges of the green transition.

- **Participatory future-visioning at various levels of governance** to effectively address socio-political challenges and ensure that regions heavily dependent on industries such as coal mining or steel production are considered. It is crucial to engage and involve potentially vulnerable groups in the green transition process. By actively including their perspectives, needs and aspirations, policies can be designed to address their specific challenges and ensure that they do not undermine equitable transition measures. By empowering vulnerable groups, the green transition can be strengthened and made more equitable.

- **Impact assessment at the regional level** requires granular data and mapping of the skills needed. This includes analysing the specific socio-economic conditions and challenges of each region and identifying the skills and capacities needed to support the green transition. By understanding the regional context and skills landscape, targeted interventions and initiatives can better address regional disparities and maximise positive impacts.

4.3 In summary

Given the complex interactions between the transitions and various emerging crises, implementing EU priorities in strengthening transformative resilience poses a major challenge. How can the transitions be accelerated in all action areas and in all regions at the same time? How can regional particularities be utilised as strengths for appropriate and just transitions?

Table 4.1 contains specific examples of transformative resilience developed with experts and policymakers from different governance levels in the three Futures Dialogues. They demonstrate the high practical relevance of the concept for European resilience and Green Deal policy — and confirm the previous assumption that the two are closely interlinked and mutually dependent.

Further exploration of the concept of transformative resilience will increase benefits for all stakeholders and policymakers at the EU, national, regional and local levels. One step would be to analyse the links between the transformative resilience

Table 4.1 Types of governance capacities for the resilience of system transformations

Types of governance capacities	Net zero carbon by 2050 — energy transition	Decoupling of resource use from economic growth and zero waste — economic transition	Leave no one behind — just transition
Anticipative capacities	Horizon scanning, analysis of impacts and need for action: e.g. geo-economic trends and impacts on energy supply disruptions.	Trend and impact analysis: e.g. technology radar, emerging consumption patterns, foresight for global supply chains and risks of disruption.	Socio-economic trend analysis, impact analysis: e.g. identify key factors for social cohesion and change.
Preventive capacities	Identify and prepare for future risks of zero-carbon energy supply disruptions: e.g. new energy import partnerships for diversified energy sources.	Prepare for resource scarcity and decrease reliance on virgin materials: e.g. European resource mapping and regional resource banks, incentives for sustainable consumption.	Reduction of risks of socio-economic vulnerability: e.g. basic education, local skill development and job training programmes, subsidies for households.
Absorptive capacities	Safeguard already established zero-carbon solutions against shocks: e.g. redundant infrastructures, pricing mechanisms.	Support industry to close material and resource cycles locally: e.g. construction of recycling plants, establishing effective collection and treatment systems.	Engage citizens of all ages in social and community activities: e.g. neighbourhood assistance or environmental care, redistribution of financial burden of transitions.
Adaptive capacities	Reconfigured energy supply networks: e.g. decentralised power generation, controlled centrally.	Innovation and R&D: e.g. rewards and incentives for local innovations and start-ups with circular business models, scaling up innovative technologies to achieve measurable impacts.	Social innovation: e.g. test basic income models, support social start-ups, inclusive policy labs for collaboration and engagement with local stakeholders.
Transformative capacities	Reorientation of energy demand: e.g. recognise renewable energy as a public good, emphasise equitable access.	Reorientation of resource consumption: e.g. higher taxes on use of non-recycled materials.	Reconfiguration and renewal of social cohesion strategies: e.g. redistribution of wealth, foster collaboration and exchange among regions.
Supporting capacities	Coordination of capacities and stakeholders: e.g. European engagement in international climate negotiations, pan-European regional energy agreements.	Engage stakeholders and citizens in collaboration and mutual learning: e.g. establish living labs for recycling and reuse solutions and innovations, green public procurement standards.	Organisation and coordination: e.g. develop regional transition pathways with EU and local authority commitment.

Source: EEA.

capacities and different phases of the policy cycle. Based on the findings above, we assume that transformative resilience capacities are relevant for any phase of democratic decision-making in the era of the polycrisis. The framework developed below uses a simplified model of the policy cycle to systemise and structure the highly complex process of policymaking.

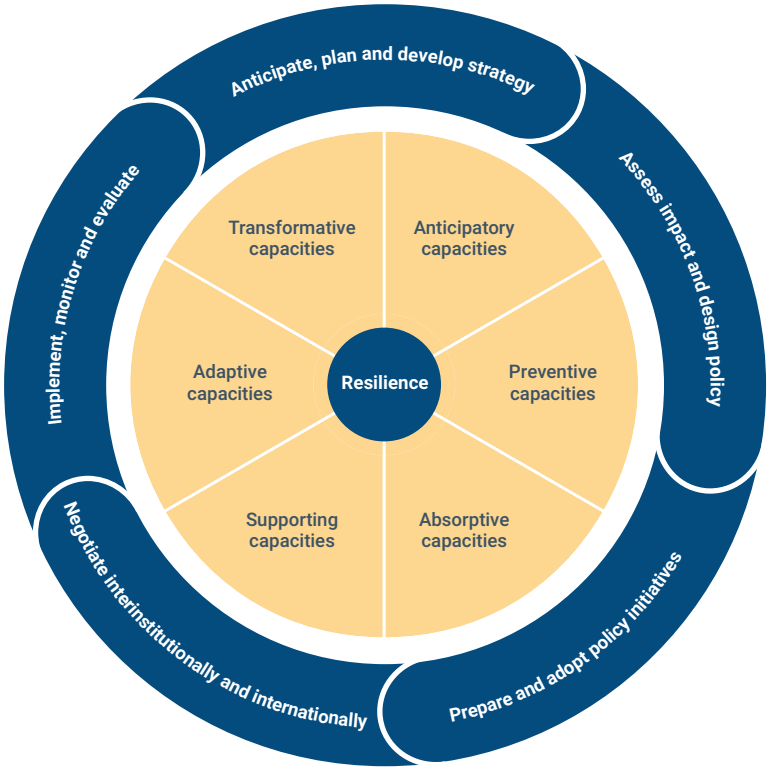
The European Commission's Knowledge4Policy initiative distinguishes five phases for pinpointing key competencies in policymaking:

1. anticipate, plan and develop strategy;
2. assess impact and design policy;
3. prepare and adopt policy initiatives;
4. negotiate inter-institutionally and internationally;
5. implement, monitor and evaluate.

Assigning the capacities of resilient governance to the phases of policymaking produces the following picture (Figure 4.2). The preventive capacities are clearly assigned to the first phase when it comes to recognising risks and taking measures to avoid or mitigate them. The absorptive and adaptive capacities are primarily required in the second and third phases of the policy cycle when policy measures need to be adapted, and in the fifth phase of their implementation, to respond to shocks and their consequences. Supportive capacities are mainly needed in the fourth and fifth phases so that the measures can be standardised and the necessary resources are made available. Transformative capacities are relevant in all phases of the cycle, with a particular focus on anticipatory actions of governance.

It should be noted that this is an idealised policy cycle, with the allocation of capacities based on their core benefit for policymaking in crises. In practice, of course, it is not possible to categorise them so clearly.

Figure 4.2 **Governance capacities for resilience along the policy cycle**



Source: EEA.

Conclusions

As this report has argued, strengthening Europe's transformative resilience within and across key policy areas is essential for ensuring these transitions are implemented and delivered. Adaptive/adoptive resilience is a poor alternative to enhancing sustainability transitions.

The EU faces the challenge of consistently reconciling the urgent need to implement emergency measures for the security of supply, technological sovereignty and strategic autonomy with its sustainability goals.

How can a policy for sustainability transitions deal with conflicting goals? How can the tensions be resolved and how can synergies in climate protection between environmental and security, economic and social policy be created? What can the necessary readjustment of sustainability policy in all policy fields look like? If transformability is key to the resilience of transitions, what enables their emergence and how?

Sustainability transitions are intrinsically linked to social innovation. Specifically, social innovation plays a crucial role in:

- the emergence of change in different niches on the fringe of an established socio-economic system. Sometimes, such niche spaces are created by public policy interventions;
- disruptions at the landscape level, which can uproot the established socio-technical system and regime. Such exogenous changes can include gradual, long-term trends such as demographics or political ideologies or more sudden shocks like military conflict;
- destabilisation at the regime/system level, which creates windows of opportunity for transitional change.

These three levels correspond to the three phases of a transition: emergence/take-off, diffusion/acceleration, and reconfiguration/stabilisation.

'Transformability' of resilience is not a static component. It depends on social innovations in the mode of governance and the quality and composition of 'innovators' that govern a transition.

As the current EU policy cycle ends in 2024, the following 5 years will produce new policy agendas and framings for the EU's transformations, including in the energy system, circular economy, and in tackling the issue of justice, fairness and cohesion ([3]). Crises and disruptions will continue to happen frequently and probably often unexpectedly. Resilience is likely to feature prominently in the evolving policy language. Key questions remain. Will the 'transformability' of resilience

([3]) For some thinking on this, see *Exploring the social challenges of low-carbon energy policies in Europe* (https://www.eea.europa.eu/publications/exploring-the-social-challenges-of).

be anchored in the EU's governance of 2025-2030? Will the transitions remain stable and adaptable in the face of new shocks and shifting priorities? Will future adaptive cycles be about scaling down unsustainable elements in the energy and economy systems and phasing up sustainable practices? Or will they be more about bouncing back to the 'old normal'? Finally, will the transitions of the next 5 years be resilient — and transformative — enough given the regional disparities across the EU and demonstrate improvement around just transition?

As argued in this report, the essential aspects of resilience — transformability, stability and adaptability — need to be established within the broad space of transition governance. This points to the importance of different types of governance-related innovations, including new institutional design and policy mixes contributing to sustainability transitions. These social innovations can be applied to build transformative resilience into the systems undergoing transitions to help them absorb shocks, adapt to new states and retain their transformative dynamics.

A single and simple recipe does not exist. Nor is there a single actor vested with the authority, power and foresight to steer the EU single-handedly to sustainability. A search and formulation of the next steps for 'governance innovation' can be informed by three considerations.

Firstly, there needs to be a more nuanced understanding of the constraints of the EU's multi-level governance. As the development of transitions is uneven and non-linear, institutional stakeholders in the EU's policy system have an essential role to play, although throughout different phases of a transition. EU institutions, national governments and sub-European regional actors (for example, cities) have unique capacities, resources and authority to identify and agree upon goals and targets, create institutions and networks, and facilitate structural socio-economic change. Public policy institutions are not only the major enablers of a transformation process but they are also part of it. What elements of the EU's political-institutional set-up require change to bring about transformative resilient policy outputs? Could (or should) we envisage changes to the EU's political-institutional model to match the ambitions, scope and direction of transitions?

Secondly, innovations in and of policy processes are key. Open, inclusive, participatory and intersectional processes are essential to supporting complex directions and involving different stakeholders. For example, new entrants into a policy process (e.g. volunteers, activists) can bring in more radical innovation. These innovations differ from mainstream ones because they prioritise societal purpose, moral values and collective aspirations. They are also highly contextual and often developed in response to concrete local problems. In addition, they are more oriented towards local communities, social justice or alternative economic rationales (e.g. community ownership, shortening supply chains, self-sufficiency and de-growth). All these points are important to resilience thinking and feature in the current policy debate about the EU's strategic priorities.

Thirdly, **innovating policy instruments** is important. A relatively novel policy toolkit of foresight approaches can help policy planners and other 'governance innovators' envision alternative futures. Forward-looking approaches can provide valuable insights into the urgency of action, where to target efforts and investments, and the kinds of trade-offs and tipping points that may arise during transition processes in the future. Ideas indicated in Chapter 4 of this report have the potential to strengthen the EU's governance capacity to innovate through crisis. When facing a shock, policymakers are often forced to renegotiate their policies, strategies or future targets. The outcomes of such negotiations are uncertain.

The ability to respond continues to depend on the ability of policymakers to balance short-term responses and their long-term outcomes (Haldon et al., 2020). Looking ahead to the next EGD policy cycle, policymakers should prepare very well for such negotiations to steer sustainability transitions in the case of future shocks.

Conversely, by enabling an open reflection on the future, strategic foresight also helps revisit the past in the same open way. Strategically engaging with the future requires critical reflection **about alternative roads not taken and various tipping points that might have influenced the course and outcome of previous adaptive cycles**. With the shocks of the war in Ukraine, COVID-19 and potential future challenges, the EU is forced to ask: what are the vulnerabilities and opportunities in the current transition policies? How can the EU most effectively leverage its governance model to accelerate transitions and remain resilient against shocks? Overall, foresight has been and will be critical to facilitate the exchange of information and cross-fertilisation of ideas and to help policymakers steer transitions in the next few years of the EU's policy cycle.

Annex 1 Approach and methodology

The analysis in this report is a result of the work carried out under the project, *Exploring the long-term resilience of European sustainability transitions in the context of systemic shocks*.

It is based on insights from a joint project by the EEA and the European Topic Centre on Sustainability Transitions on the exploration of transformative resilience. The project approached it as a new concept to accelerate systems transitions towards a sustainable Europe by 2050 and to fulfil the goals of the European Green Deal despite external shocks, such as the war in Ukraine or other future emerging risks.

This project aimed to unite expertise in resilience, sustainability transitions and foresight to explore the resilience of the EU's policies for transitions. By bridging knowledge on sustainability transitions and resilience thinking and by making use of strategic foresight, the project probed into how the EU's long-term transitions to sustainability can be made more resilient while remaining transformative.

Overall, the project seeks to provide new insights into how resilient Europe's long-term transitions to sustainability are and to leverage existing knowledge solutions by addressing the following objectives:

- inform an understanding of long-term 'transformative resilience' beyond the capacity to simply bounce back and return to the *status quo ante*;
- explore resilience against systemic shocks (e.g. the war in Ukraine) in the three broad areas of the EU's transitions to sustainability where the EU's socio-economic development is in line with its environmental and climate objectives (energy transition, economic transition and democracy and governance transition);
- develop actionable ideas for anticipatory approaches to systemic shocks, including ideas for monitoring and assessing resilience with specific indicators.

The starting point is a system-theoretical approach, in particular system transitions and innovations, and an understanding of foresight as a participatory approach to dealing with uncertainty in policymaking.

For the methodology, we relied on desk research and the integrated participatory foresight approach of Futures Dialogues with stakeholders of the EEA, including experts from different policy levels, policy action areas and research fields of relevance for the topic. Overall, three dialogues were implemented, each applying a specific lens on the resilience of system transitions, challenges and ideas for solutions in three policy areas: energy transition, circular economy and just transition.

1. Futures Dialogue 1 (17 May 2022, Copenhagen)

- Global lens: Exploration of vulnerabilities and long-term impacts of the shock of the Russian war in Ukraine.

- Participants: EEA's Scientific Committee, experts from EU authorities and strategic foresight units of the European Commission and OECD.

- Method: Keynotes from external experts, discussion of major tensions and synergies between the European Green Deal policy actions and short-term responses to the crisis in breakout groups per policy area.

2. Futures Dialogue 2 (18/19 October 2022, Prague)

- Regional lens: Exploration of capacities and actions needed at sub-national levels across Europe for reaching the goal of a sustainable Europe by 2050. Participants: Experts on regional capacities and resilience from different research fields (i.e. economics, regional planning, environment policy). Method: Keynote from the EEA, discussion of possible future risks, challenges and ideas for solutions at the regional level in breakout groups. Firstly, for four different scenarios (EEA, 2024a); secondly, for three policy areas (energy transition, circular economy, just transition).

3. Futures Dialogue 3 (27 April 2023, Brussels)

- EU lens: Resilience of the EU's sustainability transitions in the evolving policy landscape — towards a strategic roadmap for 2025-2030.

- Participants: Experts from EU authorities and strategic foresight units of the European Commission and OECD.

- Method: Keynote from the EEA, discussion of needs for policy instruments and structures to increase the EU's transformative resilience for the next EU strategic plan towards 2040 and development of ideas for policy innovations at all levels of governance in breakout groups for three policy areas.

Figure A1.1 The process with foresight lenses

Source: EEA.

References

Asadzadeh, A., et al., 2022, 'Transformative Resilience: An Overview of Its Structure, Evolution, and Trends', *Sustainability* 14(22), p. 15267 (DOI: 10.3390/su142215267).

Asadzadeh, A., et al., 2023, 'Capacitating urban governance and planning systems to drive transformative resilience', *Sustainable Cities and Society* 96, p. 104637 (DOI: 10.1016/j.scs.2023.104637).

Avelino, F., et al., 2023, Towards a robust conceptualization of justice for sustainability transitions: A literature review for the European Environment Agency. Unpublished.

Balland, P.-A. and Boschma, R., 2021, 'Mapping the potentials of regions in Europe to contribute to new knowledge production in Industry 4.0 technologies', *Regional Studies* 55(10-11), pp. 1652-1666 (DOI: 10.1080/00343404.2021.1900557).

Boschma, R., 2023, *Cohesion Policy and its Contribution to Enhancing Regional Resilience against Emerging Challenges*, Final report, European Commission (https://ec.europa.eu/regional_policy/sources/policy/how/future-cohesion-policy/Academic_Paper_RonBoschma.pdf) accessed 6 May 2024.

Brozou, M., 2022, 'The European Green Deal and the war in Ukraine: Addressing crises in the short and long term', European Think Tanks Group (https://ettg.eu/publications/the-european-green-deal-and-the-war-in-ukraine-addressing-crises-in-the-short-and-long-term/) accessed 6 February 2024.

Davidson, J. L., et al., 2016, 'Interrogating resilience: toward a typology to improve its operationalization', *Ecology and Society* 21(2).

EEA, 2019, *Drivers of change of relevance for Europe's environment and sustainability*, EEA Report No 25/2019, European Environment Agency (https://www.eea.europa.eu/publications/drivers-of-change) accessed 6 December 2018.

EEA, 2022, 'Towards 'just resilience': leaving no one behind when adapting to climate change' (https://www.eea.europa.eu/publications/just-resilience-leaving-no-one-behind) accessed 6 May 2024.

EEA, 2023a, *European Union 8th Environment Action Programme — Monitoring report on progress towards the 8th EAP objectives 2023 edition*, EEA Report 11/2023, European Environment Agency (https://www.eea.europa.eu/publications/european-union-8th-environment-action-programme) accessed 6 February 2024.

EEA, 2023b, 'Greenhouse gas emission intensity of electricity generation in Europe' (https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emission-intensity-of-1) accessed 6 February 2024.

EEA, 2023c, 'Investments in the sustainability transition: leveraging green industrial policy against emerging constraints' (https://www.eea.europa.eu/publications/investments-into-the-sustainability-transition) accessed 6 May 2024.

EEA, 2024a, 'Circular economy' (https://www.eea.europa.eu/en/topics/in-depth/circular-economy) accessed 6 February 2024.

EEA, 2024b, *Delivering justice in sustainability transitions* (https://www.eea.europa.eu/publications/delivering-justice-in-sustainability-transitions/) accessed 6 May 2024.

EEA, 2024c, *Imagining sustainable futures for Europe*'(https://www.eea.europa.eu/publications/scenarios-for-a-sustainable-europe-2050/imagining-sustainable-futures-for-europe) accessed 6 May 2024.

EEA, 2024d, What does a just transition to sustainability look like and how do we deliver? (https://www.eea.europa.eu/en/newsroom/news/what-does-a-just-transition) accessed 07.06.2024.

EC, 2020, *2020 Strategic Foresight Report* (https://commission.europa.eu/document/download/497a17be-3824-4135-bf2b-1072d74272b3_en?filename=strategic_foresight_report_2020_1.pdf) accessed 6 May 2024.

EC, 2023a, *2023 Strategic Foresight Report* (https://commission.europa.eu/strategy-and-policy/strategic-planning/strategic-foresight/2023-strategic-foresight-report_en) accessed 6 February 2024.

EC, 2023b, *Capacities for transformative innovation in public administrations and governance systems: evidence from pioneering policy practice*, Publications Office of the European Union, Luxembourg (https://data.europa.eu/doi/10.2760/220273) accessed 6 February 2024.

EC, 2024, 'The Just Transition Mechanism: making sure no one is left behind' (https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transition-mechanism_en) accessed 6 February 2024.

Erdmann, Lorenz; Kimpeler, Simone; Freudenberg, Charlotte, Kononenko, Vadim (forthcoming): *Transformative resilience - governing sustainability transitions in the light of shocks and crises*. Paper, EUSPRI Conference, 4-7 June 2024, Twente.

European Parliament, 2020, *Slowing down or changing track?: understanding the dynamics of 'Slowbalisation : in depth analysis*, Publications Office of the European Union, Luxembourg (https://data.europa.eu/doi/10.2861/914072) accessed 6 February 2024.

Fedele, G., et al., 2019, 'Transformative adaptation to climate change for sustainable social-ecological systems', *Environmental Science & Policy* 101, pp. 116-125 (DOI: 10.1016/j.envsci.2019.07.001).

Folke, C., et al., 2010, 'Resilience Thinking: Integrating Resilience, Adaptability and Transformability', *Ecology and Society* 15(4).

Haldon, J., et al., 2020, 'Lessons from the past, policies for the future: resilience and sustainability in past crises', *Environment Systems and Decisions* 40(2), pp. 287-297 (DOI: 10.1007/s10669-020-09778-9).

Iao-Jörgensen, J., 2023, 'Antecedents to bounce forward: A case study tracing the resilience of inter-organisational projects in the face of disruptions', *International Journal of Project Management* 41(2), p. 102440 (DOI: 10.1016/j.ijproman.2023.102440).

Manca, A. R., et al., 2017, 'Building a Scientific Narrative Towards a More Resilient EU Society Part 1: a Conceptual Framework', JRC Publications Repository (https://publications.jrc.ec.europa.eu/repository/handle/JRC106265) accessed 6 February 2024.

Manyena, B., et al., 2019, 'Disaster Resilience Integrated Framework for Transformation (DRIFT): A new approach to theorising and operationalising resilience', *World Development* 123, p. 104587 (DOI: 10.1016/j.worlddev.2019.06.011).

Marchese, D., et al., 2018, 'Resilience and sustainability: Similarities and differences in environmental management applications', *The Science of the Total Environment* 613-614, pp. 1275-1283 (DOI: 10.1016/j.scitotenv.2017.09.086).

O'Brien, K., 2012, 'Global environmental change II: From adaptation to deliberate transformation', *Progress in Human Geography* 36(5), pp. 667-676 (DOI: 10.1177/0309132511425767).

Patel, S. S., et al., 2017, 'What Do We Mean by "Community Resilience"? A Systematic Literature Review of How It Is Defined in the Literature', *PLoS currents* 9 (DOI: 10.1371/currents.dis.db775aff25efc5ac4f0660ad9c9f7db2).

Reyers, B., et al., 2022, 'The contributions of resilience to reshaping sustainable development', *Nature Sustainability* 5(8), pp. 657-664 (DOI: 10.1038/s41893-022-00889-6).

Roth, F., et al., 2021, Insights into systemic resilience from innovation research, Fraunhofer ISI (https://publica.fraunhofer.de/handle/publica/416797) accessed 6 February 2024,.

Schwaag Serger, S., et al., 2023, *Transformative innovation policy in practice in Austria, Finland and Sweden. What do the Recovery and Resilience Plans tell us about linking transformation and innovation policy?*, OECD Publishing, Paris, France.

Tagliapietra, S., 2023, 'After the great energy crisis: Europe's new landscape', presentation given at: Briefing to the US Senate Climate Change Task Force, Washington D.C., 14 June 2023.

Trippl, M., et al., 2023, 'Rethinking regional economic resilience: Preconditions and processes shaping transformative resilience', *European Urban and Regional Studies*, p. 09697764231172326 (DOI: 10.1177/09697764231172326).

UNEP, 2020, *The triple planetary crisis: Forging a new relationship between people and the earth*, United Nations Environment Programme (http://www.unep.org/news-and-stories/speech/triple-planetary-crisis-forging-new-relationship-between-people-and-earth) accessed 6 February 2024.

van Popering-Verkerk, J., et al., 2022, 'A Framework for Governance Capacity: A Broad Perspective on Steering Efforts in Society', *Administration & Society* 54(9), pp. 1767-1794 (DOI: 10.1177/00953997211069932).

Vermeulen, S. J., et al., 2018, 'Transformation in Practice: A Review of Empirical Cases of Transformational Adaptation in Agriculture Under Climate Change', *Frontiers in Sustainable Food Systems* 2.

Walker, B., et al., 2002, 'Resilience management in social-ecological systems: A working hypothesis for a participatory approach', *Ecology and Society* 6(1) (DOI: 10.5751/es-00356-060114).

List of abbreviations

Abbreviation	Name
EGD	European Green Deal
Eionet	European Environment Information and Observation Network
JRC	European Commission's Joint Research Centre
OECD	Organisation for Economic Co-operation and Development
RRF	Recovery and Resilience Facility

European Environment Agency

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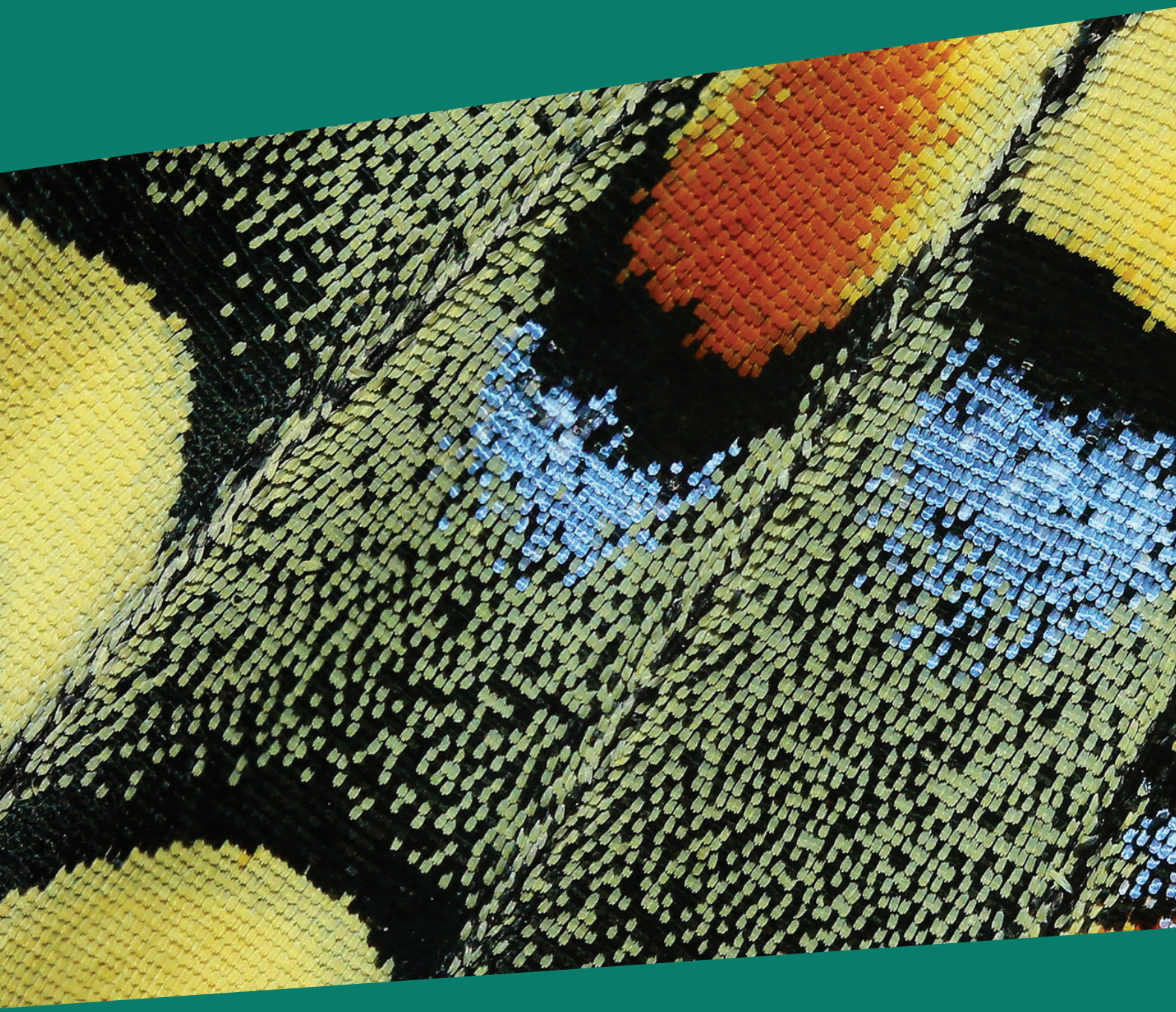

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