Shaping the future – a guideline for transformative policy

Contents

The Advisory Council for Science, Technology and Innovation (AWTI) has developed a guideline for developing a transformative policy mix with policy instruments that help to achieve transformations. This guideline is intended for those who develop and implement policy and for other stakeholders who work on transformations. This guideline is a concrete follow-up step to the advice 'Shaping the future - from optimisation to transformation' that the council published at the end of 2023.

Complex societal challenges in the areas of climate, nature, food, energy, mobility and healthcare require innovative solutions and fundamental changes in farming methods and food production, in mobility, in energy use and in health case. Transformations are complex, because they are not about a single change or innovation, but often require multiple solutions and changes in different processes, networks, systems and structures. Moreover, the government cannot achieve transformations on its own. Multiple stakeholders are needed, each with their own role, responsibility and opportunities to take action. The government play an essential role in creating the right conditions with policy interventions and in stimulating (or slowing down) other stakeholders in their activities. These policy interventions come together in a transformative policy mix.

The guideline shows that an effective transformative policy mix is inspired by a future vision based on clear choices. The transformative policy mix introduces interventions tailored to the specific phases of a transformation, drives new movements and actively slows down old systems, relates to all relevant government policy and involves a broad group of organisations and people from practice.

The guideline introduces a governance to develop a transformative policy mix 'learning by doing' and in close interaction with practice, facilitated by transformation teams. Coordination and cooperation between different policy levels and policy domains is essential and the guideline outlines a number of possibilities for this.

In addition, the guideline offers a step-by-step plan to develop an effective transformative policy mix. This step-by-step plan is in line with the Policy Compass of the national government and uses the TransMission model (Simons et al, 2023) as a tool for identifying bottlenecks and success factors in a transformation. Part of the step-by-step plan is a policy matrix that provides insight into which policy instruments are needed in which phase of the transformation to address the identified bottlenecks and success factors.

The AWTI presents the guideline as an invitation to policymakers and others to get started with transformative policy. This fits with the change that is taking place in thinking about how innovation policy can contribute to a future-proof and sustainable society and economy. This recent development in policy is certainly not crystallised. The practical experiences with this guideline will provide additional insights and thus help to further improve a transformative policy approach. Monitoring and evaluation of the experiences with the guideline is essential for this.

The Netherlands is facing urgent challenges on a number of fronts: climate, food, energy, mobility and health care. Innovative solutions are needed to made the Dutch economy and society future-proof and sustainable, in order to maintain the high levels of prosperity and welfare the Netherlands enjoys. Those solutions will not simply materialise unaided; and they will demand radical changes in Dutch society.

Transformations will be needed in many areas: fundamental changes in, for example, farming methods and food production, in mobility, in energy use and in health care. All these 'societal systems' will need to be overhauled.

Science, technology and innovation play a key role in transformations. Scientific knowledge is needed to understand how the societal systems we wish to change function, to underpin collective decisions about them and to find new solutions. Technology and innovation are essential for developing technological and non-technological solutions for change. Transformations can be radical, but at the same time offer momentum and new opportunities. The demand for new, sustainable products, processes, services and lifestyles leads to new fields of research, new economic activity and employment. The Netherlands has many instruments to promote science, technology and innovation. Much has already been achieved thanks to these instruments, but it is not enough if we genuinely wish to change course and accelerate the necessary transformations.

Generic stimulation of research and innovation remains essential for strengthening the knowledge position and competitiveness of the Netherlands and for generating unforeseen solutions, but speeding up the necessary transformations also requires policy to focus on what is needed in the future: transformation instead of optimalisation of existing systems.

In 2023, the AWTI issued the advisory report 'Shaping the future - from optimisation to transformation'. In this advice, the council advocates a transformative approach to knowledge and innovation. This approach must be based on an attractive future vision that provides direction and incentive and does not – as is the case now – strengthen and perpetuate established processes, structures and interests. In this advice, the AWTI makes four recommendations:
- Set a course with an inspiring future vision based on clear choices;
- Make more use of pricing and standardisation;
- Make better use of the innovative strengths of society and give knowledge and expertise in the civil service and politics top priority;
- Finally, develop a transformative policy mix which both stimulates new innovation pathways and breaks down well-trodden and unhelpful paths.

In the advisory report, the council announced that it will give more detailed advice on the latter in a separate advisory report on the elements of a comprehensive and cohesive transformative policy mix. The AWTI has followed up on this intention and elaborated it in this guideline for those who develop and implement policy and for other stakeholders working on transformations.

The AWTI presents the guideline as an invitation to policymakers to get started. This fits with the change that is taking place in thinking about how innovation policy can contribute to a future-proof and sustainable society and economy. Thinking and doing about transformative policy is in full development. A continuous process is needed in which policymakers and all actors involved experiment and learn what works and what does not. The experiences in practice with this guideline can contribute to this. Monitoring and evaluation of the experiences with the guideline is essential.[1]

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1 New evaluation methods and frameworks can help in this experimentation and learning process. See for example Ter Weel et al. (2022) and Janssen (2023).

The guideline starts in **Chapter 1** with an **explanation of the principles that, according to the AWTI, are leading for a transformative policy mix**. An effective transformative policy mix is inspired by a future perspective based on clear choices. The transformative policy mix introduces interventions at the right times in the specific phases of the transformation, drives new movements and actively slows down old systems, relates to all relevant government policy and involves a broad group of organisations and people. These principles are reflected in the approach that the AWTI proposes in this guideline.

Chapter 2 discusses a governance to enable the development of transformative policies and their effective implementation. A transformative policy approach develops 'learning by doing' and in close interaction with practice. Moreover, close coordination and cooperation between different policy levels and policy domains is needed to ensure a comprehensive, coherent and well-timed policy approach. **We propose a participatory and learning governance approach and outline different possibilities for horizontal and vertical coordination between governments**.

In **Chapter 3**, the guideline focuses on policy formulation as part of the policy cycle. In the policy formulation phase, the bottlenecks and success factors that are relevant for the development of a transformation are identified and the corresponding policy instruments are selected. **We use the TransMission model as a tool for identifying the bottlenecks and success factors and for determining policy instruments for an effective transformative policy mix.**

Chapter 4 outlines a step-by-step plan as a tool to weigh the various options for policy instruments and arrive at a well-founded mix of policy instruments. **We explain which types of policy instruments can be used when**. As part of the step-by-step plan, we introduce a policy matrix to provide insight into which policy instruments can help in which phase in the transformation.

The AWTI has developed two cases to inspire and illustrate what a transformative policy mix can look like. The application in the cases is not intended to provide a complete overview. The cases show how the policy mix can differ over time and between transformations, how it relates to existing policy and what questions this raises with the current approach. The elaboration of these cases is included in a **separate document**.

The guideline concludes with further information about **how the AWTI developed the guideline** and an **overview of the references** used.

Transformations[2] are far-reaching fundamental changes in the structure, culture and infrastructure of our societal systems[3] that go beyond ordinary changes[4]. They are necessary to tackle challenging societal issues, or 'wicked problems'. These issues are particularly difficult because it is often unclear what the problem actually is that needs to be solved, when the problem will be solved and which solutions can be effective. Moreover, solutions can lead to new problems.[5] Transformations are therefore extremely complex and are characterised by uncertainty about what the world will look like after the transformation and also about the routes to get there. Established, familiar paths within systems need to change; this can have a major impact and meet with resistance. Technological innovations and new ways of thinking, working and organising are needed. Just as important is the need to change, phase out and discontinue existing patterns and working methods (see Figure 1).

Transformations are not about a single innovation or change, but often require multiple solutions, partial transitions and changes in different processes, networks and structures. Moreover, the government cannot initiate and achieve transformations on its own. Multiple stakeholders are needed and they all have their own role, responsibility and possibilities to take action. The government is therefore one of the stakeholders, but an essential one because the government can create the right conditions with policy and stimulate or slow down other stakeholders in their activities and contributions. The various interventions by the government come together as policy instruments in a transformative policy mix. The AWTI sees a number of leading principles for such a transformative policy mix.[6]

First of all, an effective transformative policy mix starts from an inspiring future vision based on clear choices: what change do we want to bring about, what do we consider important, which values do we put centrally and where do we want to end up? This future vision feeds the missions and objectives of a transformation and provides direction for possible solutions. In the advisory report 'Shaping the future - from optimisation to transformation', the AWTI discusses in more detail the importance and characteristics of an inspiring future vision and the council outlines the steps for the creation of such a future vision.

Figure 1 Transformations: Building up and breaking down

2 The term 'transition' is often used as a synonym for 'transformation'. In this advice, the AWTI chooses 'transformations' to emphasize that a number of fundamental, long-term upheavals in various societal systems are needed, the outcome of which is not certain. For an explanation and background, see: Hölscher et al. (2018).

3 By societal systems we mean systems that are related to societal 'needs' such as food, energy, education and mobility. They consist of actors (organisations, groups, individuals), materials (products, technologies and infrastructures) and rules (regulation, values, norms and customs).

4 For the academic basis of transformations and transitions, see Geels (2002); Geels and Schot (2007); Geels (2020); Rotmans (2003); Loorbach (2007); Kerr et al. (n.d); Schot and Steinmueller (2018); Diercks et al. (2019); Grin et al. (2010), Hebinck et al., (2022); Rip and Kemp (1998); Rotmans and Verheijden (2021).
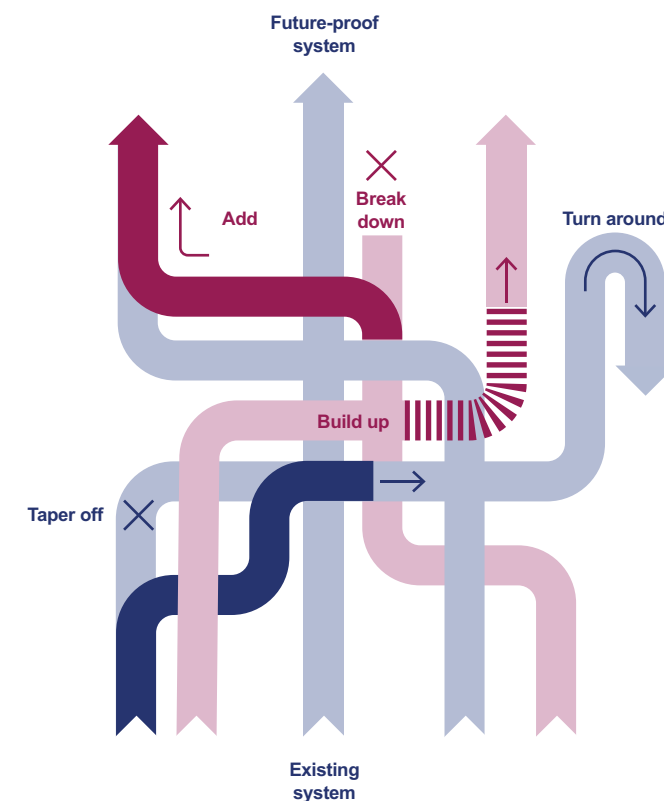
5 Rittel and Webber (1973); Nelson (1974); Wanzenböck et al. (2020).

6 See AWTI (2023b) for further explanation and substantiation of the advice to the Dutch government to make knowledge and innovation policy more transformative.

Secondly, a policy mix is only effective if it intervenes at the right times on what is needed in the development of a transformation.[7] With sufficient scope for early-phase development of new knowledge and technologies which could eventually contribute to the necessary transformations. With stimulation of upscaling and dissemination of promising solutions. And with measures aimed at phasing out non-future-proof practices, so that space is created for new alternatives and ultimately the old societal (socio-technical) system tilts towards a new societal system.[8]

Thirdly, transformations require a coherent policy mix that not only drives the development of innovative (technological) solutions, but also creates demand for those solutions and facilitates the dissemination of innovations. A transformative policy mix therefore not only consists of instruments from science, technology and innovation policy, but also integrates instruments from sectoral policy. Examples include policy interventions in relation to infrastructure, labour market, market regulation, funding opportunities and standards, as well as pricing, standardisation and innovation-driven and socially responsible procurement by the government as a 'launching customer'. Special attention needs to be given to inhibiting legislation and licensing procedures. Cohesion, coordination and consistency across the different laws is needed to prevent projects, companies and citizens being confronted with conflicting or uncoordinated legislation or comparable problems being resolved in different ways under different pieces of legislation.[9]

Fourthly, in addition to horizontal integration and coordination between policies from different domains and sectors, vertical coordination is also needed between European, national and regional policies. Policy instruments of different governments can reinforce each other (via substantive and financial leverage) or complement each other.[10]

Fifthly, a transformative policy mix also includes instruments that stimulate and make better use of knowledge and innovation from the social sciences and humanities. When tackling societal challenges, people often think of all kinds of technological innovations that should solve the problems. However, with these complex issues, we should not only pay attention to the technical dimensions, but also to the social, economic, ethical, legal and cultural dimensions. The idea that this causes delays in technological development and innovation is incorrect. In fact, ignoring the social, ethical and legal aspects of it causes delays. Moreover, knowledge from the social sciences and humanities can lead to new, non-technological solutions. Knowledge and innovation from the social sciences and humanities are therefore essential and must be deployed from the start.[11]

Sixth, a transformative policy mix involves a broader group of actors, including non-established parties, creative makers and thinkers, citizen collectives and other social partners. They are an important driver and source of innovation that will initiate transformations, but also help to accelerate them. Moreover, greater participation of citizens and others ensures democratic legitimacy and mandate for the policy.

Finally, a transformative policy mix is adaptive and reflexive. Experiences in practice provide insights into the functioning and effects of instruments, about instruments that reinforce each other and about contradictions that arise from combinations of instruments. These insights ensure that a policy mix can develop. Moreover, no transformation is the same and is therefore context-dependent: the societal challenges manifest themselves differently in different environments and the possibilities and obstacles for transformative change are also determined by their environment.[12] This means that there is no ready-made, one-size-fits-all policy mix.

7   In its report Mapping ERC Frontier Research: Transformative change for a sustainable future (2024), the European Research Council (ERC) uses ERC-funded frontier research to show why technological and social solutions to the grand societal challenges are not being adopted at scale and what is needed to overcome the obstacles. ERC research projects offer governments, businesses, communities and other stakeholders perspectives to act. With a focus on the social sciences and humanities, the report underlines the value of combining diverse knowledge and expertise to find innovative solutions to complex challenges.

8   Meadowcraft and Rosenbloom (2023).

9   Without being a demonstrable reason for this. The AWTI will issue separate advice on innovation and legislation and regulations.

10 AWTI (2023a).

11 AWTI (2024); ERC (2024); OECD (2025).

12 Uyarra et al. (2025); Meadowcraft and Rosenbloom (2023).

Transformative policy in a geopolitical context

Governments worldwide are working on developing mission-driven and transformative (innovation) policies.[13] This is in line with the increased attention for complex societal challenges and the Sustainable Development Goals (SDGs) and climate goals (such as in the Paris Climate Agreement). At the same time, concerns about future prosperity in Europe and the Netherlands are increasing, in a world in which other power blocs are increasingly acting on the basis of geopolitical considerations and goals. The report on the future of European competitiveness by former Prime Minister of Italy and ECB President Mario Draghi was a real wake-up call for Europe.[14]

In his report, Mario Draghi points out that both the EU's innovation capacity and productivity growth are lagging behind those of the US and China. Europe's logic that open (trade) relations, cooperation and free movement of goods and people lead to prosperity, equality, freedom and peace does not work in a world where the US and China are trying to increase their power by linking their economic goals to their geopolitical goals. Mario Draghi therefore advocates a new industrial strategy for Europe to close the 'innovation gap' with the US and China, increase Europe's security and strategic independence, strengthen European competitiveness and at the same time make the European economy climate neutral (low carbon).

Mario Draghi's report and the European Commission's response in the form of a Competitiveness Compass[15] show that Europe faces the major and urgent challenge of taking action on several policy goals simultaneously: improving innovation and competitiveness, sustainability, strategic autonomy, security, equality and justice. Combining these different goals is extremely complex, because how do these goals relate to each other? It leads to all kinds of dilemmas and trade-offs.[16]

One example is the high energy prices that European industry is struggling with. Carbon taxes encourage industry to consume less energy and reduce emissions, which is sensible for a climate-neutral economy. However, the higher energy prices do threaten the competitive position of industry compared to countries with less regulation and pricing. Another example is the ambition of more production and use of renewable energy. This is more sustainable and reduces dependence on imports of fossil fuels. However, due to the war in Ukraine, EU member states were forced to take quick action and invest in LNG (liquefied natural gas). This contributes to strategic autonomy, but not to a climate-neutral energy supply.[17]

The challenge is therefore to enable synergies between the different policy goals and to minimize contradictions. A transformative approach to policy and governance can support this, as this approach is directive, adaptive and participatory and, from a system perspective, strives for coordination and alignment between goals, strategies and actions of different policy domains, policy levels and other actors.

13 Larrue (2021); OECD (2024a); see also: https://www.oecd.org/en/topics/sub-issues/mission-oriented-innovation.html

14 Draghi (2024). Mario Draghi's report is not the first signal, but provides an overarching and detailed problem analysis of the European economy and presents a comprehensive strategy to turn the tide. In April 2024, Enrico Letta's report on strengthening the internal market for more international economic and geopolitical striking power was published. Both reports provide guidance for the plans and actions of the new European Commission 2024-2029.

15 European Commission (2025).

16 Schwaag-Serger et al. (2024).

17 Kivimaa and Rogge (2024).

Working on transformations with transformative policies requires governance that enables the development of these policies and supports their effective implementation. This governance is about the government's ability - through processes, structures, rules and skills - to initiate, stimulate, accelerate, adjust and facilitate transformations with policy instruments. [18]

To do this, the government needs specific, transformative capacities, including[19]:

- **Directive capacity:** The capacity to define policy ambitions and goals based on the long-term societal challenge. This means taking leadership to direct, coordinate, connect and align policy processes. Leadership is aimed at tackling societal challenges.
- **System innovation capacity:** The capacity to support and scale up technological, societal and institutional innovations, to recognize and reverse and dismantle unsustainable practices in the status quo, and to scale up and institutionalize creative and new ways of doing and thinking from society. This requires an approach that not only stimulates the development of new solutions, but also mobilizes the demand for those solutions.
- **Legitimizing capacity:** The capacity to shape policy processes and their concrete implementation in a way that is acceptable and fair for a diversity of stakeholders (including citizens). This requires an approach that actually involves various stakeholders and networks in the development and implementation of policy.
- **Adaptive capacity:** Reflexivity through learning and experimenting. The ability to flexibly adapt and adjust policy in response to relevant (unexpected) developments, uncertainties, risks, new insights and opportunities.

The governance of transformative policy must be able to facilitate and safeguard these different capacities. In section 2.1 we introduce a participatory and learning governance framework for this purpose. Transformative policy develops 'learning by doing' and in close interaction with practice. We will discuss this in more detail in sections 2.2 and 2.3. In addition, close coordination and cooperation is needed between different policy levels and policy domains in order to create a comprehensive, coherent and well-timed policy approach. In section 2.5 we outline various possibilities for horizontal and vertical coordination between governments.

2.1 A participatory and learning governance for transformative policy

A transformative policy approach is characterised by its 'learning by doing' nature and its close interaction with practice.[20] In addition, close coordination and cooperation between different policy levels and policy domains is required to create a comprehensive, coherent and well-timed policy approach.

The AWTI recommends using a participatory and learning governance framework. Such a framework connects the different phases of a policy cycle (from policy development to implementation to policy learning)[21] with the different activities that take place in practice. This practice can be seen as an experimental space, where experience is gained in and with practice with initiating new solution options, scaling up promising solutions and phasing out old, unhelpful practices. The Flemish Advisory Council for Innovation and Entrepreneurship (VARIO) has developed such a framework and it can serve as an example.[22] See Figure 2.

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18 Janssen et al. (2023a); OECD (2024b).
19 Based on Kunseler et al. (2024); Haddad et al. (2022); Borrás (2011); Kattel and Mazzucato (2018); Janssen et al. (2023a).
20 Janssen et al. (2023 a and b).
21 This cycle is based on Haddad et al. (2022), who used Cairney (2012) and Howlett and Giest (2013) for this purpose. A similar policy cycle is used by the government. Such models of the policy cycle are always a simplification of the practice of policymakers, but they do help to make this practice clear and to structure it.
22 VARIO (2024). VARIO has based the framework on the model that VITO/VOORLAND CV developed in the context of the process guidance of the Open Space Platform in Flanders.

The left side of the figure shows the policy cycle with the different phases in the development, implementation and evaluation of policy. The right side shows the different elements of the external experimental space (the practice).

The policy cycle has six policy phases:
1 **Agenda setting:** Identifying manageable challenges in a transformation
2 **Policy formulation:** Identifying solutions in an optimal policy mix
3 **Legitimation:** Creating support and dynamism for the policy mix
4 **Implementation:** Executing the planned policy mix
5 **Monitoring and evaluation** of system change
6 **Policy learning:** Incorporating a continuous and collective learning process

The experimental space consists of five components:
1 Transition arena: together with coalitions of the willing, explore what (future) problems and possible solutions are and which stakeholders can contribute what. Tools and methods such as future explorations and system analyses can support this.
2 Initiate innovative niches: stimulate the development of new technologies, products, services and practices and stimulate and create new markets. Policy experiments with living labs, regulatory sandboxes can support this.
3 Exnovation: reduce and phase out undesirable practices.
4 Scale up & integrate innovative niches: scale up, accelerate as well as connect and integrate innovative solutions with potential for system change.
5 Reflexive learning: evaluate and learn by reflecting on experiences, results and working methods in practice, on the assumptions and ideas regarding problems, solutions and on the role of the stakeholders involved in addressing these.

Figure 2 A participatory and learning governance framework for transformative policy
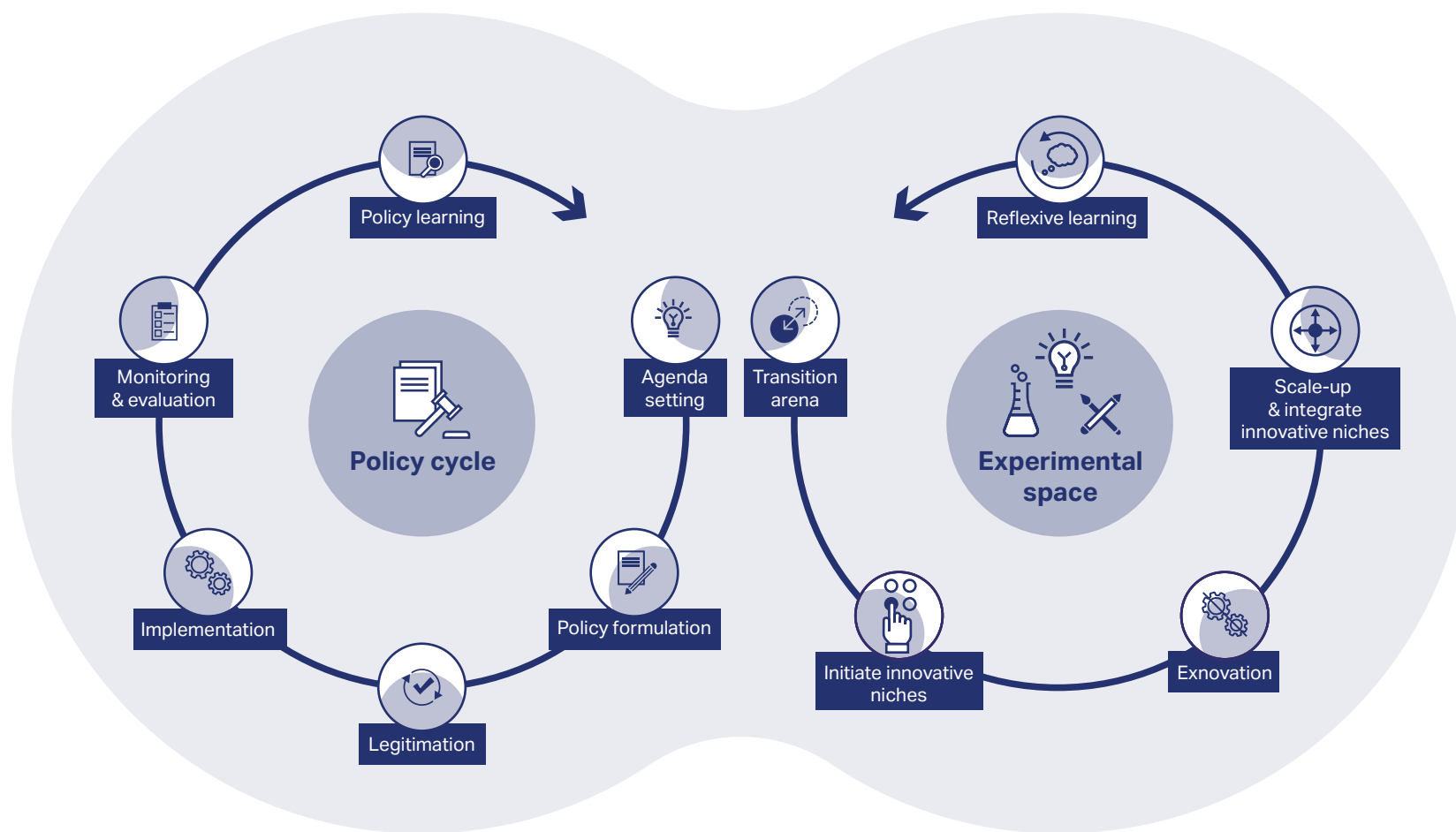
There is a continuous exchange of information, expertise and experiences between the policy cycle and the external experimental space. The various components of the experimental space are connected to the various policy phases. The governance framework starts on the left with the 'Agenda setting' and uses the input from the 'Transition arenas' in the external experimental space on the right. In 'Transition arenas', companies, research organisations, educational institutions, governments, social organisations, citizen collectives and individual citizens use future explorations and system analyses to explore which problems exist and which solutions are possible. The challenges identified in the policy phase 'Agenda setting' are then further elaborated in the 'Policy formulation' phase into instruments to tackle the challenges. Supported by the policy developed and implemented in the policy cycle (left side), experiments such as living labs and regulatory sandboxes are organised in the experimental space (right side) to stimulate new technologies, products, services and practices ('Initiating innovative niches'). 'Innovative niches' with potential need to be scaled up or accelerated, or connected or aligned, to achieve system change. In addition, consideration is given to which elements in the unsustainable system need to be phased out ('Exnovation').

In the policy phase 'Monitoring and Evaluation' (left side), the impact of the policy instruments and the policy mix are monitored and evaluated. The results of the implementation of policy in practice provide important input for this ('Reflexive learning' in the experimental space, right side). In the next policy phase, 'Policy learning', a decision is made to continue with the policy, to adjust the policy or to discontinue it. In this way, the policy can adapt to the bottlenecks and success factors in practice. The different policy phases do not necessarily run sequentially and can be 'run through' several times with feedback loops from the experimental space and depending on the development of a transformation.

The government's directive capacity is expressed in the 'Agenda setting' and the Transition Arena. The combination of stimulating niches and scaling up and phasing out old practices requires the government to adopt a system view in which both the supply of new solutions and the demand for these solutions must be stimulated. The interaction with practice (the experimental space) ensures stronger legitimacy of the policy and the continuous feedback loops from the experimental space to the policy cycle support the adaptive capacity of policy.

2.2 The experimental space is dynamic and inclusive

A transformative policy approach is developed in close interaction with various stakeholders in practice. These are coalitions and networks of various companies, research organisations, educational institutions, social organisations and citizen collectives that jointly accelerate a transformation. The AWTI believes that promising solutions cannot be found within existing networks and coalitions alone. These do not sufficiently stimulate experimentation and the search for radical and creative changes. After all, it is not always in the interest of established participants to develop solutions that go against their position and competitiveness, even when this is necessary.[23] The coalitions and networks of stakeholders must be open to new players and ideas and, moreover, be able to change along with the development of the transformation.[24]

For more dynamism and inclusivity in the experimental space, the AWTI recommends the following:

• **Use the future vision as a basis from which to outline the (non-optional) frameworks, goals and conditions within which society itself can make judgements and can investigate, innovate, experiment and implement.** The frameworks must offer sufficient scope and flexibility and must be fair, just and predictable. Organize this as part of the regular political-administrative processes and ensure administrative commitment in advance so that joint 'ownership' of the transformation tasks and approach is created.[25]

• **Facilitate dynamic coalitions:** Make it possible for participants to enter and exit depending on the phase of a research and innovation trajectory and the phase of the transformation. Adjust the conditions of financing for this. Think of conditions regarding co-financing and knowledge sharing.

• **Lower the barriers for social initiatives, citizen collectives, professionals, creative makers and thinkers:** They can (through access to resources such as money, knowledge and (social) networks) and want to (through the ability and willingness to use these resources) participate and contribute to the development and implementation of new solutions. Therefore, make the policy more **inclusive**[26]:

  ○ **Ensure full financing and substantive support.** This can be done, for example, through innovation-oriented tenders that are not only open to companies, but also to social organisations and initiatives. Another possibility is the use of *right to challenge* trajectories[27]. Also offer social initiatives access to policy networks by offering them a platform and giving them certain experimental rights and resources to ensure a level playing field with other, also established, parties. Also keep an eye on the 'right to grow up'[28]: the time that a social initiative needs to gather knowledge and skills in order to be able to enter the playing field on an equal footing.

  ○ **Adjust the conditions for financing to facilitate the participation of non-scientific parties in research and innovation processes.**[29] Do this, for example, by including the participation of non-scientists as a possibility and by reorganising or removing co-financing

23 AWTI (2023b).
24 AWTI (2020a).
25 AWTI (2022a).
26 AWTI (2024).

requirements for stakeholders who do not benefit financially from the research, but do help to achieve social impact.[30] Research and innovation that works on societal issues in which the business economics perspective plays a lesser role will also benefit from this. Look at European framework programmes for examples, where much less distinction is made between types of parties when financing research and innovation.

○ **Develop new financial and legal arrangements for public-private-civil partnerships.** This also requires agreements on the ownership and use of jointly achieved results.[31]

○ **Stimulate the use of impact investors[32], who do not necessarily invest in projects with a high financial return, but also give social return a prominent role.** An investment in a project with a low financial return and a high social return is then considered an attractive investment.

• **Stimulate the development of clear agreements for transdisciplinary research and innovation**. Society must be able to have a say in the purpose and implementation of research and their own role in it, while guaranteeing research quality and scientific standards. For researchers, co-creation with non-scientists can be included in systems for rewarding and recognising their qualities.[33]

• **Lower the barriers for innovative entrepreneurs, start-ups and scale-ups.** Financing options for knowledge-intensive and innovative entrepreneurs, start-ups and scale-ups are still insufficient in the Netherlands and Europe.[34] An improvement of the financing market for the growth of knowledge-intensive and innovative start-ups is still important.[35] A continued commitment to the exchange of knowledge between Dutch entrepreneurs and knowledge institutions is also necessary.[36] Finally, the government and parliament will have to pay

attention to a national supporting environment where scale-ups are supported to grow beyond the borders of Dutch regions and internationally.[37]

2.3 Transformation teams are the pivot of the experimental space

The policy cycle (the left side of the governance framework) is the domain of policy and policymakers, but the right side of the governance framework, the experimental space, can be facilitated by **transformation teams**. Such a transformation team is in direct contact with a broad group of stakeholders who can contribute to the transformation and/or suffer the consequences of the transformation. The transformation team has a good view of the activities that are already supported by the stakeholders themselves, explores which policy instruments are needed to scale up these bottom-up activities and informs policy about the impact of policy instruments on practice. In addition, the transformation team can establish connections between the various stakeholders and their projects in order to make these projects viable and accelerate them. A transformation team acts as an intermediary between government policy and practice.

27 In a *right to challenge* approach, a group of (organized) residents can be given the opportunity to take over tasks from the government if they think it can be done differently, better, smarter and/or cheaper. For more information, see: https://vng.nl/artikelen/wat-is-het-right-to-challenge-en-waar-komt-het-vandaan.

28 Overlegorgaan Fysieke Leefomgeving (2022).

29 AWTI (2022b) and AWTI (2022a).

30 Like companies, they do not earn back their investment. Examples are patient associations, citizen collectives or artists.

31 AWTI (2022a) and AWTI (2023b).

32 Collectieve Kracht, Triodos Bank and Katalys (2024).

33 AWTI (2022a); AWTI (2022c).

34 PWC (2024); Van Poll (2024); EIB (2024).

35 AWTI (2020b).

36 AWTI (2021a).

37 AWTI (2020b).

The box below shows an example of a transformation team in Flanders.

The transformation team of Circular Flanders

Circular Flanders is "the hub and inspiration for the circular economy in Flanders. It is a partnership of governments, companies, civil society and the knowledge community that take action together."[38] Circular Flanders was established by the Flemish Government, in the context of Vision 2050 (2015), to accelerate and establish the circular economy, an economy in which raw material cycles are closed. Circular Flanders is organised in six strategic thematic work agendas, each with different drivers. These work agendas are partnerships within Circular Flanders that focus on circular actions within a strategic theme. Both public and private actors are involved, 50 to 100 per partnership. The Circular Flanders transition team coordinates the work agendas and the horizontal lines of action ('leverages' such as access to financing, circular purchasing and regulation) and establishes connections between all actors involved, so that they can learn from each other. The transition team is embedded in the Public Waste Agency of Flanders (OVAM), an agency of the Flemish government focused on waste, materials and soil management in Flanders.

The AWTI considers the transformation teams as a further development of the mission teams in the current mission-driven top sectors and innovation policy (MTIB). The governance of the MTIB has developed from public-private coordination of activities to increase innovation opportunities for top sectors to an approach for better coordination between innovation systems and investments in research and innovation on the one hand and the societal problems and efforts to solve

them on the other. To this end, the top sectors governance has been expanded with mission teams and overarching theme teams, supported by the Top Consortia for Knowledge and Innovation (TKIs).[39] These mission teams focus on programming and coordinating innovation efforts and the conditions that should increase the adoption and chance of success of these innovations for the benefit of missions. The AWTI believes that the direct connection between the mission teams and practice as experimental space is still limited. Moreover, mission teams focus more on programming, coordinating and facilitating R&D and knowledge-driven innovations than on connecting and coordinating the broad set of changes and policy interventions that are needed for transformations.

The transformation teams proposed by the AWTI are in line with the development towards a more participatory government or a society-oriented governance model in which the government focuses on facilitating, bundling and strengthening social energy and resilience.[40] Actors in society organise themselves and take action, and in this way all kinds of initiatives arise bottom up. The focus is on experimenting and learning for initiating, scaling up and disseminating innovative solutions and changes that can lead to transformation of societal systems. These can be R&D-driven innovations, but also changes in behaviour or institutional innovations, for which not only science and innovation policy is relevant, but also actions and interventions from other policy domains. Transformations require such a participatory and learning approach. In contrast, the governance of the current MTIB shows more characteristics of the classic government model in which the government provides direction, steers and coordinates from a hierarchical role combined with characteristics of a more network-based governance model in which the government operates together with others in a more horizontal relationship, in public-private partnerships.

The proposed transformation teams can be embedded in an existing organization. An organization that is experienced in implementing policy instruments in practice and therefore operates in close contact with the stakeholders who use or are influenced by the policy instruments. The Netherlands Enterprise Agency (RVO) is such an organization.

RVO is an executive agency of the Ministry of Economic Affairs, but also works on behalf of other ministries on the implementation of policy. RVO is therefore an intermediary between practice (of entrepreneurs, companies and other organisations) and policy. Embedding transformation teams at RVO fits well with its ambition to move from a mission-oriented organisation to a transition-oriented organisation, as expressed in its multi-year strategy. RVO focuses on three transitions: the climate and energy transition, the transition to a sustainable agricultural and food system and the transition to a future-proof and digital economy. Each transition includes multiple social challenges. In its multi-year strategy, RVO has indicated that it will more actively seek cooperation with clients (the policy) on the one hand and customers (the target groups of the policy in practice) on the other.

RVO has a great deal of knowledge and expertise about transitions, the clients and the policy instruments. It wants to offer this more actively in order to think along with clients and customers about the development and implementation of new solutions for the various sustainability challenges. RVO can also show policymakers how the policy works in practice and, where possible, suggest points for improvement.[41] Given RVO's ambitions and its development towards a transition-oriented organisation, the AWTI sees potential at RVO for integrating transformation teams. This requires RVO not only to develop a new organisational structure, but also new guidelines and frameworks, sufficient capacity and relevant knowledge and

38 vlaanderen-circulair.be/nl zie ook Janssen et al. (2023a).
39 Janssen (2020); Janssen et al. (2023a and b).
40 Janssen et al. (2023 a and b); Van der Steen et al. (2014).
41 Rijksdienst voor Ondernemend Nederland (2022). See also: https://oecd-opsi.org/blog/missions-transitions-insights-from-the-netherlands/ for a description of the development that RVO is undergoing towards a transition-oriented organisation.

skills that are required for a transformative approach. This concerns, for example, effective portfolio management, systems thinking, involving citizens and social initiatives and monitoring and methods for learning evaluation.[42]

2.4 Horizontal and vertical coordination is essential

Transformations do not occur by stimulating new knowledge, technologies and innovations alone. A large number of (additional) technical, economic, social and institutional changes are required. This requires a system view and cooperation and coordination between different ministries (horizontally) and governments (vertically) in the development of policy. Insufficient connection and coordination between different policy domains can lead to incoherence and even contradictions and this hinders progress in transformations.[43] Despite the steps that are being taken to tackle specific transformations in a coordinated manner (such as in the National Energy System Plan 2050 and the National Sustainable Industry Programme), the council previously noted that there are still too few connections between innovation policy in a strict sense and sectoral policy.[44]

International comparative studies on mission-oriented innovation policy also show that coordination and cooperation between policy domains is not an easy task.[45] An important reason is that the transformations and possible solutions are complex and uncertain in themselves and are often contested, not only by different stakeholders, but also between government organizations. This requires extensive coordination, between different policy domains that go beyond science and innovation, between different policy levels and also with different stakeholders. This is necessary to avoid the 'technology trap': a focus on science and technology development as the only approach for transitions because mission-oriented and

transformation-oriented policy is developed and financed from regular science and innovation policy.[46]

Furthermore, transformative policy often builds on existing policy that is developed and implemented in existing governance systems. This can save time and money, but it comes with the risk that only established players will find their way in these systems, which can then obstruct transformative changes.[47] Moreover, additions to existing governance, for example in the form of additional committees and consultation structures, can make the necessary coordination and cooperation more complex. For example, the large number of consultations of the various mission teams, top sector teams, core teams and other consultation structures within the mission-driven top sector policy is a reason to reform and simplify the governance of this policy approach. Various stakeholders have spoken of 'mission fatigue'.[48]

Another challenge is that government funding of the various interventions and actions within transformations is fragmented. Aligning the financial resources between the various government organisations is seen as the biggest challenge, in addition to the observation that the size of the resources does not match the ambitions and earmarked resources are missing. Policy strategies often list which resources would be available and who will contribute what, but these agreements are mainly intentions and rarely binding.[49]

For more *horizontal* coordination and cooperation between ministries, the AWTI recommends the following:

- **Use a systems perspective for transformations.** A systems perspective is needed to address issues that transcend the boundaries of sectors and thus ministries. Always ask the question: What exactly is the problem with the complex issues at stake and what is relevant to take into account? Which

technical, social, cultural and ethical dimensions are important and which form(s) of innovation, including system innovation, can help us move forward? Which policy areas are relevant in this regard? This helps to look at the transformation issues multidimensionally, to involve the various ministries and to arrive at a joint image of the coherence between sectoral and transformation tasks.[50]

- **Organise continuous coordination and alignment in and between ministries under national, government-wide management.**
  Other countries face similar coordination challenges and are developing various solutions for them. The OECD, among others, is mapping these.[51] Because these governance approaches are still in full development, little is known about which approach works best. Moreover, this strongly depends on the context in which the approach is implemented. For example, countries have different administrative structures and governance traditions, and the characteristics of the transformation can also make a difference.[52] Although no single approach emerges as the best, international examples can provide inspiration.

42 Kattel and Mazzucato (2018).
43 OECD (2024b); Janssen et al. (2023b).
44 AWTI (2023b).
45 See for example: OECD (2024b); OECD (2024c); Janssen et al. (2023a and b).
46 OECD (2024a and b).
47 OECD (2024c).
48 OECD (2024b).
49 OECD (2024a, b and c).
50 AWTI (2024).
51 The OECD has mapped out various options in their studies on mission-oriented and transformative innovation policy: see e.g. OECD (2022); OECD (2024 b and c); Larrue (2021). In addition, a comparative study was also commissioned by the European Commission on approaches to a number of mission-oriented policy initiatives: Janssen et al. (2023a).
52 A comparative study of how governments implement transformative innovation policies shows that different approaches can be structured into different governance modes and each have their own opportunities and challenges for the implementation of transformative policies. See Janssen et al., (2023 and b). A German study compared a number of governance approaches and assessed their suitability in the German context; see Wittmann et al. (2025).

1 **A coordinating minister per transformation.** In the Netherlands, coordinating ministers have already been appointed, for example a minister for Climate and Energy in the Rutte IV cabinet and the current minister for Climate and Green Growth. In the United Kingdom an approach for a mission-driven government is being considered in which ministers are given the responsibility and mandate to direct specific missions (see the box).

Een missiegedreven overheid in het Verenigd Koninkrijk

In the UK, think tank Future Governance Forum[53] has developed a governance approach for a mission-driven government. Part of this approach is that existing ministers and secretaries of state are given the responsibility and mandate to direct specific missions. A Mission Leadership Group of a number of ministers oversees all missions, informed by mission councils made up of representatives from other levels of government, business, public knowledge institutions and civil society. The implementation is driven by interdepartmental mission teams with clear ministerial support and leadership.

2 **Interdepartmental consultation committees, programme directorates-general or network directorates-general.** This happened, for example, during Corona with the establishment of a temporary programme directorate-general Society and COVID-19[54]. See the box for an example from Flanders.

Interdepartmental consultation committees in Flanders[55]

In Flanders, Vision 2050 was launched in 2015, a new long-term strategy for a sustainable Flanders, in which seven transition priorities were determined.[56] These transition priorities are managed on the basis of a governance structure in which the Flemish Transition Platform (with transition managers) acts as an intermediary between the policy on the one hand (Flemish Government, and the Chairperson's College - comparable to the Secretaries-General consultation in the Netherlands) and various transition spaces (per transition priority[57]) on the other. In order to further improve coordination between the various ministries and agencies, VARIO recommends setting up interdepartmental consultation committees for each of the selected transition priorities. These consist of representatives from various relevant ministries and agencies, together with the transition managers and other relevant stakeholders from the government, including the cabinets (the personal staff members and advisors of the ministers), municipal or federal policy levels. The Flemish Government and the Chairpersons' Board should also give the consultation committees sufficient mandate to create impact. In order to prevent the transformation approach from being mainly a paper reality, VARIO advises to make a budgetary link via the Policy and Budget Explanations and to release interministerial transformation or transition budgets.

3 **A 'super ministry' or 'mission ministry' that covers various interlinked societal themes. This is the approach that Austria has adopted (see box).**

An Austrian super ministry

Austria has had a 'super ministry' for some time now: the Ministry for Climate Action, Environment, Mobility, Energy, Innovation & Technology. This super ministry must ensure more efficient and effective policy coordination and integration of policy initiatives and supports a minister from the Green Austrian party. This minister wants to implement system changes and implement the (EU) missions.

The super ministry tries to implement the missions based on an integral, systemic approach, not just on R&D and innovation. Because the ministry is also responsible for mobility and energy, they can also exert political influence on, among other things, regulations in these policy areas. However, it remains to be seen what the impact of these initiatives and activities will be. At the moment, the ministry is having a hard time with counterparts and established values from industry and the economy. In addition, there is a culture of silo thinking in the ministries, in which departments have their own budgets and strategies and also take their own initiatives that are hardly coordinated. This coordination and coordination is already more successful at the implementation level through FFG, the Austrian agency for funding industry-related research and innovation.[58]

Wittman et al. (2025) see that a 'super- or mission ministry' offers opportunities to streamline coordination processes and to appoint a central mission owner with a clear mandate and high visibility. The formal structural changes

53 Mazzucato (2024).
54 In an essay, NSOB describes the lessons learned from the interdepartmental programme DG: the Programme Directorate-General Society and COVID-19 (DGSC-19), see Schulz et al. (2021)
55 Zie VARIO (2024).
56 www.vlaanderen.be/uw-overheid/beleid/het-vlaamse-beleid-voor-duurzame-ontwikkeling/vlaamse-strategie-duurzame-ontwikkeling/transitieprioriteiten-duurzame-ontwikkeling
57 See for example www.transitiellw.be/aanpak/
58 See the country study by VARIO and AWTI as appendix to AWTI (2023b); Janssen et al. (2023a and b); Biegelbauer et al. (2020).

can be implemented quickly, but fully integrating and embedding the new approach and processes is complex and expensive in time and resources.

4 **Interdepartmental mission teams combine policy officers from different ministries to jointly shape mission policy.** Germany created mission teams when introducing the Zukunftsstrategie Forschung und Innovation (see box).

Interdepartmental mission teams in the German Zukunftsstrategie Forschung und Innovation (successor to the High-Tech Strategy 2025)

For its Future Strategy Research and Innovation, Germany has appointed interdepartmental mission teams that are responsible for the six missions defined in this strategy. The mission teams consist of 10 to 15 policymakers from different ministries. Each mission has a coordinating ministry and participating ministries. The mission teams must ensure coordination between the different policy domains and are advised in this by the #Zukunftsstrategieforum, an advisory board of experts. At a higher, strategic level, there are round tables of directors of policy departments and, if necessary, round tables of state secretaries can be set up.[59]

The mission teams are supported by central coordination from the Ministry of Education and Research (BMBF). Although the mission teams ensure coordination and cooperation between policymakers, the policymakers depend on approvals and resources from the ministerial hierarchy. The individual ministries therefore remain responsible for carrying out the actions. This means that the interests of individual ministries are sometimes more

important than joint action, especially if support from strategic levels is lacking. The strategy does not have a separate budget or an earmarked budget, and neither do the mission teams. This makes it very complex to mobilize ministries that are responsible for certain sectors or domains and the associated legislation and regulations. The advantage of mission teams is that they are relatively easy to set up because they fit easily into the existing bureaucracy. At little cost (in time and resources), mission teams can at least provide horizontal policy coordination in the short term.[60]

The Expertenkommission Forschung und Innovation (EFI) has proposed to strengthen the mission teams with state secretaries from the various ministries and to provide them with specific budgets. Furthermore, the EFI proposed to set up a Regierungsausschuss für Innovation und Transformation. This government committee for innovation and transformation should ensure substantive coordination and alignment between policy strategies at the highest level for missions and transformations. The government committee for innovation and transformation should be housed in the Federal Chancellery. In addition to the head of the Federal Chancellery, the ministers should be members of departments involved in the various missions and transformations. The previously discussed interdepartmental mission teams should focus on the operational implementation of policy, while the government committee focuses on overview and coordination at the strategic level.[61]

5 **Collaboration platforms on a number of missions or transformation challenges** within which policymakers from different ministries can collaborate. See the box for an example from Australia.

Collaboration Platforms[62]

The Australian Government (Victoria) has created an online platform to connect civil servants around key thematic areas. Civil servants can work together across departmental and policy silos in networks dedicated to five public sector reforms to learn and improve outcomes.

6 **Separate commission, bodies and agencies with their own programme**, under the auspices of the Prime Minister, who is responsible for coordination between policy areas in one or more transformations and who also has a mandate and resources for this. The box provides examples from Japan and France.

Japan: Cross-ministerial Strategic Innovation Promotion Program (SIP)

The Cross-ministerial Strategic Innovation Promotion Program (SIP)[63] is a major multi-year national STI program that aims to address societal challenges and promote economic growth in areas where strong interministerial coordination is needed. This interministerial coordination is needed to better connect research and innovation activities with social demand and the sectoral context. The SIP program is managed by the Council for Science, Technology and Innovation (CSTI), which is tasked with developing the overall national STI strategy and ensuring interministerial coordination. The CSTI is chaired by the

59 stip.oecd.org/moip/case-studies/28
60 stip.oecd.org/moip/case-studies/28 and Wittmann et al. (2025).
61 EFI – Commission of Experts for Research and Innovation (2023); Wittmann et al. (2025).
62 OECD (2022).
63 stip.oecd.org/moip/case-studies/15

Prime Minister and consists of 14 members, including the Chief of Staff and several ministers, as well as experts from academia and industry.

France: Stratégies d'accélération pour l'innovation (Acceleration Strategies for Innovation)

Stratégies d'accélération pour l'innovation[64] is part of the fourth Programme d'investissements d'avenir (Investing for the Future Programme), which aims to strengthen employment, competitiveness and productivity in France. The fourth edition (2021-2025) focuses on complex societal challenges, including sustainability transitions. On the one hand, the programme offers long-term financing for research institutes. On the other hand, the programme focuses on a few large targeted investments in specific areas and technologies. These 24 Stratégies dáccélération are part of France 2030, the French Recovery and Resilience Plan, and combine various policy instruments including investments in R&D, business financing, regulation, standardisation, pricing and training to achieve a number of specific societal missions. France 2030 and the Stratégies dáccélération are coordinated by the General Secretariat for Investments (Secretariat Général pour l'Investissement – SGPI), which reports directly to the Prime Minister.

In addition to horizontal coordination, vertical coordination and alignment between different policy levels is important for more coherence in the policy originating from different policy levels. The transformation challenges do not stop at the border: other countries and regions are struggling with similar issues, the cause of the problems often lies outside the regional and national borders and often cross-regional and international solutions are needed. With more coherence, policy instruments can reinforce each other, in terms of content and financially, so that more opportunities arise to accelerate the transformations. Moreover, more coherence in policy helps to reduce contradictions and blockages in policy.[66]

For more *vertical* coordination and cooperation, the AWTI recommends the following:

- **Treat regional, national and European policy for innovation and transitions as a single whole.[67]** Aim to link the various instruments in the policy mix with other instruments at the various levels in such a way that they reinforce each other (via 'leverages', in terms of content and/or finance) or complement each other. Carry out a preliminary 'EU check': identify which EU regulations exist in the relevant area, followed by a considered judgement on how the national or regional policy align with this. In addition, periodically carry out an ex post evaluation of the whole policy mix to identify where various regulations reinforce each other, or work against each other, or where there are still gaps.
- **Create an overview of regional initiatives and policy instruments for transformations and help to establish connections.[68]** The central government can help regions to arrive at good propositions in order to position themselves in European agendas, programmes and funds. The government can also help by nominating research and innovation themes - that have been identified in the regional transformation

agendas - for the agenda and work programmes of the European Framework Programme for Research and Innovation (now Horizon Europe).
- **Regions can make better use of the opportunities offered by EU policy and ensure that regional and EU policy reinforce or complement each other.[69]** This can be done by:

  a taking account of relevant EU policy in the regional innovation agenda;
  b spending the regional EU funds in such a way that they reinforce other STI policy;
  c helping regional actors to make use of EU instruments;
  d linking regional ecosystems to promote inter-European collaboration.

64 stip.oecd.org/moip/case-studies/40; www.info.gouv.fr/organisation/secretariat-general-pour-l-investissement-sgpi/strategies-d-acceleration-pour-l-innovation

65 At the same time, societal challenges manifest themselves differently in different environments. Obstacles and possible solutions can depend on that environment. There is therefore increasing attention for place-based policies for innovation and transformation in which local and regional challenges are central and the place-based approach is essential for inclusive, just and smart transformations. See Mccann and Soete (2020); Schwaag Serger et al. (2023); Bianchi et al. (2024).

66 OECD (2024c) and AWTI (2023a).

67 AWTI (2023a).

68 AWTI (2021b) and AWTI (2023a).

69 AWTI (2023a).

This guideline focuses on the development of a transformative policy mix. In the governance framework outlined earlier, the development of a policy mix is part of the Policy formulation phase in the policy cycle (see Figure 3). In this phase, the bottlenecks and success factors that are relevant for the development of the transformations are identified and the corresponding policy instruments are selected.

Figure 3 Policy formulation in the governance framework for transformative policy
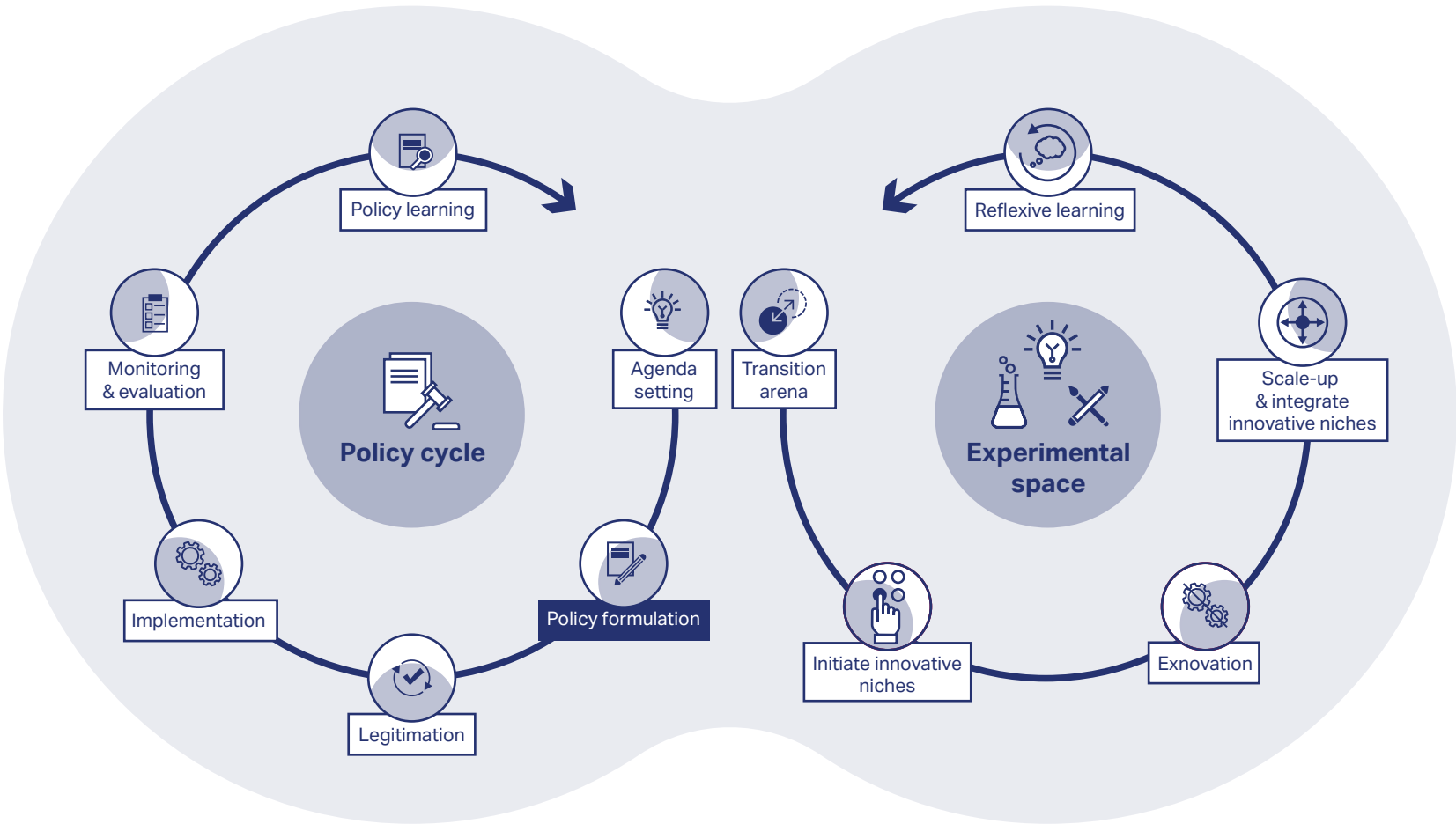
As described in **Chapter 1**, transformations are unique, complex and go through different phases. They require a clear, coherent mix of policy instruments that is dynamic and adaptive and therefore 'moves along' with the phases in which a transformation is located and that responds to the specific characteristics, driving forces and bottlenecks of such a transformation. No transformation is the same. Moreover, transformations do not require a single change or only technological innovation, but they always involve multiple changes and require adjustments to all kinds of components and processes in the societal system that must transform.

The government cannot initiate and achieve transformations on its own. Without research organizations, companies, financiers and social organizations, no new, innovative solutions will emerge and they will not be scaled up, marketed and implemented. However, the government can mobilize, stimulate or slow down the other stakeholders with certain interventions. These interventions come together in a policy mix that is tailored to the context of the transformation and is adaptive.

In order to determine a transformative policy mix, it is important to understand how transformations can develop, which processes are important, the networks of stakeholders that play a role in this and the influencing strategies that can be used. Various models and concepts have been developed to understand transformations, including the TransMission model. We will discuss this in section 3.1 In section 3.2 we outline the different phases and their characteristics, followed by section 3.3 about the key processes that must be organised in the different phases in order to accelerate a transformation.

3.1 Understanding transformations with the TransMission model

In science, several models and concepts have been developed for thinking about and acting in transformations.[75] Well-known perspectives in the Netherlands are Transition Management (Erasmus University, DRIFT), Mission-driven innovation systems (Utrecht University, Copernicus Institute), Small wins (Wageningen University), Sustainable market transformation (NewForesight and Nyenrode Business University) and TransMission (NewForesight, Nyenrode Business University and Copernicus Institute). These perspectives all start from a systems perspective: a society is seen as a 'complex system' and transformations as complex, non-linear change processes in societal systems.[76]

Designing a policy mix in theory and practice

Transformations do not come about through a single action or a single policy intervention. Multiple interventions and thus multiple and different policy instruments are needed that jointly try to achieve the intended policy goals. A policy mix is a well-considered combination of different policy instruments.[70]

The various policy instruments in the mix influence each other and can therefore create positive synergy, but can also get in each other's way. For example, instruments can have an effect on other domains or sectors than they were intended for. Furthermore, instruments are used by multiple governments, national, local and at European level, and by other countries.[71] Policy mixes evolve rather than completely new ones being set up. This means that new instruments are gradually added, while existing instruments remain intact, that the objectives are adjusted but not the instruments themselves or that instruments are adjusted but not the objectives. The logical consequence is that

the policy mix becomes inconsistent and therefore less effective than intended.[72]

There are few thorough analyses of the possible positive and negative synergies between policy instruments. The available studies point to possible synergies, but good empirical studies are lacking to identify causal effects and to investigate synergies.[73]

The question is whether it is possible to design and implement a completely new consistent policy mix. Policymakers and policy researchers agree that an optimal policy mix does not exist and that a policy mix is never 'finished', but that the policy mix can be improved through monitoring, evaluations, mutual coordination and alignment.[74] The governance framework and the step-by-step plan in this guideline can be helpful in this regard.

70 There are multiple definitions of a policy mix in the literature. For an overview, see for example Kivimaa and Kern (2016). This guideline follows the narrower definition of a policy mix as 'a set of different and complementary policy instruments to address the problems identified in a national or regional innovation system' (Borrás and Edquist, 2013). A broader definition also includes 'policy goals and rationales as well as processes of policy making and implementation' (Rogge and Reichardt, 2016). In this guideline, these elements are part of the entire policy cycle.

71 Georghiou (2024).

72 Howlett and Rayner (2007).

73 CE Delft (2024) based on: Van den Bergh et al. (2021); Drews et al. (2020); D'Arcangelo et al. (2023); D'Arcangelo et al. (2022); Nachtigall et al. (2024).

74 Flanagan et al. (2011); Nauwelaers et al. (2009); Borrás and Edquist (2013).

75 See for example: Mazzucato (2018); Haddad et al, (2022); Geels (2002); Hebinck et al. (2022); Wesseling and Meijerhof (2023).

76 See https://www.sociaalcirculair. nl/wp-content/uploads/2021/02/ Houvast-voor-duurzame- vernieuwers_Vier-perspectieven- op-transitiedenken-en-doen.pdf and https://www.ipo.nl/media/ jshdozkb/wegwijzer-voor-het- werken-aan-transities.pdf for an overview and explanation of the various concepts.

Figure 4 The TransMission model

The TransMission model consists of building up sustainable partial solutions, phasing-out unsustainable practices and the five key processes that should be organised in every phase of a transformation.

Source: *Adapted by AWTI from the model designed by the TransMission Institute (Simons et al. 2023)*

Stakeholders

- Government
- Knowledge institutions
- Businesses
- Financial institutions
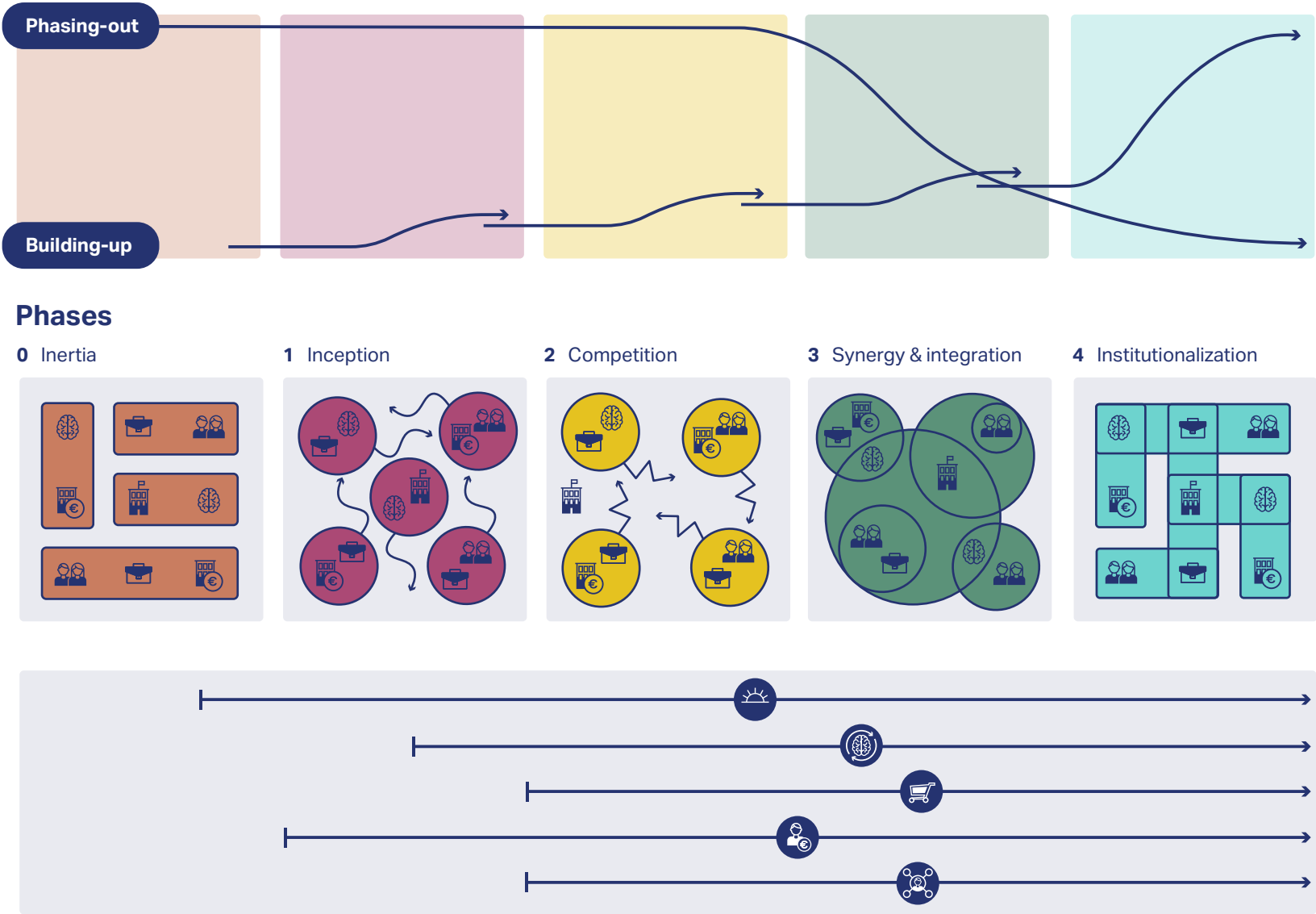- Civil society

Key Processes

- Provide direction to the problem & solution
- Knowledge development & knowledge dissemination
- Entrepreneurship & market formation
- People & resources
- Sector organisation & coordination

Phases

0 Inertia
1 Inception
2 Competition
3 Synergy & integration
4 Institutionalization

The perspectives differ, partly due to the scientific disciplines and theories on which each of them builds. For example, sustainable market transformation focuses on changes in systems in which market-driven chains are part of both the problem and the future. Examples of sectors are greenhouse horticulture or the textile chain. Mission-driven innovation systems focus on technical or social innovations and processes, and conditions in the environment that are important for the development and application of those innovations. Transition management looks at the entire transformation process and tries to accelerate and direct transformations by bringing together transformative coalitions in a very targeted manner. It looks at the role of innovators who develop radically different practices and at the role of existing parties who must adapt and dismantle their approaches to make the transformation possible. Small wins is about achieving transformations through small, meaningful steps. Small wins are profound changes with concrete results that have overcome all kinds of barriers on a small scale.

This guideline uses the TransMission model as a tool for determining an effective transformative policy mix. TransMission brings together elements from the perspectives described above. It provides insight into what different actors (governments, companies, financial institutions, civil society and knowledge institutions) can do in the different phases of a transformation to initiate new solutions, scale up the desired solutions and put pressure on the old system in order to accelerate the transformation. It distinguishes phases in the development of the partial solutions and thus the transformation. In addition, TransMission distinguishes different key processes that must be organized if a transformation is to proceed successfully. Furthermore, TransMission recognizes that for a transformation to succeed, it is not enough to only stimulate new solutions and build the new, sustainable system.

At the same time, existing practices, which are currently more attractive, efficient and profitable due to mutually reinforcing dependencies, must be phased out (also known as exnovation).[77]

Figure 4 shows the TransMission model. Two elements are decisive in this: phases and key processes. We will explain these in the following two paragraphs.

3.2 Transformations go through different phases

Transformations and the various partial transitions and solutions go through different phases, each with specific characteristics and specific activities of different stakeholders to accelerate the build-up of new practices and dismantling old practices.[78] The TransMission model[79] distinguishes five phases (partial solutions and transitions) that transformations go through, including both constructive and deconstructive activities:

In phase 0, **the Inertia phase**, the (sustainability) problems of the existing system are becoming increasingly greater. The problems are known, but the urgency to tackle the problems is absent or limited. The urgency can arise, for example, through a crisis, but also through actions of specific stakeholders.

In phase 1, **the Inception phase**, urgency and awareness have increased significantly. The change process is getting underway and possible alternative (sustainable) solutions are being sought. However, established players continue to deny the problems and try to slow down the changes.

In phase 2, **the Competition phase**, new solutions enter the market and business models are developed. Alternative solutions compete with each other and the market develops. The pressure on laggards and deniers increases.

In phase 3, **the Integration and Synergy phase**, it becomes clear which solutions are workable and have market potential and which are not. The market becomes larger. Barriers to scaling up are addressed. The old system must be made consciously less attractive.

In phase 4, **the Institutionalisation phase**, the desired new solutions are normalized, optimized and institutionalized. The old system is phased out at an accelerated pace.

77 See Simons et al. (2023) for an extensive description of the model and underlying theories.
78 Phases in transformations are extensively described in the literature. See, among others, Geels (2002); Hebinck et al. (2022); Loorbach et al. (2017); Lodder et al. (2017); Nijhof et al. (2022); Simons and Nijhof (2020). The phases as presented here follow from TransMission.
79 Simons et al. (2023).

3.3 Progress in transformations depends on key processes

In the development of transformations, various key processes are relevant.[80] These must be properly organised in a transformation. When a key process does not work, it becomes a bottleneck in the further transformation process. When a key process does work properly, it functions as a success factor for the transformation.

The five key processes in TransMission model[81] are:

Providing direction to the problem & solutions: What exactly is the central social problem, why and for whom is it a problem? What are the possible solutions? To what extent is there consensus on the nature and urgency of the problem and the potential of the solutions?

Knowledge development & knowledge dissemination: Is there already sufficient knowledge about the problem and the various solutions? Are these solutions being experimented with, and do the insights also reach parties who can benefit from them?

Entrepreneurship & market formation: How can the demand for new solutions be increased and how can supply be organised and improved? Which risks or barriers are holding back market forms and how can they be removed? Are there sufficient companies or other actors who are trying to make new solutions viable?

People and resources: Are there sufficient financial, human, material and infrastructural resources for developing and scaling up promising solutions?

Sector organization & coordination: Are there structures and processes that enable stakeholders to find each other and work together on goals? Is it clear who has which roles and responsibilities and who should or should not join?

The key processes have two directions: both constructive and deconstructive. For example, the key process Knowledge development & knowledge dissemination is aimed at creating and disseminating knowledge and solutions that form the new alternative for existing practices. This key process also involves 'unlearning' existing, no longer desired practices and stopping knowledge development aimed at those practices. The key process Entrepreneurship & market formation is not only about stimulating new markets and business, but also about destabilizing existing markets and limiting business in sectors that are not future-proof.

All key processes are important in all phases, but some key processes require more attention and effort in certain phases than in other phases. For example, knowledge development is very relevant to develop new solutions in the Inception phase, while Entrepreneurship & Market Formation mainly requires attention in the Competition phase. Within a transformation, different solutions can be at different stages of development. For example, in the development towards zero-emission construction sites, equipment based on a fuel cell or hydrogen is still in the Inception phase, while hybrid and electric construction equipment is ready for large-scale upscaling in the Competition phase. This means that the interventions needed to accelerate a transformation will differ between the different solutions.

The various key processes also interact and can thus promote or hinder transformation processes.[82] An example of a virtuous circle is that the development of new knowledge (Knowledge development & knowledge dissemination) encourages expectations about promising solutions (Providing direction) and prompts policymakers to develop new subsidy programs for more R&D (People & resources) and stimulates entrepreneurs to also invest in R&D and new business (Entrepreneurship & market formation). An example of a vicious circle is that a lack of direction from the government or the lack of a shared vision can discourage entrepreneurs from investing in research and innovation (Entrepreneurship & market formation), which means that new knowledge and solutions do not become available (Knowledge development & knowledge dissemination). Moreover, the lack of direction creates uncertainty, which means that new markets do not form, investments lag behind (People & resources) and subsequently promising solutions become out of sight (Providing direction to problems and solutions).

A transformative policy mix intervenes in the key processes in the various phases and aims to ensure that the key processes work well and do not delay or hinder the transformation, but rather stimulate and accelerate it. The aforementioned virtuous and vicious circles of various key processes should also be taken into account.

80 Hekkert et al. (2020); Hekkert et al. (2007); Suurs and Hekkert (2009); Elzinga et al. (2023); Hekkert and Negro (2009); Vermunt et al. (2022).

81 Simons et al. (2023). The key processes form a synthesis of a larger range of processes as proposed in the innovation systems literature on which TransMission builds.

82 See for example Suurs (2009); Suurs and Hekkert (2009); Elzinga et al. (2023); Hekkert and Negro (2009); Vermunt et al. (2022).

To compose an effective policy mix, a structured and careful approach is needed that helps to weigh the different options for policy instruments and arrive at a well-founded mix of policy instruments. **In this guideline, the AWTI introduces a step-by-step plan as a tool to carefully make the necessary considerations and arrive at an effective transformative policy mix.** Determining the policy mix is not a one-off exercise, but is part of a policy cycle that is in continuous interaction with the experimental space and is fed by the experiences and knowledge from the experimental environment where the policy instruments are also implemented. **It is up to the policymakers to design the policy mix and to go through the step-by-step plan for this. The policymakers do this in collaboration with the transformation teams that are in close contact with networks and coalitions of stakeholders in the external experimental space.**

A policy mix consists of various policy instruments. We describe the various types of policy instruments in paragraph 4.1. In paragraph 4.2 we introduce a policy matrix to provide insight into which policy instruments can address in which phase the identified bottlenecks and success factors in a transformation. We present the step-by-step plan in paragraph 4.3.

4.1 A policy mix consists of different policy instruments

There are many different types of policy instruments possible to influence the key processes. These can be arranged in a number of Categorys[83]:

1 **Communication & information:** The government can convey a message through communication. This is often aimed at imparting knowledge or changing behaviour. There are various instruments that match these aims, including feedback mechanisms, environmental incentives and information campaigns. Through administrative consultations, the government can establish contacts between parties and exchange information. Communication, information and consultation can also contribute to increasing the support for a change.

2 **Financial:** With financial control, the government financially rewards desired behaviour or financially taxes undesirable behaviour. A financial instrument can convince actors to act in a desirable way, while this does not occur automatically because the (perceived) costs are too high. Examples are financial incentives in the form of subsidies, vouchers, taxes, excise duties, personal contributions and financing levies that influence the choice of a certain target group, because the costs and revenues of different choices change.

3 **Legal:** Legal measures can be used to coercively steer behaviour, for example by prohibiting certain behaviour with legislation and regulations, but also by providing space for innovation and desired behaviour with appropriate standards. Legislation and regulations, standardisation, target prescriptions, sanctions, but also room for experimentation via *regulatory sandboxes* can be used for this purpose. A *right to challenge* provision in legislation offers the possibility to grant citizens and companies an exemption or waiver from the rules if the objective of a regulation can be achieved in a different way than prescribed.

4 **Co-regulation or self-regulation:** Self-regulation occurs when a sector sets standards itself. If the sector does this together with the government, this is called co-regulation. In the case of self-regulation or co-regulation, the government wants to influence behaviour in a certain sector by regulating matters together with the sector. There are various ways of self-regulation and co-regulation. Benchmarking compares the performance of organizations with each other and this can, also via *'naming and shaming'*, encourage organizations to display more sustainable behaviour and improve their performance. Other ways include setting covenants, codes of conduct, quality marks, accreditations and agreeing on industry standards.

5 **Organisation & coordination:** This category includes agreements and approaches that concern who carries out what tasks (within and outside the government) with what mandate and authority.[84] Examples include stimulating cooperation, coalitions and coordination, via public-private and public-private-civil partnerships, platforms, task forces and coordinating programmes.

83 The Policy Compass has been developed by the government as the central method for making policy. The Policy Compass helps policymakers to go from problem/ task to the most suitable policy intervention. The step-by-step plan follows the Categorys of the Policy Compass so that it fits as well as possible into the approach for policy development prescribed by the government.

84 The Policy Compass mainly concerns methods such as privatisation, external and internal independence, decentralisation and delegation and attribution of authority.

6 **Supporting instruments:** supporting instruments enable the effects/results of other policy interventions. For example: setting up monitoring makes co-regulation possible or setting up experiments can be used to try out which approach is desirable and what its effects are, without having to start a legislative procedure immediately. Another supporting instrument is setting up policy-informing research to acquire more knowledge on the basis of which policy choices can be made.

The instruments can be used to stimulate the development of new solutions as well as to phase out old practices because they are no longer appropriate and may hinder innovation.

4.2 A policy matrix links the different policy instruments to the phases and key processes

The policy mix combines different (types of) policy instruments. **The AWTI has compiled a policy matrix** to provide insight into which policy instruments can help to organise, facilitate and safeguard the various key processes in which phase. Because each transformation and partial solutions are in a different phase of development, other stakeholders are involved, other bottlenecks occur, the policy mix will differ between different transformations. Moreover, the composition of the policy mix changes with the development of the transformation, because which instruments are relevant differs between the phases. Two things are therefore important for determining the mix of policy instruments (see the **TransMission model**):

• The status of the transformation: What developments are taking place in the transformation and in which phase is the transformation?
• The key processes that are important for the transformation: In which key processes (individually and also in relation to each

other) are bottlenecks identified that hinder the development of the transformation?

Sometimes policy instruments are important in multiple phases. For example, consider standardisation and pricing. In the Competition phase, this can help to improve the business model of sustainable solutions compared to existing, unsustainable practices. In the Synergy & Integration phase, pricing and standardisation contribute to the further phasing out of unsustainable practices. Sometimes policy instruments are mainly important for a specific phase. For example, consider financing of programmes that should stimulate radical innovation or breakthrough technologies. This is especially important in the Inception phase.

Policy instruments can also be relevant for multiple key processes. This is in itself contrary to the 'Tinbergen principle' (one instrument for one policy objective), but policy objectives are often related and this also applies to key processes for which the policy instruments are used. One instrument in particular can have a reinforcing effect on multiple key processes in order to initiate transformations. Again, the example of pricing and standardisation: With pricing and standardisation, the government provides direction for the problem definition and solutions (the government prices emissions and sets emission standards with the aim of reducing emissions and stimulating the development of more sustainable alternatives). At the same time, the government stimulates the demand for more sustainable solutions and thus the development of the market for these solutions with pricing and standardisation.

4.3 The step-by-step plan

In order to determine the policy mix, it is necessary to determine which policy interventions and types of instruments can be used in which phase and on which key process. To do this, we distinguish the following steps:

Step 1 *Determine the scope of the transformation*

Determine the scope (demarcation) of the transformation in as much detail as possible based on the urgency, the future vision, the tasks, goals and mission, the sector(s) and stakeholders involved and possible solutions. Do this together with the transformation teams and coalitions of stakeholders from practice (the experimental space, the right side of the governance framework).

A transformation is a sum of multiple solutions and partial transitions. This also means that an entire transformation is too large and too broad as a focus for a policy mix. To keep it manageable, it is better to concentrate on partial transitions and partial solutions in which specific sectors, actors and markets play a role. So for example not the energy transition as a whole, but the transition to climate-neutral greenhouse horticulture and then the various solution directions within that.

The AWTI has explained in the advisory reports 'Shaping the future. From optimization to transformation' (2023) and 'Strengthen the role of science, technology and innovation in societal transitions' (2020) how to arrive at a shared future vision and how coalitions and networks of stakeholders and other parties can be used to explore and develop shared problem concepts, possible solutions and future visions.[85]

Step 2 *Determine the state of the transformation using the TransMission model*[86]

Determine together with the transformation teams and stakeholders from the experimental space:
a **the current phase** of the partial transitions or solutions in the transformation;
b **the key processes** that are the most restrictive/obstructive in

85 In the literature, this is described as transition arenas or mission arenas. See Loorbach (2010); Elzinga et al. (2023); Wesseling and Meijerhof (2023); Janssen et al. (2023c).

further development

c   **and the actions** (interventions) that are required at the various bottlenecks in the specific phase.

Step 3   *Determine what actions should be taken by the government*

Then determine:

a   Which of the identified actions (Step 2c) can **only be taken by the government?**

b   What other actions (to be taken by other stakeholders) (Step 2c) **can be stimulated and facilitated by the government?**

This step is about determining the rationale behind the actions by the government. This rationale is determined by the public interest that must be protected by the government or a public value that must be realized. The public interest depends on whether there is market failure, system failure and/or transition failure.[87] Market failure indicates underinvestment by companies in research and innovation than the socially desired level. System failure occurs when the interaction between different parties in the innovation system does not run smoothly because certain parties are not involved or cannot find each other. Transition failure occurs when existing innovation systems fail to reinvent themselves and set a radically different course. The table below provides insight into the different types of failure from the perspective of transformations. [88]

Step 4   *Determine the intended goals of the actions*

A policy objective is a concretely formulated objective of the desired situation or the desired behaviour in a key process in a certain phase of the transformation.

For example, there is still insufficient knowledge of the risks of deep and shallow geothermal energy and the possibilities for greenhouse horticulture. The policy objective is then, for

Market failure	Information asymmetry: an imbalance in which one actor has more or better information than another
	Knowledge spillovers: knowledge spreads to third parties without the person who originated the knowledge being compensated for it
	Externalities: unintended effects of production or consumption that are experienced by others than the causer (and are therefore included in the price)
	Overuse of natural resources
System failure	Deficient physical and knowledge infrastructure
	Outdated regulations and societal norms
	Fragmented networks and lack of sector organisation
	Lack of appropriate knowledge and skills
Transition failure	Lack of guiding vision
	Poor demand articulation
	Lack of market differentiation
	Poor policy coordination
	Lack of reflexivity and learning ability
	Lack of urgency

example, to get an overview of the risks of geothermal energy in the subsurface for greenhouse horticulture.

Step 5   *Determine which policy instruments can be used to achieve the intended objectives of the actions*

a   **Use the policy matrix**
The horizontal axis shows the phases of the transformation and the vertical axis shows the key processes. Select the cell in the matrix that matches the phase of the transformation (Step 2a) and a key process (Step 2b)

b   **Select the matching policy instruments from the different Categorys**
A policy instrument is an approach to achieve the goals. This can be a single policy instrument, such as providing a subsidy, but it often involves a combination of instruments such as a subsidy and a public campaign or setting general legal frameworks in combination with more specific self-regulation within a sector.

The AWTI has applied the policy matrix to the cases "climate-neutral greenhouse horticulture" and "protein transition". The cases show how the policy mix can differ over time and between transformations, how it relates to existing policy and which questions this raises with the current approach. The elaboration of these cases is included in a **separate document.**

c   **Determine the potential of these policy instruments.** Use the knowledge and experiences from the experimental space. Assess the policy instruments on their:

i   **legality:** What scope do the national and international legal frameworks offer for the policy instruments?

ii   **effectiveness:** Are the policy instruments effective in achieving the objective?

iii   **efficiency:** Are the policy instruments efficient in achieving the objective?

86 Simons et al. (2023)
87 Weber and Rohracher (2012); Frenken and Hekkert, (2017); Loorbach et al. (2017); Schot and Steinmueller (2018).
88 Weber and Rohracher (2012).

iv **feasibility:** Are the policy instruments feasible for implementation by organisations, citizens (ability to act) and companies (including a SME test)?

v and **determine under which conditions** they can be successful

Step 6 *Match the existing policy instruments with the desired policy instruments*

Identify:

a which policy instruments are **already being used by national, decentralised and European governments;**

b which policy instruments **are missing but are necessary** given the transformation phase and the identified bottlenecks;

c which existing (national) policy instruments **are no longer necessary** given the transformation phase and the identified bottlenecks or because they hinder the transformation;

d which existing (national) policy instruments **are insufficiently effective and efficient;**

e and what opportunities exist **to connect with EU policy** so that policy instruments reinforce or supplement each other (i.e. are complementary).[89]

Step 7 *Determine the composition of the policy mix*

The policy mix combines the various policy instruments to resolve the most important bottlenecks in the transformation and accelerate the development of the transformation. In transformations that are already in a further phase of development and where there is 'policy richness', the order of steps 5 to 7 can also be adjusted. For example, it may be more efficient to first map out which policy instruments already exist (step 6a), to assess them for their effectiveness, efficiency and feasibility (step 5c) and then to determine which of these instruments are no longer appropriate (steps 6b and c) and which new policy instruments are additionally needed to achieve the desired goals (step 5). In this way, the step-by-step plan does more justice to the work that has already been done to stimulate and accelerate the transformations.

An adaptive policy mix implies that the policy mix 'moves along' with the development of the transformation. Therefore, the step-by-step plan as part of the policy cycle will have to be re-run regularly, making use of the knowledge and experiences with the policy instruments and the activities that the various stakeholders undertake in practice (in the experimental space of the governance framework).

This requires monitoring and evaluation methods that focus on understanding the functioning and effects of transformative policies (and instruments). Traditional evaluation methods are not sufficient. They are mainly suitable for classic innovation policies with individual programs and instruments. Transformative policies use a more complex mix of policy instruments that can lead to a broader set of system changes. This requires insight into the interplay and interaction of all instruments in the policy mix, but also into the various possible system changes, both expected and direct and unexpected and indirect. New evaluation frameworks and methods for policy are being developed, also in the Netherlands. For an overview of the developments and the challenges involved, see e.g. OECD (2024), Ter Weel et al. (2022), Janssen (2023) and Verwoerd and Kunseler (2025).[90]

89 See recommendation 1 in AWTI (2023a).

90 OECD (2024d); Ter Weel et al. (2022), *Durf te leren, ga door met meten,* Den Haag, ministerie van Economische Zaken en Klimaat; Janssen (2023); Verwoerd and Kunseler (2025).

Phases	Phase 0 Inertia	Phase 1 Inception	Phase 2 Competition	Phase 3 Synergy & Integration	Phase 4 Institutionalization
	The sustainability problems of the existing system are growing steadily. The issues are known, but there is little or no sense of urgency for change. That urgency needs to be sparked.	Urgency and awareness have increased significantly. The change process is starting, marked by a search for possible sustainable solutions. Incumbent players continue to deny the issues and attempt to delay progress.	Sustainable solutions enter the market and business models are being developed. Alternatives compete with each other in an evolving market. Pressure on laggards and deniers is increased.	It becomes clear which solutions are workable and have market potential, and which do not. The market grows. Barriers for scaling up have to be addressed. The old system becomes unattractive.	The desired sustainable solutions are being normalized, optimized and institutionalized. The old system is phased out in an accelerated pace.
Key Processes					
Provide direction to the problem and solution					
Knowledge development & knowledge dissemination					
Entrepreneurship & market formation					
People & Resources					
Sector organisation & coordination					

Key Process
Provide direction to the problem and solution

Goal of the phase

Spark urgency and awareness of the sustainability issue.

What is happening?

- There is limited awareness of sustainability issues, and the urgency to take action is hardly felt.
- Crises or unexpected events are used to highlight the need for change, to mobilize actors, and to present alternative visions for the current system.
- Through protest movements, NGO campaigns, investigative journalism, or court rulings, attention is drawn to the problem and change is set in motion.

Which policy instruments can be applied?

Category	Build up	Break down
Communication & information	• Set up (or help set up) public campaigns to emphasize the urgency and necessity of change • Organize (or support the organization of) public debates to raise awareness, question the current paradigm/vision, and explore alternative perspectives	
Organisation & coordination	• Put the challenge or issue on policy agendas • Support bottom-up coalition building to ensure stakeholders have a voice	

Goal of the phase

Spark urgency and awareness of the sustainability issue.

What is happening?

- Knowledge development is still primarily focused on improving the existing system.
- Initial analyses are being conducted on what is already happening and whether it is possible to solve the sustainability issue.
- Actors seeking change use knowledge and research to demonstrate that the current approach is not working.

Which policy instruments can be applied?

Category	Build up	Break down
Communication & information	• Promote open access to research findings and data.	
Financial	• Fund research that challenges established paradigms and interests (independent and unrestricted research) • Fund research to explore possibilities for restoration • Fund research aimed at problem/system analysis, mapping chains, perspectives, initiatives, and vision development	• Fund research for problem/system analysis and for mapping value chains and perspectives.

Goal of the phase

Spark urgency and awareness of the sustainability issue

What is happening?

- The current market dynamics focus on increasing economic efficiency and intense competition based on the lowest price, or on quality and reliability of supply. A market for sustainable alternatives does not yet exist.
- Awareness among established market players is low. However, some market actors are beginning to recognize and explore what is happening and what role they can play.

Which policy instruments can be applied?

Category	Build up	Break down
Communication & information		• Directly ask entrepreneurs about urgency and risks • Initiate stress tests to analyse the unsustainability of current market functioning
Financial	• Ask questions about sustainability in tenders (but not yet include it as a awarding criterion)	
Support		• Initiate research into current market incentives and the rules of the game • Initiate research into why efficiency in the current system hinders space for innovation

Goal of the phase

Spark urgency and awareness of sustainability problem.

What is happening?

- Investments, education, and infrastructure are all designed to maintain and optimize the existing system

Which policy instruments can be applied?

Category	Build up	Break down
Communication & information	• Make visible the opportunities that financiers overlook in making innovation profitable (and highlight where they are overly optimistic about continuing the funding of existing activities).	

Goal of the phase

Spark urgency and awareness of sustainability problem.

What is happening?

- Front-runners in the sector are willing to speak out that things must change.
- Actors are seeking collaboration in setting the agenda and creating urgency around sustainability issues.

Which policy instruments can be applied?

Category	Build up	Break down
Communication & information	• Support activities that build bottom-up coalitions for public campaigns, public debates, and setting the agenda for urgency • Promote science communication to increase mutual understanding and trust	
Organisation & coordination	• Support bottom-up coalition building to ensure stakeholders have a voice.	

Key Process
Provide direction to the problem and solution

Goal of the phase

Strengthen urgency and find possible sustainable solutions.

What is happening?

- Various parties start searching for solutions and are thinking about alternative visions for the future.
- They define a general direction for the transformation.
- Actions by civil society, citizens and media provide increasing pressure on the old system.
- The damage of unsustainable practices is made visible and awareness is increased.

Which policy instruments can be applied?

Category	Build up	Break down
Communication & information	• Organize public debates • Launch public campaigns to communicate more widely the purpose and urgency of the formulated direction of the transformation • Ask market parties about solutions, possibilities and ambitions • Determine first targets	
Financial	• Acknowledge frontrunners and innovative parties with awards.	• Finance research and activities that provide insight into the damage of unsustainable practices.
Legal	• Adjust regulation to get rid of bureaucratic obstacles	• Take steps in refining legislation
Organisation & coordination	• Bring various parties together in coalitions, clusters and networks to work on challenges, vision, missions and goals. • Support the formulation of the mission for a specific sector or challenge (with prioritization of problems and the setting of goals)	
Support	• Explore possibilities and routes for specific solution directions.	

Goal of the phase

Strengthen urgency and find possible sustainable solutions

What is happening?

- Research is focused on deciding the possible solutions for the sustainability problem.
- A knowledge agenda is established.
- Research for the old system is phased out.
- Lessons are learned from failed attempts at solving the problem

Which policy instruments can be applied?

Category	Build up	Break down
Communication & information	• Organize learning processes to draw lessons from failed attempts at solving the problem (for example through field labs)	
Financial	• Finance research, institutions and programs for knowledge development for new solutions and the principles that these solutions have to adhere to. • Funding high risk high reward research and the development of breakthrough technologies • Funding untargeted (fundamental) research • Funding transdisciplinary research • Funding challenges for public/private/civil parties • Include valorisation as a requirement in funded research programmes • Adjust conditions for participation by the civil sector • Provide co-financing for European research and development funds	• Limit funding for research programs thar target the old system • Limit participation of established stakeholders in the design, evaluation and implementation of research programs
Legal	• Adjustments to legislation to enable experiments, set up *regulatory sandboxes*	
Organisation & coordination	• Mission and challenge-oriented public/private/civil coalitions require the development of knowledge agendas and the allocation of resources to them • Set up knowledge sharing platforms for a sector	

Goal of the phase

Increase urgency and find sustainable solutions.

What is happening?

- Startups and frontrunners develop and experiment with new solutions.
- Putting innovators in the spotlight.
- It becomes clearer that unsustainable practices will not be profitable in the long run

Which policy instruments can be applied?

Category	Build up	Break down
Communication & information	• Set up experimental and learning places (including field labs and incubators)	• Emphasize to companies that harmful practices will not be profitable in the long term
Financial	• Offer innovation subsidies, challenges, hackathons, competitions for innovators • Provide extra support to frontrunners with prizes, incentive money, and put them in the spotlight • Stimulate knowledge-intensive start-ups and entrepreneurship • Stimulate the development of sustainable business models • Offer innovation financing for companies that are innovating/ making things more sustainable for the first time • Use innovation-driven procurement	
Legal	• Adjustments to legislation to enable experiments, set up *regulatory sandboxes*	
Organisation & coordination	• Stimulate collaboration between companies to share knowledge, follow pilots, clarify supply and demand, explore options	
Support	• Identify barriers to innovation and market creation and formulate actions accordingly	

Goal of the phase

Increase urgency and find sustainable solutions.

What is happening?

- Money is being made available for research, development, innovation and pilots to develop sustainable solutions.
- Restraint in being exercised in deploying resources for the old system.

Which policy instruments can be applied?

Category	Build up	Break down
Communication & information	• Map out financial resources for innovation and inform players about them	
Financial	• Use fiscal instruments to stimulate research and development, but with the condition that it is sustainable. • Provide co-financing for EU programmes that stimulate the development, demonstration and introduction of sustainable solutions • Provide financial support for the joint development and use of research infrastructures, field labs, incubators and technical infrastructures • Take participations in companies that develop innovations and infrastructure • Finance experiments and pilots with sustainable solutions • Develop and make accessible risk financing • Provide guarantees and risk-sharing provisions	• Limit public financing options for unsustainable practices
Organisation & coordination	• Stimulate the development of public/private/civil partnerships for joint development of research infrastructure and technical infrastructure	

Goal of the phase

Increase urgency and find sustainable solutions.

What is happening?

- Collaboration is created around innovation projects, experiments and pilots.
- A small group of parties organizes itself around the mission.
- Pressure is put on industry and interest groups that deny the problem and want to maintain the current system.

Which policy instruments can be applied?

Category	Build up	Break down
Communication & information	• Set up experimental and learning environments where parties can learn together (field labs, communities of practice) • Organize knowledge sharing activities (e.g. via symposia, webinars) • Invite other/new players to advisory and selection committees	
Organisation & coordination	• (Help) developing organizational capacity to manage transformations • (Help) setting up bottom-up public/private/civil partnerships around missions with conditions that enable new parties to participate	

Goal of the phase

Create market differentiation and increase supply and demand for sustainable solutions.

What is happening?

- More parties are supporting the missions and long-term goals are being set.
- Tackling the sustainability problem is now also seen as an opportunity.
- Different solutions and visions for the future are competing with each other.
- It is made clear which practices will no longer have a future in the long term.

Which policy instruments can be applied?

Category	Build up	Break down
Communication & information	• Develop a shared future vision of the economy (national and more specifically for certain sectors) and use this as a benchmark for visions of transformation • Set quantitative/normative long-term goals	• Debate which practices no longer have a future
Financial	• Promote promising solutions with prizes, incentive money and by putting them in spotlight	• Start with tailor-made agreements and transition subsidies for polluting activities of companies for which there is a future perspective • Stop subsidies and tax reductions on unsustainable innovations • Introduce pricing according to a clear and predictable path • Shift from taxing labour to taxing emissions and the use of raw materials
Legal	• Establish regulations that are reflexive, technology neutral and practice-oriented • Establish Right to Challenge provisions to enable alternative solutions without directly changing regulations	• Set standards according to a clear and predictable path
Co- & self-regulation		• Initiate binding agreements with companies on phasing out polluting activities
Organisation & coordination	• Launch overarching national programmes with a coherent package of measures for specific goals, sectors or domains	

Goal of the phase

Create market differentiation and increase supply and demand for sustainable solutions.

What is happening?

- Research focuses on further developing solutions with the most potential and creating revenue models for this.
- The social costs and benefits of the transition are made clear.
- Research is done into the costs of the externalities of the current system and how this system is subsidized.

Which policy instruments can be applied?

Category	Build up	Break down
Communication & information	• Gain insight into the social costs and benefits of the transformation • Set up workshops for researchers, entrepreneurs and professionals to gain knowledge and learn	• Calculate the social costs/externalities of existing practices and provide insight into how these are currently subsidized
Financial	• Fund application-oriented research and innovation, according to mission programs • Fund research into new revenue models • Fund knowledge transfer & valorisation programs to share knowledge with and for innovative companies / practice • Fund research in the social sciences and humanities for solutions	• Start phasing out research programs that focus on the old system
Support	• Set up monitoring and measurement systems	

Goal of the phase

Create market differentiation and increase supply and demand for sustainable solutions.

What is happening?

- Niche markets are created by creating opportunities for market parties to distinguish themselves with sustainable solutions through standards, labels, or recognition.
- Risks around new solutions are removed, which means more parties follow.
- Competition between (market) parties around new solutions ensures innovation and commitment.
- Demand is stimulated by socially responsible purchasing and consumption.
- Solutions start to compete in niches with unsustainable practices.
- Laggards are challenged to also focus on sustainable solutions.

Which policy instruments can be applied?

Category	Build up	Build down
Communicatie & informatie	• Provide advice to entrepreneurs	
Financial	• Offer subsidies for demonstrations and testing of innovations within a company • Offer adoption/purchase subsidies, investment subsidies or tax reductions on investments in sustainable applications • Offer guarantees • Organize pilots with target groups • Promote frontrunners with prizes, incentive money, put them on a podium • Prioritize innovation-oriented and socially responsible commissioning and purchasing • Offer financing for scaling-up activities	• Establish/expand a trading system in certificates and emissions that puts a price on undesirable effects or sets a ceiling • Introduce pricing (via taxes) according to a clear and predictable path • End subsidies and fiscal support for unsustainable practices
Legal	• Standardize and simplify permit procedures	• Set standards along a clear and predictable path • Set import restrictions on unsustainable technology
Co- & self-regulation	• Stimulate the development of standards for new solutions • Stimulate the development of quality marks/indexes/rankings or labels for sustainable solutions	• Stimulate the adjustment of accounting principles and rules with a view to value retention (instead of depreciation) • Stimulate the application of new requirements for annual reports by financiers and accountants
Organisation & coordination	• Stimulate and facilitate market parties to come together for demand bundling	
Support		• Think about future scenarios for 'losers' of the transformation (buyouts, helping with redundancies/retraining employees, etc.)

Goal of the phase

Create market differentiation and increase supply and demand for sustainable solutions.

What is happening?

- Grants with co-financing conditions and favourable loans are made available for investments in solutions and business models.
- Access to resources for unsustainable practices is phased out.

Which policy instruments can be applied?

Category	Build up	Build down
Financial	• Improve access to capital for new solutions • Make existing funds available for Socially Responsible Commissioning and Procurement (CSR) • Invest in demonstration/test facilities • Invest in build-up and conversion of production facilities • Develop new forms of public financing: e.g. subsidies in combination with loans • Encourage financiers to develop new financing models • 'Socialize / mitigate risks' to get investors on board • Set CSR requirements for public investment projects • Link performance agreements to the allocation of resources • Apply positive screening for financing (what do we want) • Strengthen joint research infrastructures and technical infrastructures • Stimulate sustainable (daring) investments through tax benefits • Stimulate the development of talent and new skills with specific programs and make agreements with educational institutions	• Apply negative screening when deploying resources (what we no longer want) • Limit access to financing for those left behind • Set levies that should generate revenues for the transformation
Legal		• Setting requirements for reporting by financiers
Organisation & coordination	• Stimulate public/private (and civil) partnerships for the development of the necessary infrastructure and training	

Goal of the phase

Create market differentiation and increase supply and demand for sustainable solutions.

What is happening?

- There is both cooperation and competition between parties in the sector.
- Chain cooperation ensures organisation of supply, knowledge development and sharing.
- The demand for sustainable solutions is scaled up through cooperation with customers.
- Resistance to change is growing and opposing forces are organising themselves.
- The strategies and lobbying practices of these parties are mapped out

Which policy instruments can be applied?

Category	Build up	Build down
Communication & information	• Stimulate open access to knowledge, data and research materials	
Financial	• Encourage knowledge institutions to become active in transdisciplinary approaches and co-creation, for example through performance agreements and specific programs	
Legal	• Facilitating the organization of the *commons* as a form of ownership and organization through adjustments in regulations and financing	
Co- & self-regulation	• Stimulate the development of joint standards	
Organisation & coordination	• Stimulate public/private/civil cooperation in chains focusing on specific challenges or tasks • Stimulate the formation of coalitions of the willing across sectors and disciplines • Identify/recognize which parties can and should potentially fulfil a director's function, support them and facilitate further cooperation • Make national agreements with local authorities, coordinate with regional agendas	

Goal of the phase

Integrate promising sustainable solutions, create synergies and achieve scaling up.

What is happening?

- A broad group of sector stakeholders (government, market, knowledge institutions, non-governmental organisations, banks, etc.) support the mission; a joint roadmap and scaling plan are developed.
- There is more clarity about which sustainable solutions are most desirable and should or should not become part of the new system.
- A critical mass of sector stakeholders increases the call for change.
- Legitimacy of unsustainable practices and the old system is decreasing more and more.
- Laggards and resisters focus on delay and strongly lobby against change.

Which policy instruments can be applied?

Category	Build up	Build down
Communication & information	• Develop roadmaps with a sector to translate visions into strategy and actions with a focus on scaling up • Clarify which solutions are part of the final vision and which are not • Set up a prioritization framework, sharpen goals and instructions • Clarify how the new system will work	
Financial		• Continue to phase out unsustainable practices with next steps in standardization, pricing, buyout arrangements and customized agreements • Set up recovery programs
Legal	• Make international agreements for a level playing field	
Co- & self-regulation		• Expand agreements on the implementation of agreements • Use co-regulation

Goal of the phase

Integrate promising sustainable solutions, create synergies and achieve scaling up.

What is happening?

- Research focuses on optimizing sustainable solutions and the necessary preconditions for scaling up.
- Coherence and synergies between (partial) transformations are being investigated.
- Research is being done on where the transformation will hurt and on the best ways to phase out the old system.

Which policy instruments can be applied?

Category	Build up	Build down
Communication & information	• Create structures for knowledge sharing on scaling, integration and optimization	
Financial	• Fund research into scaling up and optimising sustainable solutions (according to the roadmaps and scaling up plan) • Fund research into the coherence between transformations	• Fund research into possible unintended side effects and transition pains • Phasing out research that focuses on the old system
Support	• Implement and broaden a monitoring programme for the progress of sustainable solutions and transformation	

Goal of the phase

Integrate promising sustainable solutions, create synergies and achieve scaling up.

What is happening?

- By organizing supply, increasing demand, and creating the right preconditions, sustainable solutions can be scaled up.
- Harmful practices become more expensive and riskier.
- Sustainable solutions provide more competition but are not yet sufficient for a complete change.

Which policy instruments can be applied?

Category	Build up	Build down
Communication & information	• Influence consumer perception and behaviour with public campaigns	• Influence consumer perception and behaviour with public campaigns
Financial	• Influence consumer perception and behaviour with financial incentives via taxes/levies/subsidies for sustainability • Offer adoption/purchase subsidies, investment subsidies or tax reductions on investments in proven sustainable applications	• Expand pricing and trading system for emissions to more sectors, phase out exemptions and free rights • Encourage banks and other financiers to review their investments, identify risks of stranded assets
Legal	• Harmonize competing standards and work towards international standards • Introduce legislation that sets targets and determines liability • Coordinate/align internationally for a level playing field • Make manufacturers responsible for the entire functional life cycle of their product	• Imposing import restrictions on unsustainable technology in an international context
Organisation & coordination	• Coordinate between policy areas to remove barriers and create a level playing field	
Support	• Develop new arrangements/contracts/models for the distribution of costs, risks and benefits • Organize preconditions for scaling up	• Stimulate the development of true pricing methods to discount integral costs

Goal of the phase

Integrate promising sustainable solutions, create synergies and achieve scaling up.

What is happening?

- Large-scale investments (are made possible) in solutions.
- Sector stakeholders invest (together) in the necessary infrastructure, technology, training and other preconditions.
- It is becoming increasingly difficult to mobilize resources to maintain the old system. Subsidies, investments and loans are limited

Which policy instruments can be applied?

Category	Build up	Build down
Financial	• Set up investment bank, international investment funds for large investments • Make long-term investment plans • Set up relief and support programs for sustainability and (energy) reductions • Invest in necessary infrastructures for sustainable solutions • Provide resources for local governments for implementation • Stimulate the development of new training programs, provide support for Lifelong Development and business schools	• Establish compensation funds, provide recovery resources, set up transition programs • End funding for harmful practices • End funding for incremental improvements of old systems • Reduce funding opportunities for unsustainable technologies and practices
Co- & self-regulation		• Encourage companies, financiers and governments to prepare for divestments
Support	• Monitor skills mismatches and formulate actions accordingly	

Goal of the phase

Integrate promising sustainable solutions, create synergies and achieve scaling up.

What is happening?

- A broad group of stakeholders from industry, government and civil society work together (pre-competitively) to determine the future of the sector and to scale up solutions.
- Resistance and lobbying from the established order is anticipated. Parties that do not want to participate are excluded from sector cooperation

Which policy instruments can be applied?

Category	Build up	Build down
Communication & information	• Facilitate access to knowledge and talent for social initiatives and communities	
Financial	• Support the scaling up of sustainable solutions developed by communities with financing and access to knowledge and talent	
Organisation & coordination	• Support the development of challenge-/mission-oriented collaboration platforms that bring together public, private and civil • Harmonize the governance of public/private/civil collaborations and knowledge exchanges across government • Ensure alignment and coordination between national, regional and international funding and programs	• Exclude parties that resist from consortia • No longer invite to the table established sector organizations that resist

Goal of the phase

Normalizing sustainable solutions and phasing out the old system.

What is happening?

- Proven sustainable solutions are institutionalized and are now the standard. Attention shifts to scaling up solutions in earlier phases.
- Laggards are forced to follow or stop.
- Unsustainable practices are phased out completely.
- Attention is paid to consolidation of the new system, for example by capturing revenues from taxes on unsustainable practices (think of fuel taxes)

Which policy instruments can be applied?

Category	Build up	Build down
Communication & information	• Recalibrate the missions, roadmaps and roadmaps and determine what still needs to be done and implement concrete actions on this	
Financial	• Develop new tax measures based on the new system instead of the old system	
Legal		• Adjust laws and regulations so that harmful practices become illegal or no longer profitable • Say goodbye to parties that do not want to participate, for example through buyout programs and regulations

Goal of the phase

Normalizing sustainable solutions and phasing out the old system.

What is happening?

- Research and knowledge development focuses on optimizing the new system, determining whether the original problem is solved and monitoring unexpected side effects.
- No further research is conducted into the old system.
- It is monitored whether parties adhere to sector agreements and new laws and regulations

Which policy instruments can be applied?

Category	Build up	Build down
Financial	• Fund research into optimising the new system • Provide programmes for the development of missing solutions and further scaling up	• Stop investigating the old system
Support	• Implement a monitoring program and recalibrate if necessary	

Goal of the phase

Normalizing sustainable solutions and phasing out the old system.

What is happening?

- A tipping point is emerging in the market, which now focuses on sustainable solutions.
- Parties are committed to improving solutions.
- Legislation, regulations and policy are being adjusted so that unsustainable practices are no longer profitable or illegal

Which policy instruments can be applied?

Category	Build up	Build down
Financial		• Exclude parties from tenders that are not committed
Legal	• Adapt legislation, regulations and policies to make new solutions the new standard	• Enforcement through taxes or bans • Reporting violations

Goal of the phase

Normalizing sustainable solutions and phasing out the old system.

What is happening?

- Resources are invested in the new system on a large scale.
- Where necessary, losers of the transition are compensated.
- Resources are diverted from unsustainable practices through divestment or write-offs.
- Laggards are bought out or compensated to stop.

Which policy instruments can be applied?

Category	Build up	Build down
Financial	• Implement large-scale *just transition* mechanisms • Invest in talent through Human Capital Agendas, Lifelong Development programs, retraining, agreements with educational institutions on educational programs, support for company schools • Install large investment funds to finance/compensate the transition to the new solutions	• Buy out/compensate those left behind
Legal		• Force companies, financiers and governments to divest from old practices

Goal of the phase

Normalizing sustainable solutions and phasing out the old system.

What is happening?

- Parties in the new system focus on joint lobbying and organize monitoring and watchdog function to ensure that institutionalization runs smoothly.
- Stakeholders formalize multi-stakeholder collaboration or bring this under an existing industry organization.
- Industry and interest groups embrace the new system or abolish their network and activities

Which policy instruments can be applied?

Category	Build up	Build down
Organisation & coordination	• Support the development of new industry and interest groups • Institutionalize sector collaboration in formal industry associations	
Support		• Organizing new monitoring and supervision functions, for example by setting up or designating an authority to monitor compliance

The AWTI developed this guideline in a number of steps. The council started with a literature study into types of policy instruments, policy mixes and models and concepts for analysis of transformations and policy interventions. This literature study provided tools to categorise types of policy interventions and instruments and to link these to development phases and processes in transformations.

We then made an inventory of policy instruments that are currently used by the central government to stimulate research, development and innovation (generic instruments) and instruments that specifically stimulate and facilitate the energy transition or the agrifood transition (specific policy instruments for research and innovation and sectoral policy). Based on the insights from the literature study, the policy instruments were labelled and classified into different Categorys, such as the policy objective (for example, stimulating knowledge development or market creation), the type of policy instrument (for example, subsidy, tax reduction or regulation), the policy domain (science, innovation or sectoral) and at which phase in research and innovation the instrument is used (for example, fundamental research or demonstration).

The council wanted to offer concrete tools for developing a transformative policy mix. That is why, based on the literature study, we opted for a concrete analysis model and worked out two cases. There are several models and concepts to analyse and shape the thinking and doing in transformations. The guideline builds on the TransMission model. The model distinguishes five different phases in transformations. Five key processes play a role in this. These must be organised properly in a transformation. According to the AWTI, the TransMission model combines insights from several transition concepts and offers useful tools for reflecting on the policy mix for transformation tasks. See **Policy formulation: In search of an effective policy mix** for more information on the TransMission model.

The TransMission model can help determine who should do what and in which phase of a transformation. What is still missing in this model is which policy instruments can be used by the government. That is why we have compiled a policy matrix. This policy matrix provides insight into which instruments can be used and when. In doing so, it offers a range of possibilities and considerations for policymakers to arrive at a transformative policy mix.

The content of the policy matrix is based on the TransMission model and supplemented with insights from other documents, including the work of the OECD[91] and academic literature[92]. In addition, we have supplemented the matrix 'bottom-up' with examples of types of instruments and actions that come from our own inventory of policy instruments.

For this guideline, AWTI worked together with NewForesight and the Transmission Institute to develop the policy matrix and map out a number of cases. They provided feedback on the developed policy matrix and supplied material for two case studies that had previously been developed using the TransMission model: a case study on the protein transition and a case study on climate-neutral greenhouse horticulture.

The case studies focus on transformations that are in different phases and also differ in scope:

- **Protein transition:** The current level of production and consumption of animal proteins contributes greatly to the major challenges we face around health and around the environment. Change is necessary: the protein transition involves the transition to a healthier and more sustainable ratio of plant-based and animal proteins. The 'protein transition' is not one transition. Rather, we see three 'partial transitions' in the Netherlands; each is in a different phase. The three partial transitions are: the consumption-oriented transition to a food environment that

simulates a ratio of at least 60/40 plant-based/animal proteins; the transition to more plant-based production of protein-rich crops; and the shift in the meat and dairy sector to less protein production and an animal-friendly and more sustainable production of animal proteins.

- **Climate-neutral greenhouse horticulture:** Greenhouse horticulture has a significant impact in terms of energy consumption and greenhouse gas emissions. The ambition is for the sector to produce climate-neutrally by 2040. The cultivation of vegetables, fruit, flowers and plants in Dutch greenhouses must be climate-neutral by 2040 thanks to a combination of energy savings and the use of renewable energy and CO2. Climate-neutral greenhouse horticulture switches to a combination of renewable energy sources for heat, uses fully sustainably generated electricity, saves energy and obtains the required CO2 from external sustainable sources and the outside air. These different components are each in a different phase and each have their own challenges.

The application of the policy matrix in the case study is not intended to provide a complete overview but is intended to illustrate and inspire. The cases show how the policy mix can differ over time and between transformations, how this relates to existing policy and which questions this raises with the current approach. The elaboration of these cases is included in a **separate document.**

91 OECD (2024c); OECD (2024a); Larrue, P. (2021); https://stip.oecd.org/moip/
92 Including: Kanger et al. (2020); Haddad et al. (2022); Kivimaa and Kern (2016).

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